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Conservation, development and logistical support: How are these three functions incorporated in Austrian Biosphere Reserves?

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Abstract

There are four UNESCO biosphere reserves (BRs) in Austria representing different bio-geographical regions. As members of the World Network of Biosphere Reserves (WNBR), they function according to the Seville Strategy of 1996 and are intended to fulfil three complementary functions: conservation, sustainable development and logistical support. This article aims to give an overview of the manifold initiatives taking place in Austrian BRs which reflect the complexity of the landscapes and the people living there.

Figure 1 – Carinthian part of BR Salzburger Lungau and Kärntner Nockberge © BR Nockberge Franz Gerdl

Introduction

UNESCO's Man and the Biosphere Programme (MAB) aims to preserve characteristic habitats of cultural landscapes and their biodiversity while achieving sustainable regional development from an economic and socio-cultural perspective and facilitating environmental and sustainable development education. On-site managers responsible for Austrian BRs pursue these goals in regions which include both protected areas and other spatial entities which are not conventional protected areas (see Reed & Price 2019). This requires participatory governance, that is involving local people in decisions concerning the BR (Pütz & Job 2016), and combining different types of knowledge, e.g. local and traditional as well as scientific knowledge, to promote the integration of natural and social sciences (Kjellqvist et al. 2019). The existing Austrian BRs have been implemented according to the *Seville Strategy for BRs* and *MAB Statutory Framework of the World Network of BRs* (UNESCO 1996), known as the Seville Strategy, a document which names the three connected functions of BRs: conservation, development and logistical support. This conservation and development concept was intended to facilitate the protection of valuable natural and cultural landscapes while also meeting the requirements of the people living in those landscapes (Köck & Arnberger 2017). In this article we present various projects in Austrian BRs in which these three objectives are implemented.

Development of the MAB programme in Austria

In Austria, the MAB National Committee (MAB-NC) was established as early as 1973 (Köck & Grabherr 2014). It represents the national network of BRs in Austria and is the link to the MAB Secretariat at UNESCO Headquarters in Paris. The international guidelines of the Seville Strategy of 1996, the Madrid Action Plan 2008–2013 and the MAB Strategy 2015–2025 were incorporated into the Austrian criteria published by the Austrian MAB-NC in 2006, which were revised in 2015. Until 2014, Austria had a total of seven BRs. However, the MAB-NC decided to remove four of them from the World Network of Biosphere Reserves because of their non-compliance with its Statutory Framework (Köck & Arnberger 2019). In 2000, the first BR established to function according to the Seville Strategy was BR Grosses Walsertal (BRGW), followed in 2005 by Wienerwald (BRWW), and in 2012 by Salzburger Lungau and Kärntner Nockberge (BRSL&KN). In 2019, BR Unteres Murtal was approved as Austria's contribution to the 5-country transboundary BR (Austria, Slovenia, Croatia, Hungary, Serbia) along the Mura-Drava-Danube corridor.

Study areas

The four Austrian BRs cover different bio-geographical regions and vary in size, number of inhabitants, altitude, history and demography (see Table 1). Additionally, the planning and management processes in the BRs differ according to the size of the BR, and to the stakeholders and municipalities involved (see Jungmeier et al. 2011). The BRs have three, or sometimes four, defined areas: the core zone, which serves conventional nature conservation in a way similar to

Table 1 – Main characteristics of the Austrian BRs (Braun et al. in print; Austrian National Committee of the Man and the Biosphere Programme 2018). ca – core area; ba – buffer area; ta – transition area

Biosphere reserve	Classification of natural areas	Area [ha]	Inhabitants	Municipalities involved	Range [m]	Natural environment character
Großes Walsertal	Northern Alps	ca: 4010 ba: 2824 ta: 12366	3400	6	580 to 2704	- alpine cultural landscapes - meadows with high biodiversity - alpine grasslands, ravine forests, wetlands
Wienerwald	Pannonian plains and hills / Central Alps	ca: 5442 ba: 32571 ta: 66991	855000	51 in Lower Austria; 7 districts of Vienna	160 to 893	- sub-Mediterranean beech forests - pine forests with endemic Austrian pine (*Pinus nigra*), and downy oak forests (*Quercus pubescens*) - extensive meadows and pastures - traditionally managed semi-natural dry grasslands - old-growth vineyards and orchards, fields (cereals, potatoes) - dense system of rivers and watercourses - small landscape elements
Salzburger Lungau & Kärntner Nockberge	Central Alps	ca: 8192 ba: 55235 ta: 86173	34000	15 in Salzburg; 4 in Carinthia	600 to 3078	- alpine agricultural landscape - alpine meadows, bog complexes, deciduous forest (up to approx. 1400 m), arable fields, coniferous forest (up to the tree line at 1950 m), dwarf shrubs and lichen at high altitudes - traditionally managed alpine pastures - characteristic plants: *Pinus cembra*, *Valeriana celtica* ssp. *norica* - mountain lakes and mountain streams
Untere Mur	South-eastern Alpine foreland	ca: 200 ba: 1891 ta: 11089	10099	4	198 to 289	- river landscape with adjacent riparian forests - soft and hard floodplain forests, depending on the water regime - agricultural landscape units with corn, soybeans, millet and cereals, and crops such as pumpkin, wine or fruit

national parks; buffer zones, in which ecologically sustainable activities are permitted, and transition areas, in which the local population lives (Biosphärenpark Österreich 2020). BRGW also has a fourth area, the regeneration area, which may be revitalized in the future.

Presentation of the BRs' 3 functions

Selected examples of projects show how the three functions are incorporated by Austrian BRs. Since BR Unteres Murtal was established only in 2019, only one BR-specific activity has been implemented there.

Function 1: conservation

Ecosystem processes that take place in nature contribute to economic growth, and to the health and wellbeing of the local population. One focus of BRs is on ecosystems that are either unaffected by human intervention, or which exist only because of human-nature interactions.

In BRWW, the conservation function is most evident in the 37 core areas, which are exclusively forests representing the natural vegetation (see also Köck et al. 2009). These core areas are under strict nature conservation regulations in order to allow the primeval forest to grow without human intervention. In the core and buffer areas, a monitoring programme collects basic data of the natural environment (see also Drozdowski & Mrkvicka 2014). Throughout BRWW, there are many initiatives involving landowners and volunteers. These include the *Biosphere Volunteers* project, in which volunteers remove vegetation to reduce the impact of shrub encroachment and thereby preserve dry grasslands; a fruit tree campaign, which funds owners of agricultural land to plant heritage varieties and to increase meadow orchards which are rich in biodiversty; other BR projects aim to restore habitats of endangered animals such as the Corn Crake (*Crex crex*), the Ural Owl (*Strix uralensis*),

The federal government granted support for costs and loss of income resulting from compliance with nature conservation requirements (AMA 2015). The project itself ended in 2018 but its continuation is enshrined in BRGW's mission statement.

Function 2: development

In BRs, the protection of biodiversity together with economic, social and cultural aspects should ensure sustainable regional development. Sustainable regional development requires the conservation of natural resources for economic use and development. In addition to the UNESCO guidelines, a BR needs inhabitants with ideas to support the BR management (Diry 2014). A good example integrating municipalities, stakeholders and the public is the project *Future Concept*, which created a *roadmap* for BRWW for the next 10 years. The issues identified by the participants are nature conservation activities, regional development, education and public relations (Biosphärenpark Wienerwald Management GmbH 2013).

A wide range of initiatives have recently been developed in BRs to encourage the sustainable production, processing and marketing of regional food. The involvement of suppliers of regional products and services and cooperation with local companies are important for the BR regions (see Mose & Weixlbaumer 2019). The Carinthian part of BRSL&NK established a quality seal to promote local and innovative products and to guarantee landscape protection (Biosphärenpark Nockberge 2019). The BRGW management also creates incentives for sustainable agriculture by supporting farmers to become BR partner companies. It then helps to sell the products in the BR shop – which also offers products from BRWW and BRSL&KN

Figure 2 – Biosphere Reserve Wiener Wald © BPWW / L. Lammerhuber

– or via local supermarkets. The *Walserstolz*, *Bergholz* and *Alchemilla* initiatives sustainably produce cheese, furniture and herbs respectively. But not all initiatives are implemented as successfully. The online platform *Walser Kostbarkeiten*, which was initiated by the BRGW management to promote regional products, was insufficiently supported by consumers and producers, probably due to the prior existence of other well-functioning networks. The regional planning association is currently working on a regional strategy to strengthen the circular economy in the BRGW by evaluating existing networks. The aim is to establish alternative models to increase the consumption of regional products.

In 2005, the BRWW started a farming project with the aim of preserving meadows and pastures through cooperation between farmers, butchers and catering businesses. The predominantly part-time farms were able to produce high-quality meat while respecting the interests of nature conservation. Small-scale farming could be maintained through the secured sales of agricultural products. Unfortunately, after a successful start, the project alone could not meet the high from butchers and catering businesses.

Ecotourism aims to deliver sustainable development through nature conservation and regional development (Hoppstadius & Dahlsträm 2015; Weixlbaumer et al. in press). According to the Austrian criteria for BRs, nature-oriented tourism and gentle leisure use are possible in the core areas, provided they are compatible with the protection goals. The BRs in Austria face various challenges, in particular due to their location: BRGW is situated in a remote area, whereas BRWW is close to Vienna, the largest city in Austria. How visitors are managed therefore differs between the BRs. In BRWW, for example, the platform for mountain biking serves as a communication tool between various interest groups (see Köck & Brenner 2015). The platform's aim is the development of the existing trails in BRWW to create a contemporary, nature-compatible, legal mountain bike network based on attractive sustainable routes and contractual solutions.

In 2018, with the participation of the local population, BRGW developed a revised mission statement which describes two important topics of sustainable tourism for the area: deceleration and climate change. The Grosses Walsertal also has a ski resort in Faschina, which wants to promote the ski industry further, and is considering an alliance with Damüls in the Bregenzerwald outside the BRGW. The Regional Development Plan 2019, which was drawn up with the participation of the BR, recognizes that the BR's mission statement is binding but that an association between the two ski areas, combining the different touristic concepts, should also be possible (REGIO Großes Walsertal 2019). There are also alliances between the tourism association Alpenregion Bludenz and the BRGW management, who defined criteria for BR partners in the tourism industry, such as restaurants and hotels, to promote the BR concept.

One of the main economic sectors in the Carinthian part of BRSL&KN is tourism. Together with landowners and representatives from tourism, the BR management of the Carinthian part of BRSL&KN initiated a visitor guidance project for sensitive habitats of various animal species, including red deer (Cervidae), chamois (*Rupicapra rupicapra*), capercaillie (*Tetrao urogallus*), black grouse (*Lyrurus tetrix*), ptarmigan (*Lagopus* sp.), and the stone hen (*Alectoris graeca*). Additionally, suitable routes to be used for recreation were drawn up. The aim of the project is to develop a framework to guide leisure and tourism activities in this part of BRSL&KN while avoiding disturbing wildlife (see Besucherlenkung im Biosphärenpark Nockberge 2019). A further example of tourist infrastructure is the Nockalm Road, a route running through the core area of the Carinthian part of BRSL&KN. As around 200 000 people use the road in the months from May to October, discussions about air and noise pollution are frequent.

One aspect of sustainable development is clean energy. The Austrian MAB-NC published a position paper for the use of renewable energies in Austrian BRs. BRGW has already made efforts in this respect and is an eco-electricity export region with both small hydropower plants and a photovoltaic plant. It belongs to the e5 network of energy-efficient municipalities and is the only e5 *region* in Austria. The seven schools in the valleys have been awarded the eco label and are energy efficient. Another aspect is mobility within the regions. In the Carinthian part of BRSL&KN, a call-and-collect, demand-focused taxi service has been established as a green alternative to the car for locals and guests (Nockmobil 2020).

Function 3: logistical support

Education for sustainable development is one of the major goals of BRs. It covers global interrelations and challenges such as climate change, conservation of biological and cultural diversity, global justice, and

the complex economic, ecological and social causes of these problems. Forward-looking thinking, interdisciplinary knowledge, independent action and participation in decision-making processes are the design and action skills that are taught (Braun et al. in press).

Educational work in schools also reaches parents and grandparents alike and offers a good introduction to education for sustainable development and energy management, as well as specific, fundamental, BR-related content. The Carinthian part of BRSL&KN developed an ambitious school project that comprises three steps: i) BR rangers visit schools with the mobile exhibition *Smart Fox on Tour* to explore flora, fauna and the geological features of the region; ii) programmes for school trips, hiking days and project weeks; iii) schools are designated as BR schools in which the topic of BRs is included in the timetable. The Carinthian part of BRSL&KN claims only limited success in involving the local population and those responsible in the municipalities in the further development of the BR. Greater involvement would, of course, contribute a great deal to the creation of an understanding of, and an identity and enthusiasm for, the BR. The school project could help to involve more people in the BR idea. BRWW's management also engages with schools through other initiatives, e.g. the *Biosphere Reserve Game*, to deepen understanding of BRs and of sustainable development. In addition, the BRWW management offers its partners in agriculture, education and tourism a varied educational programme. Another interesting project is *Enjoy Diversity*, which involved students from culinary schools as multipliers for the concept of BRs. Young students from BRWW and BRGW were asked to document the value of biodiversity in their immediate environment through the use of edible wild plants in cooking. The recipes were published in a cookery book and promoted in various restaurants to reach as many people as possible (Köck et al. 2013, 2019). In June 2019, RIVER'SCOOL was established in the Unteres Murtal BR, a cross-border network of outdoor learning centres for school classes, local stakeholders and tourists along the Mura, Drava and Danube rivers. RIVER'SCOOL not only communicates the natural values of the river landscape, but also addresses the problems and challenges of protecting the so-called *Amazon of Europe*.

Ensuring that biodiversity becomes a mainstream topic in education and learning is one of the priorities of BRs (UNESCO 2017). This is reflected in many projects within Austria's BRs. BRGW's management encouraged municipalities to sow seeds from species-rich meadows in community areas and held workshops on how to maintain these areas. Given the low acceptance rate among some residents, since these seeds included not only flowering plants but also grasses, the BR's management attempted to communicate the importance of the project through channels like the BR journal *talschafft* with articles such as "*Not everything has to be tidy!*". The original project has come to an end

Figure 3 – Biosphere Reserve Großes Walsertal © Monika Bischof

but will be continued with: i) workshops for people with private gardens; ii) schools where flowering boxes should teach pupils about biodiversity, protection of insects, and the provision of food sources; iii) decimation of invasive neophytes during a day of action involving assigning volunteers in each community. The largest outdoor research event in Austria is the Geo-Biodiversity Day, in which BRWW and BRSL&KN regularly participate. Scientists volunteer for a 24-hour species search. The outcomes add to the research data and are published as an information booklet. Within the Slovenian-Austrian Interreg programme, the Balance for Nature and People (BANAP) project seeks to maintain biodiversity in a time of climate change, and to create a handbook and an action plan on the topic (Interreg Slowenien-Österreich 2020).

BRs stand for the harmonized management and conservation of biological and cultural diversity, and for economic and social development based on local community efforts and sound science (Schaaf & Clamote Rodrigues 2016). In order to achieve this goal, MAB Austria, funded by the Federal Ministry of Education, Science and Research, finances scientific projects within the country's BRs.

In response to UNESCO's MAB Strategy and the Lima Action Plan, BRs are supposed to build partnerships with universities and other research institutions to establish research, training and practical learning opportunities. BRGW and the Carinthian part of BRSL&KN have successfully established formal cooperation agreements with Austrian Universities, for example between Alpen-Adria University in Klagenfurt and the Carinthian part of BRSL&KN, which together created the SCiENCE_LINKnockberge project. The project's aim is long-term, systematic bridge-building between excellent international research and the living reality of the BR region.

Conclusion

Austrian BRs are living laboratories for sustainable regional development. They try to involve local residents in projects, but sometimes compromises have to be made in relation to objectives. Being embedded in an international network and national guidelines certainly help BRs to navigate the complexities of their tasks, but each region has to act according to its specific characteristics.

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