

RESEARCH, MANAGEMENT, AND MONITORING IN PROTECTED AREAS

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Contents

1. Introduction
 2. Research in protected areas
 3. Natural Ecology
 4. Human Ecology
 5. Integrating natural and human ecology
 6. Management of protected areas
 7. Monitoring in protected areas
 8. Conclusion
- Glossary
Bibliography
Biographical Sketches

Summary

This chapter outlines the relevance of research, management, and monitoring in protected areas worldwide. Concerning research, two principal types of investigation projects are considered important for protected areas: research carried out to directly support management of the specific site and research addressing general conservation goals or knowledge improvement. For both types of projects, the most important management implications are outlined. Following brief overviews of natural and human ecology issues in protected areas, the principal interactions of both are presented in a graphic scheme.

Furthermore, a common rationale for the management of different categories of protected areas is presented and illustrated with examples for two types of administration—areas managed by an administrative authority and areas managed by the inhabitants themselves.

Monitoring in protected areas is essential to assess management success. Goals for monitoring in protected areas are outlined, general implications of these goals for monitoring approaches are given and translated into recommendations. They are illustrated with examples of worldwide and site-specific monitoring programs.

1. Introduction

The category of protection given to an area, as outlined in *Selection, Categorisation, Size and Zoning in the World's Protected Areas* and *Protected Areas and Endemic Species*, strongly reflects the emphasis given to different conservation activities by the responsible authorities. Research, management, and monitoring belong, besides law enforcement, to the most important fields of action. Commonly, these tasks are not carried out by the responsible authority alone, but in co-operation with partners such as universities, scientific research institutions, or other agencies. The need for close co-operation alone calls for a continuous planning and evaluation process, which should accompany the declaration and management of any protected area. In most countries, a broadly discussed management plan is the tool of first choice to bring together all interest groups and to discuss the different options of further development. The interests and options are then formulated in guidelines and action plans. Research, management, and monitoring are complementary tasks, which are ideally carried out under a common rationale and in intensive interaction. Unfortunately, until today these tasks have been carried out only in a minority of protected areas. All three tasks are rare in most of the protected areas throughout the world, which are usually small in size and lack any protective measure save their legislative protection as listed in a gazetteer. Only the internationally more important protected site categories attract enough attention for regular management. Even less frequent are precisely planned monitoring schemes and research.

Research, monitoring, and management play a complementary role in the conservation of protected areas. The role of research is to solve problems concerning the effective conservation of protected areas, and to answer new questions arising in the course of the management of such areas. In contrast, monitoring permits assessment of whether a protected area achieves its conservation goals under current management (including doing nothing), and to assess the success or failure of a particular management plan. Furthermore, protected areas are preferred reference locations for regional, national, and international monitoring programmes, which aim at the detection of environmental change.

In this contribution, we outline the roles that research and monitoring could play in the effective conservation of protected areas and their biodiversity, and which questions need to be addressed by research and monitoring as part of an adaptive management strategy.

2. Research in Protected Areas

Research can play an important role in the protection of sites and their biodiversity, but not all research carried out in protected areas serves this role. Research in protected areas can be divided into two groups according to its goals. The first group comprises research that is carried out to support management and to solve problems in the conservation of protected areas. The second group covers research that simply aims at a better understanding of natural and human-mediated processes, without necessarily having any applied conservation goals. Research with general conservation goals that are not directly related to the conservation, monitoring, or management issues of the

protected areas also fall within this latter category. In this chapter, we will concentrate on research that addresses management and/or monitoring issues of protected areas, but will first briefly comment on the research that falls into the second group.

Research in protected areas should always be accompanied by appropriate research plans that clearly outline goals, methods, field and laboratory activities, involved staff, and the duration of the study. Access to research results and field data provided to the area authority should be unconditional as soon as they are published. For data which form part of long-term ecological research (LTER) or which are not conclusive enough to allow publication, access should be agreed even before or without publication. If not published in one of the major world languages, translation of the most outstanding results is obligatory for any researcher.

2.1. Research Not Related To the Conservation of Protected Areas

The choice of protected areas for research that does not address the conservation of the protected area is mainly motivated by advantages that protected sites can confer to research. Large protected areas frequently show much less human impact on biodiversity and natural processes than is the case in small or unprotected sites. Thus, large reserves may provide the only suitable sites for research projects that aim to understand natural processes. Likewise, they can provide suitable reference sites against which changes in biodiversity and ecosystem processes in unprotected landscapes can be evaluated. In addition, the choice of protected areas for research may be motivated by the fact that they often are more convenient for research than unprotected sites. This advantage may accrue from higher safety from inadvertent, malevolent, or land-use related human interference with a research project. Also, infrastructure available for management may be beneficial for research and vice versa. Although it may be time-consuming and tedious to obtain the permits required to carry out research in protected areas, this often is less of a disadvantage than the costs involved in paying private landowners for the guarantee of a constant land management scheme that does not interfere with the research objectives.

Some conservationists and managers reject any research in protected areas unless that research directly contributes to the solution of specific management problems. However, we argue that a wider perspective should be taken when considering the justification of selecting protected areas for research that does not directly address conservation issues of the reserve. First, it should be considered whether there is a risk of a particular research project interfering with the conservation goals for the protected area. If such a risk can be definitively excluded and good arguments can be put forward for the selection of a protected area as a study site; there should be no objection in principle to research in a protected area. If risks to the conservation goals or interference with management procedures are associated with a research project, one needs to carefully weigh the potential risks against the benefits that accrue from conservation in general. For example, will the research contribute to the solution of pressing conservation issues outside the protected area? How does it contribute to an understanding of ecological processes that improves our background knowledge for effective management and conservation? In our opinion, research is justified in protected areas, if such benefits outweigh potential risks.

2.2. Research Addressing Conservation Issues within Protected Areas

The type of research carried out and the role given to research in protected areas has been strongly influenced by the philosophy behind the declaration of protected areas. The earliest protected areas received their status because of religious beliefs or as monuments of national identity. For the conservation of such areas, research within protected areas has no role to play and may even be counterproductive in disturbing the mythology that may be the driving force for the protection of an area. However, research outside the protected area nevertheless may be very important for the management of the area. This is especially the case for regulating access of visitors to the whole park or parts thereof. Research also can contribute essential cultural knowledge for information and education of visitors.

Many national parks and biosphere reserves owe their existence to a philosophy that is closely related to mythology. Even so, this frequently remains overlooked: land untouched by civilisation (wilderness) and spectacular nature (scenery) should be protected because of the intrinsic value of nature. Advocates of wilderness argue that such protected areas should be left untouched by man as much as possible and that access should be strongly limited and allowed only when it can be guaranteed that visitors do not leave any trace of their visit. Under such a philosophy, research again does not really play a role in the conservation of protected areas. Ironically, however, few protected areas that owe their creation to this philosophy are actually run as true wilderness areas. On the contrary, their attraction and recreational capacity has caused human demand for access, leading to the situation that the wild nature of these protected wilderness areas is strongly managed and planned. As a consequence, the role of research for protected wilderness areas does not differ principally from the role research plays under the multi-purpose objectives that are characteristic of most of the larger protected areas of today.

Research in protected areas usually fulfils one of three purposes: Most frequently, research is carried out to understand the ecology of the protected area as a basis for the development of strategies to manage or monitor nature and wilderness. The second purpose is an analysis of the effects of human visitors on the protected site as a basis for the management of human interaction with nature or of the natural wilderness itself. The third reason for research is the understanding of expectations and demands of visitors for planning visitor facilities.

Research, however, should not be limited to ecological processes and the biodiversity of protected areas or the management of visitors within protected areas. Even the largest protected areas in the world are not isolated from the effects of human activities outside park boundaries. Thus, conservation strategies and research for protected areas should incorporate human activities outside protected areas. Furthermore, the goals for protected areas differ, and this influences the relevance different types of research have (or should have) in the management of protected areas. Whereas wilderness areas and the first national parks were based on the philosophy of excluding man from the area to protect untouched nature from human influence, biosphere reserves explicitly acknowledge the integration of human land-use activities within the conservation strategy. Integrated conservation and development projects that have become popular in

developing countries in recent years follow a similar philosophy independent of the specific category attached to a protected area. As in the case of biosphere reserves, these projects seek to achieve biodiversity conservation, while providing for basic human social and economic needs. Under such a philosophy, it is immediately apparent that research cannot be limited to ecological processes, biodiversity, or visitor management. On the contrary, a broader approach needs to be taken that also includes ethnological and socio-economic research on the vested interests of humans being affected or affecting protected areas. In the following sections we outline the role of research on natural and human ecology within the conservation of protected areas and provide examples for illustration.

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Bibliography

Caughley G., Shepherd N. and Short J. (1987). *Kangaroos, their Ecology and Management in the Sheep Rangelands of Australia*. Cambridge University Press, Cambridge. [An example integrating research and management in the conservation of protected areas and beyond.]

Caughley G. and Sinclair A.R.E. (1994). *Wildlife Ecology and Management*. Blackwell, Cambridge. [Introduction to research and management of endangered species.]

Dallmeier F. and Comiskey J.A. (1998). *Forest Biodiversity Research, Monitoring and Modeling*. Man and the Biosphere Series Vol. 20, UNESCO, Paris. [Conceptual background on the mentioned topics as well as several detailed examples and case studies.]

Elzinga C.L., Salzer D.W., Willoughby J.W. and Gibbs J.P. (2001). *Monitoring Plant and Animal Populations*. Blackwell Science, Malden/Mass. [Very useful handbook when planning wildlife monitoring schemes, with an emphasis on statistical methods and several outlooks on practical implementation of species management]

IUCN (1994). *Guidelines for Protected Area Management Categories*. IUCN, Gland. [This is a basic reading to gain insights into international standards for protected areas. For updated chapters, protected area lists and detailed bibliography see: www.iucn.org]

MacKinnon J., MacKinnon K., Child G. and Thorsell J. (1986). *Managing Protected Areas in the Tropics*. IUCN, International Union for Conservation of Nature and Natural Resources, Gland. [This is an excellent description of the most important topics to deal with when establishing or managing protected areas, applicable also for areas outside the tropics.]

Spellerberg I.F. (1991). *Monitoring Ecological Change*. Cambridge University Press, Cambridge. [Broad introduction into basic concepts, methods and practice of monitoring, including several examples and international programmes.]

Walpole, M.J., H.J. Goodwin & K.G.R. Ward (2001): *Pricing policy for tourism in protected areas: Lessons from Komodo National Park, Indonesia*. *Conservation Biology* 15:218-227.

Biographical Sketches

Sabine Stab was born in November 1964. She studied landscape ecology and biology at the Universities of Münster, Germany, La Paz, Bolivia, and Vancouver, Canada. After finishing her master's thesis on high-Andean ecosystems, she worked as co-ordinator of the Scientific Research Department of Beni Biological Station Biosphere Reserve in the Amazonian lowlands of Bolivia. Her first tasks included the enforcement of regulations and in-service training of station staff. Subsequent work focused on ensuring funding support and initiating projects in sustainable land use. In the following years, she served as Field Director of the Biosphere Reserve, putting special emphasis on integrating the local people into the reserve's most important research and management decisions. In close collaboration with the Reserve's park ranger group, she developed, implemented and evaluated an integrated monitoring scheme for the area, and supported the Smithsonian Institution's 'Man and the Biosphere Programme' as a local counterpart. After returning to Germany ten years later, she worked at the Centre for Environmental Research (UFZ), Department of Conservation Biology and Natural Resources, Leipzig, as co-ordinator for an interdisciplinary riverine wetlands research project. At the same time she obtained her PhD with a thesis on statistical methods for evaluation of field methods for wildlife monitoring in protected areas. Since the beginning of 2000 she has worked as head of the Information Centre of the 'Saxonian Switzerland' National Park, Germany, which was recently inaugurated as an exemplary institution engaged in nature conservation and regional development issues in close cross-border co-operation with the neighbouring Czech Republic. She also serves as a consultant in international development, research and co-operation matters for national and international institutions including the World Bank, the Scientific Commission of the RAMSAR convention, and the German Federal Agency for Nature Conservation.

Klaus Henle was born in January 1955. He studied biology at the University of Stuttgart-Hohenheim, Germany. In 1988, he obtained his PhD at the Department of Zoology, Australian National University, Canberra, with a thesis on "Population ecology and life history of a lizard community in arid Australia". He started his scientific career at the Institute for Landscape Planning and Ecology, University of Stuttgart, Germany, developing the conceptual basis for a national research initiative of the German Ministry of Science and Technology on nature conservation. With the foundation of the Centre for Environmental Research UFZ-Leipzig-Halle, he was appointed head of the Department of Conservation Biology. His duties are the development, co-ordination, and synthesis of large interdisciplinary research projects in conservation biology. Major on-going research projects are

- Species survival in fragmented landscapes in Europe, Australia, and Brazil;
- Development of robust indicator systems for ecological changes in flood plain systems;
- Monitoring methods for species and habitats of European interest;
- Development of effective networks of conservation priorities sites;
- Development of frameworks for the reconciliation of conflicts between biodiversity conservation and other human interests;
- Conceptual and theoretical basis of conservation biology.

These projects include co-operation with many research institutes mainly in Europe, Australia, and Brazil.