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The Relevance of Effective Protected Areas for Biodiversity Conservation: An Introduction

Susanne Stoll-Kleemann, Hubert Job
Guest Editors of the Special Issue

Protected areas are an important means of preserving biodiversity. This special issue investigates different ways of effectively managing protected areas. The ideal of undisturbed nature must be reconciled with people's need to use natural resources.

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Protected Areas: Management Matters

In an outline of the status quo of the world's ecosystems, the *Millennium Ecosystem Assessment (MEA)* states that "human activities have taken the planet to the edge of a massive wave of species extinctions, further threatening our own well-being" (MEA 2005). The scientists involved in the *MEA* therefore recommend safeguarding biological diversity as the basis for the biosphere that allows us to live, to fight poverty, and to support the improvement of human well-being. Protected areas are seen as the most promising and effective response strategy to fight biodiversity loss (MEA 2005).[1]

The *Convention on Biological Diversity (CBD)* states in article 8(a) and 8(b) that a system of protected areas forms a central element of any national strategy for the conservation of biological diversity. Protected areas currently cover more than twelve percent of the total terrestrial surface worldwide.[2] The *CBD's* 2010 target envisages to halt (within Europe) or at least to significantly reduce (outside Europe) the loss of biodiversity by 2010. To achieve this, management effectiveness evaluations of protected areas are vital and make it possible to assess the status of the so-called "paper park crisis". The term "paper park" refers to the designated protected areas which have turned out to exist exclusively "on paper" while failing to achieve their conservation objectives. The reasons for insufficiently operating protected areas lie in for example the fact that these sites are not adequately supported by their host nations in terms of legislation, policy-making and financing. Their management structures are often incomplete and lack the capability to establish and implement an effective management plan.

International Protected Areas Types and Categories

Protected areas are hugely variable in their size, purpose, management effectiveness, and the supporting political and legal infrastructure provided by their host nation, as well as financing, research, and monitoring.[3] Each protected area needs to go

Contact: *Prof. Dr. Susanne Stoll-Kleemann* | Ernst Moritz Arndt University of Greifswald | Department of Geography | The GoBi research group | Friedrich-Ludwig-Jahn-Str. 16 | 17487 Greifswald | Germany | Tel.: +49 3834 864680 | E-Mail: susanne.stoll-kleemann@uni-greifswald.de

Prof. Dr. Hubert Job | Julius-Maximilians-Universität Würzburg | Institute of Geography | Würzburg | Germany | E-Mail: hubert.job@uni-wuerzburg.de

1 In this special issue we employ a broad understanding of protected areas much like the majority of the literature on the subject. From our understanding, the term includes protected areas as defined by IUCN – The World Conservation Union, national governments, supra-regional institutions such as the *EU Habitats Directive (EU Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora)* or the Natura 2000 Network of the European Union, and ultimately UNESCO biosphere reserves, as they contain strictly protected parts (mainly the core zones) and sustainably used parts in the buffer and transition zones. In general, IUCN defines a protected area as "an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means" (IUCN 1994).

2 Marine and freshwater areas are massively neglected: only about 0.5 percent of the world's sea surface and approximately 1.5 percent of all lake systems are protected.

3 See the *UNESCO MAB Biosphere Reserves Directory* at: *www.unesco.org/mabdb/br/brdir/directory/database.asp*

through an assignment process in order to officially receive a label from the IUCN – The World Conservation Union. From the more than 117 000 protected areas worldwide, over 60 percent are classified under the IUCN system (Lockwood 2006). IUCN has defined a series of six protected area categories based on the primary management objective (see table, p. 88).

Each country usually has its own legally established category system for protected areas (Lockwood 2006). Biosphere reserves were recognised as a protected area category in the first categorisation system by the IUCN in 1978, but were excluded from the list in the revised version from 1994. This was based on the argument that biosphere reserves do not follow the primary goal of biodiversity protection.

Today, the functions of protected areas are regarded much more in their social context and frequently include activities that seek to enhance local livelihoods to the greatest possible extent. In such, *a paradigm shift* has taken place after a decade of discussion as to how far biodiversity can be maintained by placing either ecology or people first in protected area management. The "ecology first" perspective is based on the protection of nature by the exclusion of people. The new paradigm, the "people first" perspective, looks to a direct cooperative relationship between the integrity of ecosystems and the sustainable livelihood of local people (O'Riordan and Stoll-Kleemann 2002). The claim is that biodiversity protection through protected areas relies on empathetic local management for its continuance. Local acceptance is maintained best through mechanisms that also support local economies, such as tourism.

Biosphere Reserves: Integrating Sustainable Development with Biodiversity Conservation

UNESCO launched the *Man and the Biosphere (MAB) Programme* in 1970 as a long-term intergovernmental and interdisciplinary endeavour that focuses on research, training, monitoring, education, and pilot projects. It is meant for searching for trade-offs and a balance between the human responsibility to maintain nature on the one hand, and the human need to use natural resources for enhancing the social and economic well-being of people on the other hand. The concept of biosphere reserves has been developed within the framework of the *MAB Programme* and has resulted in the designation of currently 531 sites in 105 countries (February 2008). Biosphere reserves are conceived as a worldwide network of representative landscapes, with the primary goal of serving as learning sites for information exchange on conservation and sustainable development. According to the *Seville Strategy* (UNESCO MAB 1996), biosphere reserves are expected to fulfil three main functions:

1. in situ conservation of natural and semi-natural ecosystems and landscapes,
2. setup of demonstration areas for sustainable use, and
3. logistic support for demonstration projects, research, monitoring, environmental education, and training.

These functions are implemented through a zonation system including one or more core areas (strict protection), buffer zones (sustainable management), and transition areas that can extend beyond the territory where cooperation for sustainable development with local people can be organised (UNESCO MAB 1996).

In the latest official documents adopted by the *Madrid Declaration* (UNESCO MAB 2008a) and the *Madrid Action Plan* (UNESCO MAB 2008b) at the *3rd World Congress of Biosphere Reserves*, the potential for action of biosphere reserves to address new challenges has been discussed. In particular, "the loss of traditional knowledge and cultural diversity, demography, loss of arable land, climate change, biodiversity and sustainable development; and, in particular, as places for investments and innovation to mitigate and adapt to climate change, to promote the greater use of renewable energy in sustainable futures of rural and urban areas and to enhance and capitalise upon ecosystem services and products in sustainable development for human well-being" (UNESCO MAB 2008a). These documents emphasise that participatory and good management approaches, allowing multiple stakeholders to be an integral part of biosphere reserves, manifest themselves in effective partnerships through cooperation across all governmental >

Wolf tracks are useful means for monitoring wolf-environment relationships in many protected areas.

TABLE: Protected area categories of the IUCN – The World Conservation Union (IUCN 1994).

category	definition
Ia Strict Nature Reserve	Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.
Ib Wilderness Area	Large area of unmodified or slightly modified land and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.
II National Park	Natural area of land and/or sea, designated to a) protect the ecological integrity of one or more ecosystems for present and future generations, b) exclude exploitation or occupation inimical to the purposes of designation of the area, and c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.
III Natural Monument	Area containing one or more specific natural or natural/cultural feature which is of outstanding or unique value due to its inherent rarity, representative or aesthetic qualities, or cultural significance.
IV Habitat/Species Management Area	Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.
V Protected Landscape/Seascape	Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to such an area.
VI Managed Resource Protected Area	Area containing predominantly unmodified natural systems, managed to ensure long-term protection and maintenance of biological diversity, while simultaneously providing a sustainable flow of natural products and services to meet community needs.

Yellowstone National Park with its famous geysers attracts more than four million visitors per year.

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levels, the private sector, mass media, civil society organisations, indigenous and local communities, research, monitoring and education centres. In such, biosphere reserves can be regarded as forums for involving people and generating new ideas to solve local problems and work toward a dynamic, mutually beneficial relationship between man and nature (UNESCO MAB 2008a, 2008b).

Biosphere reserves' integrative approach to biodiversity management is increasingly being applied in various other types of protected areas. This is reflected, for instance, in the rising number of national parks having a clearly defined buffer zone in which management activities are implemented to support environmental education, sustainable resource use, and poverty alleviation.

Conclusions

In the world of protected areas expectations run high. They are supposed to be the repositories of nature. They are planned to provide viable livelihoods for those who live and work in them, which includes alleviating poverty and generating facilitating good health. They are designed to be laboratories of research and education. They are regarded as the benchmarks of how the human race should learn to live within nature's envelope (Succow and Jeschke 2008). And they are faced with the challenge of working with the needs of all those who have a stake in their purpose and wealth-creating opportunities.

It is, however, questionable whether these expectations can be met and to what extent the described quantitative increase in protected areas matches their qualitative performance. To answer these questions, both the driving and hindering factors that determine the successful co-existence of conservation goals with sustainable development approaches are analysed in this issue.

Purpose and Overview of the *GAIA* Special Issue

In light of the upcoming *9th meeting of the Conference of the Parties to the CBD* in May 2008 in Bonn, we are convinced that discussing the role of protected areas as an important instrument of biodiversity management (protection and sustainable use of biodiversity) is timely and appropriate.

This special issue of *GAIA* deals with conservation and the sustainable use of biodiversity through protected area management. In this context, ***Wolfgang Haber*** gives a critical overview of the different natural dimensions of the biodiversity concept. ***Ludwig Ellenberg*** discusses different failure factors in protected area management, with a particular focus on developing countries. ***Frauke Fischer*** challenges the paradigm of "people first" protected area management, arguing in favour of a strict law enforcement approach. ***Jeffrey A. McNeely*** draws our attention to population growth especially in the hotspots of biodiversity and suggests how protected areas can play a role in addressing this challenge. ***Hermann Lotze-Campen et al.*** propose an integrated socio-ecological monitoring system that integrates regional case studies from various spatial scales taking biosphere reserves as coherent monitoring sites. ***Rainer Schliep et al.*** emphasise the importance of the individual risk perception of protected area managers for the development of climate change adaptation strategies. ***Marion Mehring and Susanne Stoll-Kleemann*** evaluate major threats to forest biosphere reserves. ***Thomas Hammer and Dominik Siegrist*** introduce success factors of protected area tourism in the Alps. ***Hubert Job*** discusses the regional economic impact of tourism in German national parks. ***Irene Ring*** examines the idea of compensating municipalities for protected areas through fiscal transfers. ***Susanne Stoll-Kleemann and Martin Welp*** analyse to what extent participatory and integrated management of biosphere reserves is implemented in practice. Finally, ***Nadine Fritz-Vietta and Susanne Stoll-Kleemann*** highlight how stakeholders in Madagascar can foster a biosphere reserve's organisational capacities within a collaborative network.

BOX:

The *Governance of Biodiversity Research Project (GoBi)*

The *GoBi* research group evaluates and analyses success and failure factors of protected area and biosphere reserve management and governance approaches. In particular, the research group assesses the circumstances where meeting ecological imperatives requires robust management measures that empower local populations and respond to the challenges of global change impacts.

The results are based on a broad range of different quantitative and qualitative data sets. These consist of:

- a comprehensive literature review,
- 13 case studies in nine countries,
- a meta-analysis of about 165 cases drawn from this literature, and
- more than 170 detailed expert interviews.

A *Factor Evaluation Sheet* was further handed out to experts and a *global telephone survey* was conducted with 213 biosphere reserves in 78 countries. The collected data covers management as well as legal, institutional, social, economic, and ecological aspects.

The *GoBi* research group is constructing a *Protected Area and Biosphere Reserve Management Knowledge Base*. This database will provide benchmark case studies exemplifying applied practices while demonstrating tools for the management, monitoring, and evaluation of protected areas.

MORE INFORMATION: *www.biodiversitygovernance.de*
CONTACT: *Prof. Dr. Susanne Stoll-Kleemann,*
E-Mail: susanne.stoll-kleemann@uni-greifswald.de

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Susanne Stoll-Kleemann

Born 1969 in Weinheim, Germany. 1999 PhD from TU Berlin. Since 2008 Professor and Chair of Sustainability Science and Applied Geography at the Ernst Moritz Arndt University of Greifswald. Leader of the *GoBi (Governance of Biodiversity)* research group. Previously positions at Humboldt University of Berlin, at the Potsdam Institute for Climate Impact Research and the Swiss Federal Institute of Technology (ETH) in Zurich.

Hubert Job

Born 1958 in Landau/Pfalz, Germany. Studies in geography at the University of Trier. PhD as well from University of Trier. Recently appointed Full Professor of Geography and Regional Science at Julius-Maximilians-Universität Würzburg. 2000 to 2008 Associate Professor of Economic Geography at Ludwig-Maximilians-Universität München. Numerous publications related to geography of tourism and recreation, protected area management and regional science.