

Values of Protected Landscapes and Seascapes

A series published by

The Protected Landscapes Specialist Group of IUCN's World Commission on Protected Areas

Series Editorial Team: Thora Amend, Jessica Brown, Ashish Kothari, Adrian Phillips and Sue Stolton



3 Protected Landscapes and Wild Biodiversity

Edited by
Nigel Dudley and Sue Stolton

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Edited by Thora Amend, Jessica Brown, Ashish Kothari,
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Introduction: Understanding the biodiversity values of category V protected areas

Nigel Dudley



Tarren Hendre, Snowdonia National Park, Wales

Protecting scenic landscapes

From the window of our house in the Dyfi Valley, Wales, I can look out at Tarren Hendre, one of the southernmost mountains of Snowdonia National Park. Visitors from outside Europe are often surprised to hear we have a view of a national park; the hills are grazed by sheep and the slopes opposite dotted with conifer plantations, mainly Sitka spruce that originates in Alaska. A road runs along the estuary towards the old port of Aberdyfi, also in the national park. Elsewhere there are other villages, working slate quarries, reservoirs and even a (now defunct) nuclear power station within the borders. But Snowdonia also has miles of open moorland, mountains, rivers, streams, spectacular coastline, prehistoric settlements, castles, unique geological features and a more than fifty year history of deliberate management to maintain landscape and nature. This type of protected landscape, common in many European countries and growing in importance in several other parts of the world, is a long way from Serengeti or Yellowstone.

Are Snowdonia and other similar protected areas with long-term and intensive human interactions an anachronism or a new model? In the past, conservationists have disagreed and this book is an attempt to look at some of the critical

questions that have emerged in the last decade about the nature of protected areas, and nature inside protected areas. In particular, it examines whether ‘softer’ and more inclusive forms of protected areas, such as ‘protected land- and seascapes’ (category V in IUCN nomenclature), can be an effective tool for biodiversity conservation, and if so when they are likely to be most effective. While the two earlier volumes in this series looked at the way that these particular types of protected area support first agrobiodiversity and then cultural and spiritual values, this third volume investigates the value of wild biodiversity protected in category V areas. It begins what will hopefully be an ongoing process to investigate wild biodiversity within these management approaches and to analyse the scientific and conservation values of these areas in more depth.

Many of the national parks in Europe, along with other areas managed in a comparable manner around the world, are defined by IUCN as *protected landscapes* or *seascapes*, or more technically category V protected areas, “where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this



© Nigel Dudley

Ruskin's loveliest view in England, the Yorkshire Dales National Park

interaction is vital to protecting and sustaining the area and its associated nature conservation and other values" (Dudley, 2008). The earliest examples of recognised category V areas were not protected for biodiversity – a word and concept that did not exist when the protected landscape philosophy developed – but to preserve places considered of scenic beauty in part due to the long human interaction with the environment. (The link with scenic beauty is true for many of the earlier protected areas with stricter management regimes, such as Yellowstone National Park, a category II area according to the IUCN classification, although here the perception of beauty is linked to the area's 'wildness'.) At least in Europe the protected landscape perspective was influenced by Romantic ideals and an Arcadian vision of the interplay between humans and nature (Nicolson, 1959): cultural landscapes and seascapes where humans have shaped and modified ecology and landform over centuries or millennia.

Protected landscapes therefore originally aimed to protect places of beauty, predominantly those with mosaics shaped by centuries of human use. But ideas of what is beautiful themselves are not fixed. To cite another British example: outside Kirby Lonsdale, in the Yorkshire Dales National Park, there is a view that the writer John Ruskin described in the 1870s as "one of the loveliest in England", adding patriotically, "...therefore in the world" (see illustration); a river, fields, some large houses and patches of woodland which, while pleasant enough, would not rank as exceptional today. Our perception of what makes up a fine landscape is culturally related and changes over time. The

notion of change and protected landscape is important and will be returned to later.

The legislation accompanying the designation of protected landscapes was also intended to make such places accessible to everyone, rather than locking them behind the fences of rich landowners. The battles for access to the high moors above the industrial cities of Sheffield and Manchester (which included physical battles between walkers and gamekeepers) were the spark that helped to create the Peak District National Park in 1951, the first such park in the UK. Throughout much of Europe (Gambino et al., 2008) and North America (Harpers Ferry Center, 2005) the earliest national parks were promoted primarily on the basis of their value in terms of scenery. The values they aimed to preserve were tied up with aesthetics, access and outdoor pursuits and not primarily about the survival of species of plants and animals. More recently, protected areas with very different histories, philosophies and management approaches have begun to be recognised as category V protected areas, such as some indigenous and community conserved areas, but these had much less recognition at the beginning of the debate about protected landscapes.

Protected landscapes and nature conservation – a long debate

Given this background, it is not surprising that careful reading of the founding charters and legislation of the earliest protected landscapes shows that, although most included reference to nature conservation, this was not usually the first thing mentioned. The primary aim of these areas



Floating pig sty in Lonjsko Polje Nature Park, Croatia

predominantly focused on access and recreation (Burchardt, 2002). There was also an assumption that preserving traditional land-use patterns would necessarily also preserve the wild plants and animals that had become associated with such cultural ecosystems, so that conservation would be an automatic by-product of the management process: this generalisation, which was reasonable enough at the time, has certainly not always proved to be correct as forces of globalisation and technical developments in farming have impacted on even the most remote of rural communities and their ways of managing land.

Over time however, the emphasis of the protected landscape concept expanded and changed. The heightened interest in wildlife conservation that emerged in the 1960s and 1970s meant that countries with protected landscapes, particularly in Europe and Japan, took a more active interest in their nature conservation benefits as well. For example, the Satoyama Initiative, launched in Japan in 2010, explicitly seeks to link improve the links between biodiversity conservation and cultural landscapes, along with fostering scientific investigation of these links and raising public awareness of the biodiversity values of protected landscapes (Kadoya and Washitani, 2010). In Europe, the Natura 2000 initiative of the European Union meant that many established protected areas were suddenly required to deliver specific biodiversity conservation objectives. More particularly, as discussed below, some people started to associate the cultural landscapes associated with category V as having unique biodiversity values *because* of their long relationship with and influence from humans.

Over the past two decades, more countries have adopted the protected landscape approach, bringing their own specificities and expectations. In Central and Eastern Europe, protected landscapes often contain more ‘natural’ ecosystems than those to the west, partly because of different forest management traditions, which have favoured less intensive forestry, and because, in some areas, traditional extensive farming systems have continued. When the concept has been applied in the tropics or other developing countries it has often changed again, as many of the following case studies show. I have for instance sat in meetings in Madagascar as government officials and NGOs struggle to agree a ‘Malagasy-specific’ definition of category V, suitable for their cultural and social conditions (Borrini-Feyerabend and Dudley, 2005). Some developing country governments have been drawn to the increasing flexibility that the category V approach offers, rather than the exclusionary methods traditionally applied. Adding to the confusion, although difficult to prove decisively, it seems likely that some governments have also seen category V as an ‘easy option’ that did not require major cost, and have applied the concept casually and carelessly.

IUCN and those involved in the protected landscape debate use the term ‘landscape’ in a particular way, which itself can lead to misunderstandings if people speaking English as a secondary language interpret the word in line with a general dictionary definition (for instance the *Concise Oxford Dictionary* simply says ‘inland scenery’). The European Landscape Convention, the first international convention to focus exclusively on this issue, defines a landscape as “an area, as



Looking over Khonoma Valley, India

perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (Council of Europe, 2000), a far more exact description. Landscape as interpreted here also embraces *seascapes*; indeed the category V concept has been widely used in marine and coastal environments, for example in Small Island Developing States (e.g., Romulus, 2005) and northern Europe (Holloway, undated).

Protected landscapes and seascapes have had staunch champions, who have nurtured and developed the concept over time. Bing Lucas, one-time head of New Zealand’s National Parks, laid much of the groundwork for the concept of protected landscapes and a seminal workshop in the English Lake District helped to draw together a list of the values of protected landscapes (Lucas, 1992). The IUCN World Commission on Protected Areas has a standing Specialist Group focused particularly on protected landscapes that is tasked with documenting experience worldwide, mobilizing global expertise, and developing guidance on protected landscapes. The work of this expert group includes much diagnostic material (e.g. Brown et al., 2005) and the series of books, of which this is the third. IUCN-WCPA, through this Specialist Group, has also produced detailed guidelines to management of category V protected areas; the only category yet to have received such a detailed exposition (Phillips, 2002). But the concept has also had detractors and the debates about the value of the category V approach have been bitter and protracted. After years of grumbling, the matter came to a head with publication of a paper by Harvey Locke and Phil Deardon (2005), who argued that both protected landscapes and

sustainable use reserves (IUCN category VI), whilst of cultural and often economic value, had no automatic biodiversity value and should not be ‘counted’ as protected areas. The idea for the paper came when one of its authors heard the manager of a UK national park say that biodiversity was ‘irrelevant’ to his work. The debate about category V also reflected frustration amongst developing countries that ‘conservation experts’ were lobbying poor countries to lock up large areas into strictly protected areas, while in the rich countries protection was a looser concept, with less direct costs to the community or the economy, and IUCN was claiming the two approaches as equivalent. The issue became more important when countries began to report on protected areas to international bodies like the Convention on Biological Diversity: the question of ‘what counts?’ gained a greater political significance.

Changing perspectives

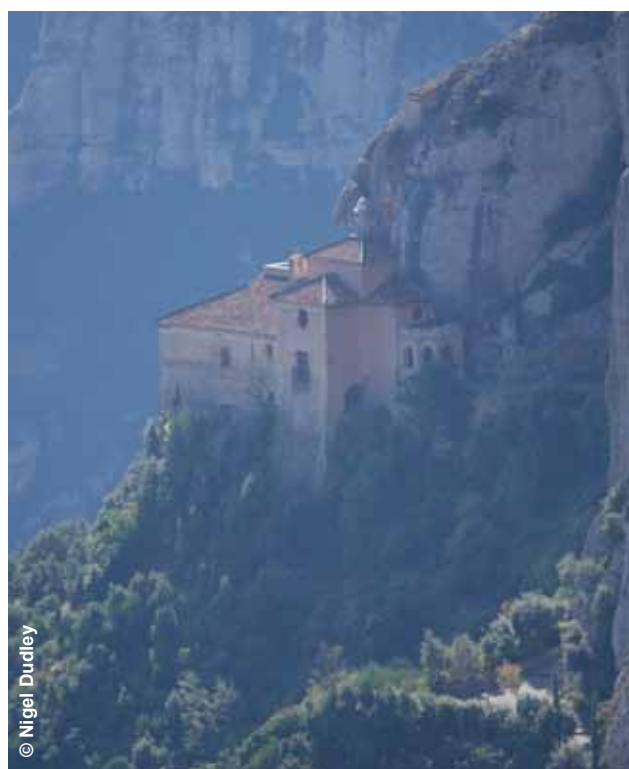
There have been some big changes over the last few years. First was an important, bottom-up process in which some indigenous peoples and rural communities began to see concepts encapsulated in category V as a useful framework to support aspects of cultural and traditional management approaches. Whereas designation of a strict protected area is often viewed with suspicion by communities because they fear loss of access and resource rights; protected landscapes are predicated on the assumption that traditional management is generally positive and should be retained. Category V thus provides a vehicle for official recognition of traditional management that supports biodiversity, such as Indigenous and Community Conserved Areas (depending on their management approach such ICCAs can fit into any of the IUCN categories but most commonly match with V and VI.) Although these proponents were often not primarily driven by interest in nature conservation, many formed useful alliances with conservationists and incorporated conservation elements into their plans.

Category V also provided one of the most obvious management approaches to combine with emerging ideas about governance: that protected areas need not invariably be managed by the state but can also be effective if they are under the control of indigenous peoples, local communities, trusts, individuals and even companies. While IUCN recognises that any of the four broad governance types defined in the categories document (government-managed, co-management between government and partners, private, indigenous and community-managed) can exist with any management category, in practice many protected landscapes (even those that exist within the framework of national legislation) are under either community or multiple ownership or governance, creating an ideal set of test sites for innovative governance approaches.

As a result of these changes and some of the challenges to the protected landscape concept that came to prominence at the beginning of the 21st century, an important debate has

been taking place within IUCN on the role of protected landscapes. At the 5th World Parks Congress in 2003 a three-day workshop convened by the WCPA Specialist Group reviewing experience from different parts of the world resulted in a book describing a 'Protected Landscape Approach,' recognizing linkages between nature and culture and the role of communities in stewardship of landscapes (Brown et al., 2005). Subsequent workshops took place in Catalonia, Spain and the Yorkshire Dales in the UK and some careful responses to the Locke and Deardon paper were prepared (e.g. Mallarach et al., 2008). Much discussion at these pivotal meetings centred on biodiversity as being the main issue of contention in the conservation community: was the new emphasis just a temporary fashion or a necessary updating of the protected landscape concept to meet priorities of the 21st century? If we forced biodiversity conservation into a dominant position in all protected area management approaches, would we be replacing it with a new idea, like ecosystem services or carbon sequestration, in a few years time? These meetings recognised the need for a much more rigorous approach to protected landscapes and germinated the *Values of Protected Landscapes and Seascapes* series including the current volume.

After a long consultation, including a major 'Categories Summit' in Spain (Dudley and Stolton, 2008), in late 2008 IUCN agreed a new protected area definition that put more emphasis on their nature conservation role, thus ending a debate that had trickled on for decades. The old definition (IUCN, 1994), "*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*" was replaced by "*A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*" (Dudley, 2008). This new definition has some associated principles, including: "*For IUCN, only those areas where the main objective is conserving nature can be considered protected areas; this can include many areas with other goals as well, at the same level, but in the case of conflict, nature conservation will be the priority*". This means that all protected areas need to prioritise nature conservation. Category V protected areas were arguably those most affected by this change. However, it should also be noted that the focus shifted from 'biological diversity' to 'nature conservation', a rather broader term. IUCN defines nature in this context as a term that: "*always refers to biodiversity, at genetic, species and ecosystem level, and often also refers to geodiversity, landform and broader natural values*" (Dudley, 2008). In this volume we are looking at category V through the slightly narrower lens of its role in protecting biological diversity; this is not to disparage the wider values contained within 'nature conservation'.



Montserrat Natural Park, Catalonia, Spain

Attitudes towards protected landscapes

Two views exist about category V. Although a spectrum of opinion exists, at their extremes both are strongly held by their supporters. One is that protected landscapes and seascapes should and can play a major role in biodiversity conservation; in other words that *all* protected areas ought to be selected and designed using the best available conservation science to maximize the biodiversity and other natural values that they protect. In this case, category V would fulfill particular functions that more strictly protected areas cannot, or play a role where strict protection is socially or politically unfeasible (Dudley, 2009). The other view is that protected landscapes and seascapes have a far wider role, that a narrow focus on biodiversity (or even 'nature') risks under-stating or losing important cultural, social, broader environmental and spiritual values, and that therefore not all protected landscapes should prioritise biodiversity conservation. While the revised protected area definition helped to clarify this at international level, the debate continues on the ground in many protected landscapes.

To make matters more complicated, different arms of government often stress different aspects of the multiple values of protected landscapes, and management can be confused as a result. Environment ministries report them as contributing to biodiversity conservation, including the Convention on Biological Diversity's *Programme of Work on Protected Areas*, while rural development ministries downplay this role in favour of human livelihood issues. Ministries of agriculture often regard them as simply one part of the



Curlew (*Numenius arquata*)

agricultural or forest estate, with little distinction made between operations inside or outside their borders. This is repeated at a management level; some protected landscape managers emphasise nature conservation while others see it as less important than maintaining landscape values, community benefits, traditional farming or the integrity of the built environment. These differences continue down to community and individual levels: some people may support a protected landscape because it maintains traditional lifestyles or choose to live there for the scenery and wildlife, while others may resent its additional restrictions and bureaucracy. Some see this ambiguity of aims as a weakness because of the lack of clarity as to purpose; others see it as a strength, as it reflects a range of values held in society.

Protected landscapes and biodiversity

It is now widely understood that we are in the middle of a biodiversity crisis (Butchart et al., 2011) – but unfortunately this has not so far brought us nearer a resolution. Because of the slightly confused view of protected landscapes that prevails in some quarters, they have frequently been included in conservation strategies by one arm of government without this really being recognised by all other stakeholders involved. Category V now dominates European conservation efforts for instance, at least in terms of area involved, with 52 per cent of protected areas (by area) in Europe being designated as category V (Gambino et al., 2008): if the protected landscape approach does not conserve biodiversity then European

conservation strategies are in deep trouble. Although Europe has an exceptionally high proportion of category V, its use is growing rapidly in other regions of the world. At the beginning of the 21st century, on a global scale of the roughly 80 per cent of protected areas assigned a category, category V made up just 5.6 per cent, around a million square kilometres (Chape et al., 2003), but constituted well over 10 per cent of the total area protected by 2005 (Chape et al., 2008).

Evidence that protected landscapes and seascapes were weak tools for biodiversity conservation would not destroy their importance but it would change the way they were used and might well mean that in some circumstances additional strictly protected areas would be required.

Do protected landscapes work?

There are actually two related questions: *do category V protected areas have a unique role in protecting culturally adapted species* and *do protected landscapes work as a way of protecting wild biodiversity?*

Do category V protected areas have a unique role in conserving culturally adapted biodiversity? To recall the initial definition of a protected landscape: as a place where “*the interaction of people and nature over time has produced an area of distinct character... where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation*” (Dudley, 2008, my emphasis). At an extreme, people who support this interpretation cite category V sites as places where

management has created conditions in which wild plant and animal species are now so adapted to the presence of human management patterns that they will decline if this management is removed: i.e., that a proportion of wild biodiversity is culturally adapted. In other cases (for instance see the Australian and Colombian case studies), long association with the land has resulted in sympathetic management that also helps conserve biodiversity, but human presence is not essential to its survival. (The same protected landscape may have examples of both.)

The European Mediterranean is a biodiversity-rich landscape with exceptionally long human influence and history (Grove and Rackham, 2001). Many ecologists believe that the landscape mosaic of traditional farming, shaped and modified over thousands of years with small fields and woodlands, grazing areas, fruit trees, market gardens, olive groves, cork forests and vineyards, needs management to maintain its biodiversity values. They argue that it is richer in diversity than the original ecosystem (Aauri and Lucio, 2001) and that abandoning (or intensifying) existing management would reduce biodiversity (González Bernáldez, 1992), of animals (Pino et al., 2000) and plants (Rescia et al., 1994). Santos and Thorne (2010) identify multi-purpose management as a necessary conservation strategy, to avoid 'over-maturity' of woodlands (their word) and scrub invasion. A protected landscape approach would support management systems that maintain the current cultural ecosystem and species mix. But that makes two assumptions: that the species mix associated with the traditional landscape is the only or the 'best' mix possible; and that such management can be maintained indefinitely. In the Mediterranean, dissenting voices argue that the emphasis on cultural systems under-values ecosystems that develop naturally (Schnitzler et al., 2008). Such approaches may also be increasingly difficult to maintain over time. Experience in many protected landscapes has found that farmers and woodland managers want to develop modern land management practices and abandon methods that they consider old fashioned or inefficient: in these circumstances the interpretation of what is 'traditional' changes surprisingly quickly, with knock-on effects on wild species.

So the unique role of a protected landscape or seascape – that of fixing a traditional set of management practices to conserve the species associated with them – is only possible in places where people responsible for management agree to maintain such traditions – whether as a result of long-standing traditions, a personal sense of stewardship or, if necessary, through financial or other incentives. This is a completely valid approach to category V management but is not the only model and will probably remain a subset of protected landscapes and seascapes. It will in addition be increasingly compromised by climate change (as is any protected area management strategy that aims to maintain the status quo), and an open ended financial commitment is always vulnerable at times of economic difficulty.

This does not invalidate the protected landscape approach, even if management of some of the individual components within the landscape or seascape mosaic alter with time. In changing conditions, managers might take the cultural landscape as a starting point but then build in deliberate interventions to increase the chances of particular species and groups surviving, whilst acknowledging that management will change over time – as will the biodiversity features. Instead of halting management at a particular historical juncture, innovative category V plans acknowledge that management within a landscape will change and that managers must work, often with many different types of landowners, to implement a landscape approach to conservation: altering grazing patterns for instance, retaining old trees, conversely opening up woodland habitats, restoring wetlands, replanting slopes and so on. These two approaches are not as distinct as a simple description might suggest; in practice managers of category V reserves are often faced with a mixture of old and new approaches and are forced to implement landscape approaches in *ad hoc* and continually developing ways – in effect an approach of adaptive management.

In these cases "safeguarding the integrity of the interaction" means more than simply freezing things as they are. It would be fair to say that managing change in protected landscapes remains a challenge that has still to be seriously addressed by managers and policy makers. Managers of category V nature parks in Central Europe are struggling with these questions at the moment as traditional agricultural practices are being abandoned: while nature conservationists in many western European countries are critical of the number of sheep in their protected landscapes because grazing pressures reduce biodiversity, further east protected landscape managers regret their decline, because reduced grazing leads to scrub invasion and loss of meadow habitats. The issue of managing through periods of change itself has important implications for biodiversity.

Although this volume focuses on wild biodiversity, it should be noted in passing that some protected landscapes certainly do have a role in protecting agricultural biodiversity in the form of long-established animal breeds and crop landraces that are otherwise disappearing in intensively managed landscapes. Here there is likely to be a link between long-term cultural practices and the survival of particular crop and animal breeds. These issues have been explored in greater depth in the first volume in the current series (Amend et al., 2007) and in other recent publications (Brown and Kothari, 2011). In the current context, traditional breeds and varieties may also be important for wild biodiversity; for instance old varieties of fruit trees that support insect life or old varieties of livestock that graze or browse in a way that encourages biodiversity. Such links deserve further exploration.

Do protected landscapes work as a way of protecting wild biodiversity? A more fundamental issue is whether or not a protected landscape approach can help to maintain or restore



Gatha with Djinydjilma (Mud Crab), Dhimurru IPA, Australia

biodiversity in a more general sense. The case studies collected here attempt to answer this question and the next part of this introductory chapter provides an overview of the current state of knowledge.

So, does category V work in terms of biodiversity conservation: either for culturally adapted biodiversity or wholly wild biodiversity? There is surprisingly little hard evidence one way or another for the effectiveness of the protected landscape/seascape approach, given the amount of time, effort and political capital already invested in their success on the ground.

To put the question into context: we actually know rather little about the effectiveness of *any* category of protected area in terms of long-term biodiversity outcomes. Research suggests that in some situations at least, protected areas of any category do not necessarily protect biodiversity (e.g. Craigie et al., 2010). The question of effectiveness has received increasing attention, with a range of assessment methodologies being employed. There have now been over 8,000 management effectiveness assessments of protected areas around the world (Leverington et al., 2010). Around 40 per cent of the protected areas surveyed showed serious management deficiencies and in about 14 per cent of cases these deficiencies were so widespread that they lacked the basic requirements to operate effectively. Or switching the figures around, some 86 per cent *were* still operating reasonably effectively. Unfortunately, these global studies have not attempted a detailed breakdown of effectiveness by category, and in any case category V has to date been relatively under-represented in management effectiveness

studies. More fundamentally, most management effectiveness methodologies (Hockings et al., 2006) are weakest in relation to biodiversity outcomes and some of the commonest assessment methods, such as the management effectiveness tracking tool (Stolton et al., 2007) and RAPPAM (Ervin, 2003) base assessment mainly on the opinions of key stakeholders (usually the protected area manager and staff).

In response, two IUCN commissions, the Species Survival Commission and the World Commission on Protected Areas, have set up a joint task force to build a database and carry out analysis on the performance of protected areas in conserving biodiversity. The task force has to date carried out a literature review, still in press; a methodology and database and a detailed analysis is planned, but at present we need to draw on existing published material in a more *ad hoc* fashion.

The first thing that becomes clear is that many academics, NGOs and governments *assume* that category V (and category VI) are less effective than more strictly protected management approaches in protected areas (e.g. Gardner et al., 2007). NGOs like WWF and Conservation International often simply omit categories V and VI from their ecoregional plans and gap analyses, at least in the tropics. Proponents of category V already have an uphill task to convince some of the major players that the approach has merit.

In fact, there is good, if somewhat limited, evidence that the category V approach can deliver biodiversity conservation, *if* it is part of a genuine and coherent conservation strategy, which should usually cover more than the protected area itself, and be carefully planned, negotiated, implemented and managed over time. A series of meta-studies and individual research projects have suggested that “softer”, more community-based approaches can be more effective in conserving biodiversity, at least in some situations, than harder, more exclusionary conservation management. A study from the World Bank used fire occurrence as a surrogate for deforestation and found that strict protected areas substantially reduced fire incidence in Asia and Latin America but that multiple use protected areas, including indigenous peoples’ reserves, were even more effective (Nelson and Chomitz, 2011). A recent meta-analysis comparing strict protected areas with community-managed forests (a number of which were also category V protected areas) suggested that the latter had lower and less variable annual deforestation rates (Porter-Boland et al., in press). A study across 49 protected areas in 22 countries found protected area category to be insignificant in predicting amount of land clearing (Nagendra, 2008). All these studies are limited in their scope, particularly by looking only at vegetation cover; they say nothing about the state of plants and animals within such forests for instance (e.g. comparing the numbers of animals that are lost through poaching). Nonetheless, they provide an incentive to look more closely at the influence of management strategies on effectiveness.

However, this positive link with protected landscapes has not been found in all studies. Research using the Management Effectiveness Tracking Tool (METT) conversely found a highly significant association between category and management effectiveness, with more strictly protected areas having higher scores for biodiversity conservation – categories Ia, Ib and II being most effective, III and IV in the middle and V and VI least effective (Dudley et al., 2007). The limitations of this study are that the METT is weakest in measuring biodiversity outcomes and that the proportion of category V in the sample was very small. Similarly, Andam et al., (2008) found deforestation less in category I and II protected areas than in other categories.

Effectiveness of categories has received relatively little attention in protected seascapes. Research on sharks in the Great Barrier Reef in eastern Australia found them declining in all areas of the reserve except for the strictly protected (category Ia) reserves (Robbins et al., 2006). On the other hand, a continent-wide analysis of marine protected area (MPA) effectiveness in Australia found little difference between the categories (Edgar and Stuart-Smith, 2009). A review of 112 independent studies found strikingly higher fish populations inside the no-take reserves compared with surrounding areas (or the same area before an MPA was established) (Halpern, 2003), although this did not look at category as such, and no-take zones can and are designated within category V MPAs as well.

Several studies have linked a high degree of enforcement with effectiveness (e.g. Bruner et al., 2001, Dobson and Lynes, 2008) and this also emerged as highly significant in the global meta-study (Leverington et al., 2008). These results have often been assumed to suggest that stricter categories are more effective although as several of the case studies in the current volume demonstrate (e.g. India), community enforcement of rules is often a critical element in success of protected landscapes as well. Effectiveness in MPAs has been linked to a combination of strong governance structures and community engagement (e.g. Pillans et al., 2008).

There is also a scattering of studies of individual category V protected landscapes and seascapes, or comparative studies of groups of protected areas. A detailed study in Catalonia, Spain (Mallarach, 2008) found that protected landscapes provided habitat even for rare species like the bear, Iberian lynx and wolf and that the relatively large size of category V reserves made them more effective than small, strictly protected areas (which also had an important role for certain species). In Catalonia, over 90 per cent of the protected areas system is category V (much of the whole region is within some kind of protected landscape) and numbers of some key species are currently increasing. In Somiedo Natural Park, in Asturias, northern Spain, the brown bear survives after 25 centuries of human occupation and its presence is welcomed by local people, who name the area *País des Osos* (Bear Country).

Studies by the Royal Society for the Protection of Birds in the UK found that even in British category V protected



Dartmoor National Park, UK

areas, some of which have tended in the past to downplay biodiversity conservation, there were quantifiable benefits for wild species (Robbins, 2008). However, it is not clear the extent to which this was due to the presence of more strictly protected areas inside the larger category V areas, or the impact that category V designation has on other reserves nested inside (this issue would benefit from further investigation). Evidence on the role of traditional farming methods in conservation exists in the Mediterranean region (Beaufoy, 1994). Research in the Lombardy plain in Italy found that natural habitats declined less and bird diversity was significantly higher in protected landscapes than in areas outside protection (Canova, 2006). Many individual projects link their success to a focused use of landscape approaches. The protected landscape approach has been used successfully as the basis for species conservation strategies under the European Union's Natura 2000 network, particularly in the Mediterranean, including the role of protected landscapes in acting as corridors between more strictly protected areas (Múgica de la Guerra et al., 2002).

But apart from a few very regionally specific studies, we still have little quantitative evidence about whether protected landscapes and seascapes are successful in protecting biodiversity or not. We know that the approach has little chance of success if it is applied laxly or just as a label. Josep Maria Mallarach and his collaborators (2008) identify the need for specific legal and technical tools tailored to the needs of protected landscapes along with dedicated monitoring programmes. Many writers point to the need for strong community support and engagement.

Collecting data

One challenge in assessing the effectiveness of protected landscapes and seascapes is that of data collection, i.e. of being certain whether a particular strategy is or is not conserving wild biodiversity. Here category V protected areas to some extent offer additional options, if these are developed, by involving resident communities in the data collection process. Long settled local communities and indigenous peoples often know more about resident wild species than incoming scientists; in Finland counts of key raptor and large mammal species doubled when the parks service started paying Sami people for records. In the last few years, the role of community monitoring in category V protected areas has been developed and refined (e.g. Danielsen et al., 2010), with work focusing on the best indicators related to particular knowledge within communities (e.g. Karim, 2009, in Bangladesh) and the social process of agreeing indicators (e.g. Steinmetz, 2000, in Lao PDR). Such monitoring depends on willingness to collect and release information. Research in Guanyinshan Nature Reserve, Shaanxi, China, found that local people's knowledge of the giant panda and golden tamarind was equal to that of scientists, although willingness to share this information varied depending on factors such as income and occupation (Neurauter et al, 2009). But the process of deciding what data to collect can be a valuable learning process for managers and communities, as has been recognised in Australia (Izurieta et al., 2011, see also case study in this volume).

The current volume has proved challenging to put together, in part because it has been difficult to find case studies with the kind of quantitative data that we were hoping for, and has taken far longer than originally planned. That said we are very happy with the final list of case studies, both in terms of the breadth of geographical and social experience that they show and the quality of information that they convey. The case studies presented here show that the protected landscapes approach is certainly no longer (if it ever was) a predominantly European response to conservation. They show that many people living in and around protected landscapes are passionate about their potential and wish to be fully involved in their management and their future, including many for whom terms like "biodiversity conservation" remain rather alien. They demonstrate some of the conservation strengths of the approach and also some remaining questions, information gaps and challenges. In a concluding section, this experience is drawn together, with some lessons learned, and some important next steps are identified.

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Croatia: The floodplain ecosystem of the Central Sava River Basin

Goran Gugić, Dijana Župan and Irina Zupan

Summary

The area protected by the Lonjsko Polje Nature Park is one of the last surviving examples of semi-natural floodplains in Europe. It is situated in central Croatia and includes around 511 km² of the floodplain ecosystem of the central Sava river basin.

Since 1990, the area has been protected in the Croatian national category corresponding with the IUCN management category V. It combines natural and semi-natural habitats in a complex living landscape, harbouring significant biodiversity and preserving the land use practices traditional in Central Europe floodplains for centuries. The most important value of these ecosystems lies in their uniqueness and the fact that this is one of the last areas where the ecological processes of inundation can be observed. While for centuries Europeans have been taming the continent's great rivers, the people from this area were developing ways of coexistence with the river's natural state. Supporting important populations of endangered plants, birds and invertebrates, the man-made habitats generated by the traditional pasturing system are of equal importance for biodiversity conservation as the natural floodplain habitats. Besides providing for the rich biodiversity, the traditional landuse principles are also of great importance for the preservation of the associated cultural heritage e.g., traditional wooden architecture, traditional skills, crafts, songs and dances, customs.

In Lonjsko Polje Nature Park, nature and culture merge in such a way that relying on management tools developed for either nature conservation or cultural heritage have limitations. The challenges of how to adequately manage both the living landscape and the permanently changing, extraordinary dynamics of a floodplain ecosystem demands the park management to look for alternative, versatile approaches.

Introduction

Lonjsko Polje Nature Park is one of the last surviving examples of semi-natural floodplains in Europe. It is situated in central Croatia in the Sava alluvial plain, around 75km downstream of Croatia's capital Zagreb, and covers around 511 km² of the country's largest floodplain ecosystem – the central Sava river basin. Here, the Sava River meanders, and by shifting its course over the years has created a complex



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Traditional fishing

of pools and oxbows, which together with the surrounding marshes, grasslands and forests create a unique landscape. In addition to the great diversity of habitats, the water regime of periodic inundations creates the unique ecological conditions, which support a diversity of living communities which can today rarely be found along the other great rivers of Western and Central Europe.

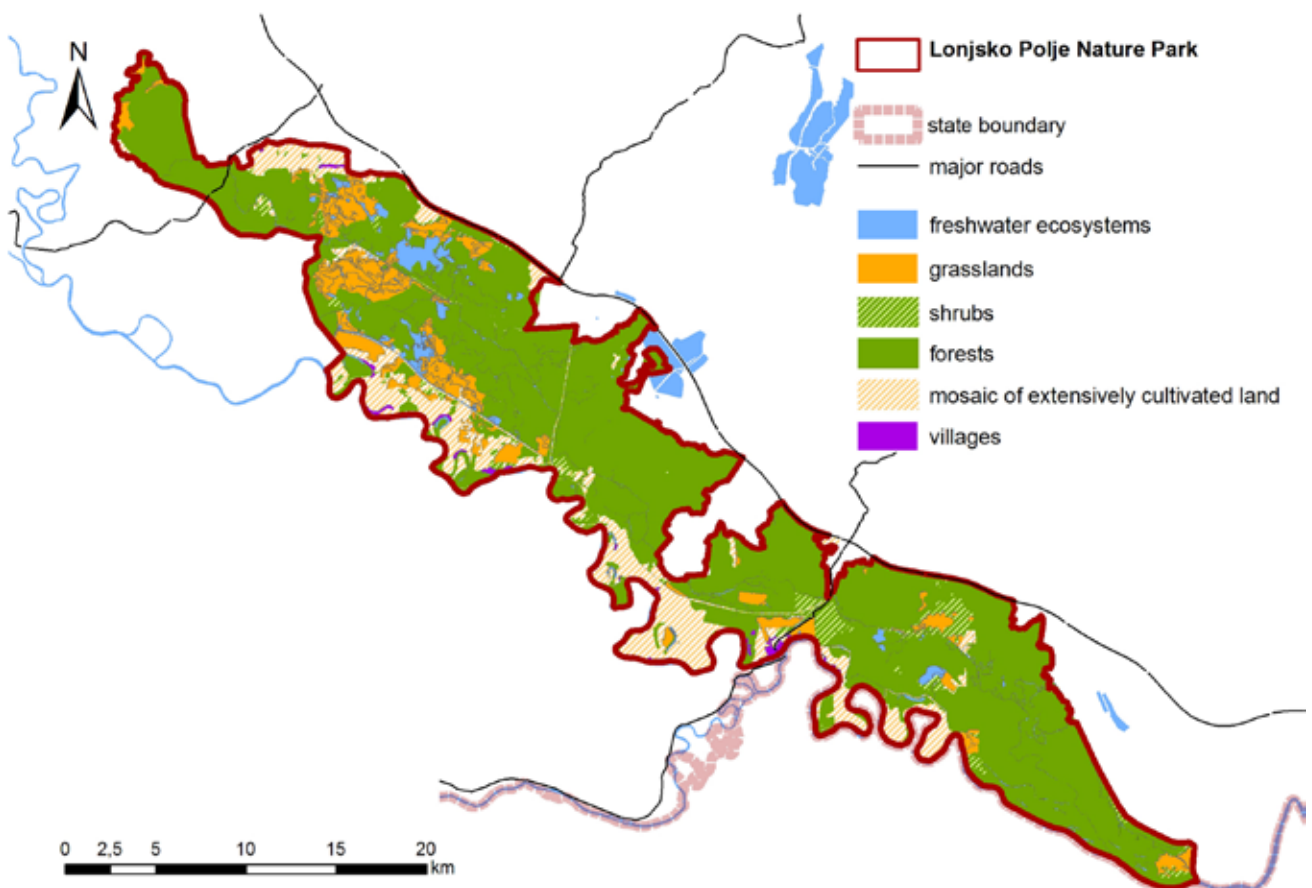
The Lonjsko Polje Nature Park was designated by the Croatian Parliament in 1990. However, the area was affected almost immediately by actions during the Homeland War (1991-1995). Active management through the foundation of Lonjsko Polje Nature Park Public Institution did not start until 1996. Although the national legislation in Croatia does not currently recognise the IUCN system of management categories, and the national categories cannot unambiguously be translated according IUCN definitions, a 'Nature Park' as defined by the Croatian Nature Protection Act approximately resembles the IUCN category V approach of a protected landscape.

Together with a further 200,000 ha of the Sava River Basin, the territory of Lonjsko Polje Nature Park was proclaimed as an Important Bird Area (IBA) by BirdLife International in 1989, and five years later, in recognition of its special values as a wetland area, it was placed on the Ramsar List of Wetlands of International Importance. When Croatia enters the European Union in 2013, the Park will become a part of EU ecological network Natura 2000 as both a Special Protection Area and Site of Community Importance. Furthermore, pursuant to the European Landscape Convention, the distinctive cultural, natural and historical landscape of the central Sava basin has been identified as important to preserve. The Park is also in the process of preparing a nomination to be inscribed on the World Heritage List (Gugić et al., 2008).

In this area, inhabited and traditionally used for centuries, nature and culture merge in such a manner that tools developed for nature conservation or cultural heritage management are not sufficient for effective protection. Complex landscapes such as Lonjsko Polje Nature Park therefore have to develop innovative approaches to management.

The largest intact complex of riparian hardwood forests in the Western Palearctic

One of the most important values of the Lonjsko Polje Nature Park is its lowland riparian forests. As Horvat et al., (1974) stated in *Vegetation of Southeast-Europe*: "... the shape of (Illyrian zone) riparian hardwood forests is still unique and unmistakable. Where else in Europe do highly natural oak stands extend over 200,000 hectares in the floodplains, and where else has their water regime remained as undisturbed as here? Not only from an economic point of view, but also with regard to science these forests, hardly touched by man, are of extraordinary value" [translated by the authors]. Around 67 per cent of the Nature Park surface is covered by these forests, representing one of the most integral complexes of oak and ash stands in Europe, consisting primarily of native tree species and constituted of four important habitat types: Alder swamp woods (*Frangulo – Alnetum glutinosae*), Illyrian snowflake ash-oak forests (*Leucoio – Fraxinetum angustifoliae*), Riparian oak-ash forests (*Genisto elatae – Quercetum roboris*) and Illyrian riparian oak hornbeam forests (*Carpino betuli – Quercetum roboris*). The distribution of these habitats follows the natural geomorphology of the floodplain with its mosaic of depressions and ridges.



Mosaic landscape of Lonjsko polje Nature park. (Map by State institute for Nature Protection)



Domestic breeds have specific traits allowing them to survive in the floodplain

When it comes to the natural values, experience has shown that conservation management in the Central Sava River basin has to give a higher priority to the maintenance of the unfragmented large complexes of riparian hardwood forest than to their qualities as wilderness. The sheer size of these large woodland complexes in combination with the flood dynamics guarantees a high level of naturalness, even though the forests are managed and used. The size and the flood dynamics allow the natural functioning of ecological processes. Most natural structures and stages of a riparian hardwood forest ecosystem can be observed. There has been no intensification of forest management nor increase in disturbance.

Traditional pasturing as the key ecological and cultural process

With its traditional system of land use, Lonjsko Polje Nature Park constitutes an example of an organically evolved landscape with a preserved medieval system of common pasturing typical of Central Europe until the second half of the 19th century. Today the way of life in the floodplain of Lonjsko Polje represents a unique cultural heritage with settlement patterns and distribution and traditional land use adapted to the river dynamics and the flooding season. Again, the floodplain micro-relief plays an important role: human settlements have been built on the safest places, on the ridges, never to be reached by the river; the ploughed fields and orchards are just behind the settlements; complexes of hay making and flood pastures further off in the lowland; and furthermore, the riparian lowland forests. The spatial organisation of the villages has remained in place along with other components of the cultural heritage of Lonjsko Polje that show close relationship with nature and rural space, including traditional wooden architecture, traditional skills, crafts, songs and dances, customs and legends.

The exceptional conditions induced by the flooding that may occur at any time of the year led to the development of specific land use practices. Traditional agriculture in the area is

based on animal husbandry in the form of extensive production. The animals are naturally adapted to the alluvial grassland and woodland habitats used for grazing, and depending on the flooding, the animals are moved to different pasture areas during the year. The resources are meagre, and some of the animals are kept outdoors for most of the year. It was therefore not only the people who had to adapt to the rhythm of the river – the indigenous Croatian breeds in Lonjsko Polje are specifically adapted to these harsh conditions: they have a strong constitution that enables them to live in the open, their food requirements are modest, and their social behaviour is adapted to the conditions of flooding. Today, seven different indigenous breeds are kept in Lonjsko Polje Nature Park: the Croatian Posavina horse, the Croatian cold blooded horse, the black Slavonian pig, the Turopolje pig, the Slavonian-symrian podolian cattle, the Posavina goose and the Posavina hound.

The irreplaceable cultural and social values associated with traditional land use practices tell just one part of the story. Along with the regular inundation, traditional animal husbandry in the floodplain contributed to the existence of open grassland habitats which are occasionally flooded, and represent a reservoir of biodiversity. As many as 550 plant species have been recorded in the Nature Park (Gugić et al., 2008). Rather than being threatened by pig herding (as commonly believed), some of them, for example *Mentha pulegium*, *Pulicaria vulgaris*, *Teucrium scordium*, *Marsilea quadrifolia* and *Gratiola officinalis*, are actually maintained in the Park only thanks to the pigs. The rooting activates the diaspores quiescent in the soil, because it gives them the light and warmth required for germination. Furthermore, it opens up the close vegetation cover, giving annual and pioneering species a chance to germinate and develop. In addition, rooting establishes a micro relief that has a greater structural diversity – some plants thrive better in shallow and some in deeper layers (Gugić, 1994; Gugić, 1996).



Black Stork and Eurasian Spoonbill: Lonjsko Polje is the only recorded area where the Spoonbill uses wet pasture for foraging

These outstanding habitat conditions can be verified by the presence of globally endangered bird species. As many as 250 bird species have been recorded in the Park, 134 out of which breed there. As well as for nesting sites, the area is important as an over-wintering area for numerous northern European bird species – mostly waterfowl, and for providing habitat for passerine and raptor species (Gugić et al., 2008). Birds use the fishpond areas and the oxbow lakes found near the villages for nesting or feeding, and two of these areas, Krapje dol and Rakita, have been additionally protected as ornithological reserves. These are of critical importance for the endangered spoonbill (*Platalea leucorodia*): Lonjsko Polje Nature Park is one of the very few sites where the spoonbill has survived in the continental part of Europe (Schneider-Jacoby, 2002). It is the only recorded permanent colony of this species situated in an oxbow and the only recorded breeding area where the adult birds use the wet pastures for foraging during the reproduction period. This helps illustrate the outstanding nature of the habitat. The spoonbill serves as a key indicator species which links the alluvial natural wetlands and the secondary wet pastures created by the traditional animal husbandry system.

This combination of natural and secondary habitats is of the utmost importance for another endangered bird species. In Central Europe the corncrake (*Crex crex*) is mainly considered to be an indicator of meadows and cultural landscape diversity. Lonjsko Polje Nature Park offers both natural and secondary wet grassland habitats for the corncrake. It is an exceptional example for the use of habitat of this species. The large depressions with natural swamp vegetation offer ideal breeding areas particularly in years when inundation does not occur. Nevertheless, the corncrakes prefer the wet, extensively used hay meadows with high vegetation cover as nesting grounds (Dumbović, 2003). There are two main reasons for the disappearance of this type of habitat: the construction of dykes halts the gradual

transitions between dry hay meadows and wet pastures land – therefore, the flooded pastures remain under water for too long a period for nesting to take place – whilst the dried out grasslands are mowed too early in the season. The modernization of agricultural practices is also a problem for corncrakes as the use of the mechanical mowers means that large areas are mown at the same time making it impossible for the birds to take shelter. Furthermore, the reduction in the number of livestock caused by the abandonment of traditional farming reduces the need for the production of hay, which leads to the encroachment of grasslands by shrubs and woods. All of these trends have caused the global population of the corncrake in Europe to be reduced by 50 per cent during the second half of the 20th century (Green et al., 1997). A recent study of the corncrake population in the Lonjsko Polje Nature Park however shows the number of breeding pairs to have remained constant over the last 15 years, with around 240 breeding pairs found in the wet grasslands of the Park (Dumbović, 2003).

Other landscape habitats in Lonjsko Polje are also important for bird fauna – the small fields cultivated extensively for maize are feeding grounds for the lesser spotted eagle (*Aquila pomarina*) and the white stork (*Ciconia ciconia*). The white stork often finds its nesting place on top of houses and more than 580 breeding pairs have been counted in the area. The rooftops of Čigoć village, which has only 124 inhabitants, usually have between 44 to 56 white stork nests each year, with a stable stork population of around 200 birds. In Čigoć the breeding success that occurred in 1987 was higher than had been recorded previously (Schneider, 1988). The village was declared a ‘European stork village’ by The European Nature Heritage Fund in 1994. The maintenance of marsh, meadow and pasture areas surrounding the village has been the key to the high breeding success of this species (EuroNatur, 2009).

Studies of another group of fauna in the Nature Park also reveal a very high diversity. Carabids are well suited as study organisms for use in the assessment of the impact of anthropogenic activity at the landscape scale. Their abundance is an indicator of the positive impact of the existing land use practices in the Nature Park (Brigić et al., 2003). All these data enforce the conclusion that the landscape and habitats generated by the traditional pasturing system are at least of the same importance for biodiversity conservation as the natural floodplain habitats.

Another way of flood control

The common concept of flood control in the past was embodied in the construction of dykes along water courses wherever floods were causing problems. With this solution the water discharge was quickly diverted downstream. Today, it has become more and more questionable if it is wise to discharge water this way. In the event of drought, water will not be available because it has already been drained. If there are heavy rainfalls the drainage structures may not be able to clear all the discharge and flooding will take on the appearance of a disaster.

This widely accepted concept of flood control was never accepted in the Central Sava River Basin. One reason was the existence and purpose of the former Military Frontier. A keystone of the military strategy of the Habsburg Monarchy in the defence system against the Ottoman Empire was the deliberate use of the natural barrier of the Sava River and its floodplains. A second reason was the vision of the experts who designed the 1972 Central Posavina Flood Control Plan. Although this aimed to reduce the existing natural retention areas by almost six times, the real innovation in flood control design was the fact that an area of some 50,000 hectares was to remain as a retention, capable of being brought into play for flood control. At that time, it was almost unthinkable to leave areas of potentially arable land as wetlands, and it was difficult to convince international donors like the World Bank to support this project. But things have changed. When Croatia asked for a new loan at the end of the millennium, the World Bank had already fundamentally changed its environmental policy and now requested the elaboration of an Environmental Impact Assessment. The conclusions of this assessment confirmed the position of the park management which requested the flood control system to take into consideration the entire current retention area of the Central Sava River Basin, thus rejecting the construction of further channels, dykes, dams and floodgates, except where absolutely necessary.

This new strategic approach has fundamental consequences. The floodplain is not subjected to unsuitable land use. It provides sufficient scope in water management to deal with equal success both drought and flooding. It is cheap. It allows local people to continue their traditional land use in the rural area. And last but not least, the intact floodplains, along with flood alleviation ensure the integrity of the



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Traditional wooden architecture of Lonjsko polje

floodplain ecosystem. The result is one of the last areas in the region with surviving habitats and ecological processes created by inundation.

The damming of big alluvial rivers, the changing speed of water flows, increased water temperature and intensive use of waters for irrigation and other purposes are the reasons for big changes in fish population in Europe in the last hundred years. The disappearance of flood plains causes the loss of the important feeding and reproducing sites for fish. The Sava River in the Lonjsko Polje Nature Park is therefore also essential as one of the last remaining refuges for the spawning of some endangered European freshwater fish species. These are the European mudminnow (*Umbra krameri*), the huchen (*Hucho hucho*), starlet (*Acipenser ruthenus*) and the streber (*Zingel streber*) (Mrakovčić et al., 2002). In addition the wild carp (*Cyprinus caprio*) has for hundreds of years been one of the most important resources for the survival of people living in the area. Today, traditional fishing is part of the cultural heritage and the identity of the people in the Nature Park.

Several species of mammals dependent on the wet habitats are found in the area of the Park: the otter (*Lutra lutra*), the water shrews (*Neomys anomalus* and *N. fodiens*) and the water wole (*Avicola terrestris*). The protected area supports significant populations of the wild cat (*Felis catus*) and wild deer (*Cervus elaphus*). The beaver was reintroduced in 1996 and its population has been stable since then. Eight species of bats have also been recorded in the Lonjsko polje Nature Park (Gugić et al., 2008).

Current management practice

1. Vision of a living floodplain

According to the Croatian Nature Protection Act and current practice, Lonjsko Polje Nature Park is managed by the Public Institution on the principles of adaptive management, participatory planning and benefit sharing. The first management plan, adopted in 2008, by the Lonjsko Polje Nature Park Public Institution defines the long-term vision of the Park: *“The degree of preservation of natural dynamics of flooding and the geomorphological processes, of the representativeness of the flood plain ecosystem with its natural and secondary habitats, of the living traditional system of pasturing with the authentic original breeds, of the completeness of the mosaic of landscape and habitat elements created out of the need to conform to the pattern of flooding, and the completeness and authenticity of the elements of the cultural landscape and identity in the tangible and intangible spheres of the cultural heritage, with an emphasis on the role and impact of the one-time Military Frontier: these constitute the foundation for wise use and for social and economic cohesion for the benefit of the local population (in Lonjsko Polje Nature Park)”*.

The conservation of natural, cultural and historical values is undeniably related to the people living in the area – and vice versa. Favourable living conditions and economic prosperity are the first prerequisite for the local residents to remain in the rural areas. With the people comes the maintenance of the traditional use of the area, and thus management system that supports the numerous semi-natural habitats important for the conservation of the park’s biodiversity values. Therefore, the successful management of the Nature Park closely depends on the collaboration with local residents and other stakeholders.

2. Partnership in management

The principles of participatory management, with the consequent feeling of ownership induced in different stakeholders, was recognised very early as important in the management practice of the Lonjsko Polje Nature Park management authority.

Since the beginning of operations, effective communication and the development of personal relations with the different stakeholder groups were of great importance to the Park management. In the second half of 1990s, that was a truly innovative approach. The task was colossal: after half a century of a totalitarian regime and fresh wounds from the Homeland War, building new relationships with the local people was not easy. War damage and poverty meant that the very survival of the local community, not just their traditional use of the land, was threatened. It was therefore not surprising that the preservation of biodiversity values was very low on their list of priorities.

However, continuous work with the forestry and water management sector, as well as with smaller institutional stakeholders (e.g., hunters and associations of traditional breed farmers) resulted in the development of permanent communication channels and a more nature-friendly use of natural resources. Work on the preservation of the area’s cultural heritage by the management authority also helped gain the trust of the local inhabitants. Management contribution to solving the administrative issues related to the use of common pastures and state owned forests for traditional grazing contributed significantly to improving the status of Lonjsko Polje Nature Park Public Institution in the eyes of the locals.

As part of the preparation for the management planning process, cooperation with stakeholders was institutionalized in form of the Lonjsko Polje Nature Park Stakeholders’ Committee. For the management authority the development of this type of cooperation body was an innovative decision, as at the time there was no legal obligation to involve stakeholders in the decision making process. The Stakeholders’ Committee serves as a forum where stakeholders can communicate problems, possible solutions or ideas on further developments. In the past, the Committee was heavily involved in all aspects of the Park management and planning processes. Currently, it is focused on solving in-situ conflicts amongst land users and therefore involves operational stakeholders like land users, municipalities, industries, tourist bureaus and scientists in open discussions and negotiations.

The participatory management approach of the Lonjsko Polje Nature Park has led to one of the most successfully protected areas in Croatia. The existing monitoring programmes show that the biodiversity indicators in the Park are all stable. And from a community relations perspective, Lonjsko Polje is the only protected area in Croatia where the local communities neighbouring the Park officially requested the national government to extend the Park borders and include their villages in the protected area.

Managing change: ecological processes as the keystone of management

In a dynamic ecosystem like the floodplains of the Sava River, the ongoing creation of spatial and temporal patterns within the ecosystem leads to high ecological complexity. Thus, a number of advantages result from the decision to base the protected area management on the concept of maintaining key ecological processes. It requires the conservation manager to permanently question ideas like equilibrium, resilience, disturbance and stability, scale and boundaries of the ecosystem. And it offers the manager the basis of decision-making: as long as the key ecological processes are able to run, there is space for negotiations on possible interventions in the protected area and change might be tolerated. But if an intervention impinges on the key ecological process itself,



Lonjsko polje Nature Park

conservation cannot allow any scope or space. On the other hand, the application of this concept also helps to avoid unnecessary or even harmful conservation measures or interventions – for nature and for man (Gugić, 2009 and 2010).

Based on this premise, any activity needs to be in accord with the key process and should contribute to its continuation, or at least not be harmful. For example, Lonjsko Polje Nature Park Institution has ordered a study on the identification and potential marketing of five traditional farm products originating from the protected area. The overall objective of this management activity was to improve benefits generated by traditional land use, particularly by the traditional animal husbandry system. The final products selected for this project had to clearly show the continuation of both key processes, biological and social, identified with the Park.

Putting the main emphasis on key ecological processes enables the Park administration to make their management decisions more transparent and comprehensible to the non-technical park staff, stakeholders and general public, and to gain quality in their conservation actions, which become more consistent and effective.

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Spain: Somiedo Natural Park bringing “everything to life”

José Alba

Summary

Somiedo is an inhabited mountainous area in north-west Spain that has preserved unusually high quality environmental conditions. These conditions are all the more valuable in light of the widespread ecological transformations that have occurred across Europe including in the nearby mining and industrial areas of Asturias, Cantabria and the Basque Country.

Somiedo has a low population density and local people who have long depended on farming and related activities. The most significant changes in the area have occurred within the last generation but remain generally in keeping with a sustainable development model.

Somiedo Natural Park has a reputation for good management practice and for showcasing how economic activity can be compatible with environmental protection. As such it illustrates well the concepts that underpin category V protected areas. This chapter will review Somiedo from a wide perspective; examining the protected area and its evolution throughout the last quarter of a century. It focuses on an analysis of the human settlements and relationships between wild species and the mountainous physical environment. It includes a discussion of trends since the late 1980s, such as the increase in recreational use around the park. The chapter will also explain how management has been successful through the efficient use of initially limited funding.

People’s actions, both individual and collective, often add richness and complexity to biogeophysical conditions and biological diversity. The case of Somiedo illustrates the relevance of dialogue between interest groups, the reconciliation of interests and the importance of taking into account the natural wealth of an area – an asset which everyone agrees should be protected.

Description of the protected landscape

The municipality of Somiedo, which encompasses the whole of the Natural Park, is located at 43 degrees latitude (the same as New York). Though very mountainous, it is close to the Atlantic coast. It lies on the northern slopes of the Cantabrian Range, sometimes called the Cantabro-Asturian Pyrenees. Somiedo is bounded on the south by the upper reaches of the Sil River, which drains to the Miño (a river that heads towards the border between Spain and Portugal) and by the Pigüña River to the north. The Pigüña receives water from Somiedo and flows



The rich meadows of the glacial valleys

towards the Cantabrian Sea (The Bay of Biscay) through the Narcea and Nalón rivers. The longest river course from Somiedo to the sea is less than 100km, but has a drop of over 2,000m.

The municipality covers an area of slightly over 29,100 hectares. The lowest point in Aguasmestas is 410m, while Cornón and Peña Orniz are the highest peak, both being near to 2,200m. The topography is unusually steep. More than half of the surface area has a slope of over 50 per cent, more than a quarter is between 30 and 50 per cent and only 5 per cent has a slope under 5 per cent. Somiedo consists of five valleys through which the rivers Somiedo, Pigüña and their tributaries flow. Roughly 45 per cent of the territory is pasture of different kinds, from fields to uncultivated plots, many of which are used for cattle breeding. Woodlands occupy up to 40 per cent of the park, and some 65 types of indigenous trees and bushes have been recorded there.

The location of Somiedo and surrounding areas and its singular climatic and mountainous conditions influence its flora and fauna. These are sufficiently distinctive for the area to be defined as the Orocantabrian Region. The climate is characterized by a sharp contrast between the winter and summer. Average temperatures are approximately 10 °C (11.4 °C in La Riera and 8.2 °C in El Valle), with January and



Centaurium somedanum

February being the coldest months. Average annual rainfall reaches 1,038mm in La Riera and 1,277mm in El Valle, but is scarce during the summer, when only 14 per cent of the annual rainfall is recorded (VV.AA. 2011).

Beech (*Fagus sylvatica*) and oak (*Quercus petraea*) are the most widespread plant (VV.AA., 2001). Mammal species include the Cantabrian brown bear (*Ursus arctos arctos*) and deer species such as the roe deer (*Capreolus capreolus*). The Cantabrian Capercaillie (*Tetrao urogallus cantabricus*)¹ and various birds of prey are characteristic birds. The 1,125 species of vascular flora and the 188 vertebrate species are particularly significant, together with a great variety of fungi (Rubio et al., 2010).

Both the flora and fauna in Somiedo has been the subject of study by various authors, including monographic and multidisciplinary works. Somiedo is considered to be an excellent example of a variety of ecosystems in a well preserved condition where "it is possible to locate all of the animal representatives of the Cantabrian Range, and is therefore a true treasure we must preserve" (Montes, 1994, Volume I, p. 18). The areas rare endemic flora includes the flowering plant *Centaurium somedanum* that "grants Somiedo's landscape its own personality" (Mayor, 1994, p.93).

The diversity of natural and environmental resources including forests, rivers, glaciated and river valleys along with many animal and plant species, create a landscape which is much valued by the local human population who identify strongly with nature. The landscape has influenced local cultural features such as the typical houses of the region, the *teitos*, as well as diverse historical and anthropological traditions.

Human settlements and population

A total of 41 settlements are organized around 15 administrative parishes. A few of these communities are *brañas de alzada*. These are transhumance settlements which

¹ There is a general agreement among experts about the great decline of this species. As long ago as 1974, a census of Capercaillie by Castroviejo, J., Delibes, M. and García Dory, M.A. revealed the threats it faced in Cantabrian area. Moreover, other new negative circumstances have occurred later (FAPAS, 2004).



The old channel between Somiedo Lakes

are traditionally occupied only in the summer by *vaqueiros de alzada* or mountain 'cowboys', who bring their herds up to the high pastures. Other villages have been outposts of another lower main village, and were inhabited only occasionally. Recently, improvements in roads, snow plough services and housing provision have allowed for a few villages to be occupied throughout the winter.

The largest centres of population are found at the heads of the valleys, where there are the most productive fields. However, dispersal has been a major trend. People settled where the environment allowed them to farm with the available technology of the time. The area exploited around a given village therefore depended on the landscape and climatic conditions and the technical knowledge of inhabitants.

Between 1900 and 1950 the population fluctuated between 15 and 20 inhabitants per km². However, it had fallen to 6.84 inhabitants per km² by 1988 reflecting the migration trends which accelerated during the period of fast growth in Spain after the opening up of its economy in 1959. According to the most recent data (IAE, 2011), the population of Somiedo in 2010 was 1,410, with a population density of slightly below 5 per km².

While Somiedo as a whole covers nearly 30,000 hectares, a distinction should be made between the populations of the valleys with permanent inhabitants and the mountainous zones (above 1,700m) that have been used for the last decades predominantly – and in some cases exclusively – as pasture for sheep flocks coming each summer from Extremadura (a region in western Spain around Merida). A third group, as mentioned



Panoramic view of the highest peaks and one of the lakes in the Park

above, the *vaqueiros de alzada*, used the pastures of Somiedo in the summer and the resources near the coast in winter, moving their families through the valleys each year (García, A, 2009).

Today, the population is ageing and the birth rate is low. Arango, (2011a, p. 146) notes: “the young population index has decreased from a value of 42 in 1991 to only 14 in 2008”²; his population projections of continuing decline mirror those of a multidisciplinary publication by the University of Oviedo 25 years ago (Marquín et al., 1986), although the decline has not been quite as severe as predicted then. In the words of Jesús Arango: “With all due respect to the bear, the most endangered species in Asturias is the farmer” (Arango, 2011).

Economic dynamics in Somiedo

The economy of Somiedo is based primarily on livestock and agriculture. The development of hydroelectric plants around the park started nearly a century ago. Currently the value of the electricity produced by the Somiedo plants substantially exceeds that from all other activities carried out in the area. However, today the existence of this major engineering project has little impact on the local economy since its operation is largely automated.

In the past, natural resources were developed to support a basic existence and a subsistence economy. Resources were adapted and exploited for continuous use, whether as meadows or arable lands, as irrigation systems, for hunting and fishing, for construction, or the supply of equipment, tools, clothing and other necessary items. Such limited natural resources as were available were drawn on by a society that lived in extremely tough conditions and where no local alternatives were available. Although equilibrium was established between the available resources and the traditional exploitation methods this had to be done within very strict limits, given the moderate carrying capacity of the territory for livestock and agriculture-related activities.

² This index represents the number of young people (from 0 to 14 years) per 100 inhabitants. In 2009 the index was 15.28 (SADEI)

With the local economy receiving few inputs and producing few outputs and given the difficulties of accessibility, Somiedo was scarcely known. Visitors were confined to public employees, hunters, fishermen, mountain climbers and ecologists, besides seasonal shepherds and a few providers of services.

Although these communities had survived for centuries, a sense of rural collapse became suddenly evident in the mid 1980s due to the lack of young people willing to live in the area, together with the retirement of the elder population from traditional institutions. The remaining population stayed in their villages mainly as a result of the lack of alternatives. Some 300 farmers (and owners) remained with common property rights directly linked to villages. But they found it difficult to adapt their complex traditional lifestyles to the rapidly changing agricultural markets and to the very new European economy after Spain’s entry into the European Economic Community in 1986.

The annual income per capita only reached the equivalent to €2476.75 (current price) in 1988, the year the park was established, while the available household income per person was just €3026.10 (constant price 2011). In both cases these amounts were lower than the figure registered in any of the six adjacent municipalities (Belmonte, Cangas del Narcea and Teverga (Asturias region) and Babia, Laciana and Luna (Castille and Leon region)).

Somiedo Natural Park

Somiedo Natural Park was created in 1988. As the traditional livelihood systems developed over generations was clearly collapsing, the regional government, local authorities and many stakeholders tried to found a new path for development. Accordingly from its declaration Somiedo Natural Park had two basic aims:

- to provide better economic conditions and living standards to local people of Somiedo; and
- to preserve the natural resources of the area.

But the challenge was how to achieve these targets without previous experiences or role models. Although the launch of the protected natural area was undertaken with a limited budget,



Cows are the basis of the traditional economy of the area

there were several positive contributing elements. A study, undertaken by the University of Oviedo (Marquínez, J et al., 1986), brought together a large team of researchers from various disciplines, advisors and local leaders and a group of young people within the local government who together took the decisive steps to make the park a reality. Within a short time the local population recognised the initiative as the only foreseeable alternative to prevent a future of continuing decline.

The Natural Park provided Somiedo primarily with a brand, as well as the possibility of being presented in the media. But above all, the park was perceived as a sincere attempt to improve the living conditions of those who would become the main actors in future local development. Local people were conscious that the will to progress was linked to a focused management effort for the area which had not been experienced in Spain until then.

Little by little, management attention aimed at the needs of those working in Somiedo started to match the attention given to the increasing number of visitors eager to know the Park, thanks to an effective publicity campaign. Financial input to develop tourism allowed for income generation activities to be developed which had particular value to a society that had previously managed to subsist with few resources. After decades of continuous traditional exploitation, tourism became the cornerstone of Somiedo's economy. Even a small increase in tourist numbers created an extremely meaningful change in the quality of life that completely altered some migration trends, production decisions, and in particular the self-esteem of society.

Ten years after the park's establishment, a true tourist experience with a fair degree of professionalization can be enjoyed in Somiedo (SITA, 2000). Over 20 businesses have been developed to meet different needs, all of which keep a strong bond with the area. Together with the housing and catering businesses, other activities favoured are: environmental workshops, horseback riding routes, livestock shows and initiatives such as the Festival *Vaqueiro de Somiedo* (a cultural event based on the traditional farming style of the area). The most important result was the development of a strong collective satisfaction resulting from the reconciliation of the social and economic needs of the area with an understanding of the value of the natural resources (particularly predator species).

Decisions affecting the area came about after extensive collaboration and fruitful discussion. The debate regarding the *Use and Management Master Plans (Planes Rectores de Uso y Gestión)* helped to build relationships between the different administrations, neighbours and University, as well as with ecologists and mountaineers. The agreements, which were reached and implemented effectively, helped legitimise the protected area in the eyes of the local people. It ought to be noted that during the period following the establishment of the park, the total financial support channelled to Somiedo barely reached €1,500 per inhabitant per year; whilst a surge in European Common Agricultural Policy funds received directly by farmers meant a remarkable increase in the resources available for the improvement of traditional land use activity and even for diversification.

Socioeconomic evolution

Within the context of an overall drop in rural populations, particularly in the mountainous areas, the population decline projected for Somiedo has been stemmed and a significant number of young people now live permanently in the area.

The impact of tourism is evident. In 2008, 72.14 per cent of income in Somiedo came from supplying services, while income from activities linked to livestock and agriculture had fallen to 23.9 per cent. Employment is however still greater in agriculture, a sector that maintains 193 registered workers, compared to the 178 employed by services (twice as many as in 1988). The disposable income per capita rose in 2008 to €15,624. Comparing current income with the updated value of the equivalent income in 1988 of €6,367 per capita, shows an increase close to 150 per cent (SADEI, 2008 and previous data series).

Changes in agricultural production can also be seen. The average farming unit today manages nearly 80 cattle using an extensive system, a dramatic change compared to just two decades ago when a much larger number of farmers handled substantially less animals (i.e. under 20 per owner). Technological and economic adaptations are important, as stated by García (2009), but the search for a new equilibrium in the organization of farming is complicated and is likely to have adverse impacts on wildlife, landscape, diversity and quality of life in the area.

Environmental sustainability

The ecological value of Somiedo has given rise to a great number of research papers, mainly related to geology, flora and fauna, including a seminal publication by Marquínez et al. in 1986. Even so it is not easy to put into words either the rich existing nature of the area or its evolution. The lack of time series data has made it difficult to draw broad conclusions from specialized studies (Naves et al., 1999). However, the establishment of Somiedo as a Biosphere Reserve in 2000 led to some degree of systematization of data, according to FUNGOBE/EUROPARC orientation and guidelines (EUROPARC España, 2002).

The Park's success in protecting the natural heritage, while working with the local people to preserve social and economic traditions has been studied by several authors. These note how the management model has "demonstrated that the successful relationship between development and preservation is not just a possibility for ecologists and conservationists" (translated by author; Vázquez, 1998, p. 102). They also highlight a change of perception of the local people in the protected area to species such as the bear, which formerly aroused enmity. Other authors agree with this observation and refer to the prestige acquired by Somiedo which has become to symbolise "the harmonic relationship between development and conservation that biosphere reserves proclaim" (translated by author; Fernández, 2005, p. 13).



Tourists visit the teito

Indicators of good environmental health

García Manteca (2005, p. 106) notes that contrary to other mountain areas, which usually have abundant herbivores but few or no predators, Somiedo hosts an animal community where each link in the food chain is well represented. She also points out the coexistence of Peninsular and Central European species, underlining the wealth of amphibians and reptiles, birds and mammals, as well as forests.

Álvarez (2006) has established 60 indicators of good preservation and environmental health for Somiedo ranging from logistical support, institutional and administrative aspects, to biodiversity and preservation of the natural environment. Core indicators of biodiversity and natural environment conservation include: biological quality of surface water masses; fragmentation of forests; impact of forest fires; wealth and threat level of animal species; brown bear reproduction; population of capercaillie and trends in breeding flocks of common birds.

Although there is still a lack of time series data, the information presented in the study lead to the conclusion that most of the indicators show a positive trend, with some minor exceptions:

- There is no significant difference in occurrence of forest fires compared to the rest of the region.
- The fish fauna have a low level of health: although the freshwater environment includes several species which represent good environmental quality indicators, such



The traditional architecture of the area. Right: Typical houses, or *teitos*, studied by Álvarez, 2001 and Graña and López, 2007

as the Pyrenean desman (*Galemys pyrenaicus*), a small semi-aquatic mammal, and the otter (*Lutra lutra*).

- The presence of some invasive species such as Buddleja (*B. davidii*) (Álvarez, 2006).

The major conservation concern relates to one of the jewels of the Cantabrian Range, the Cantabrian Capercaillie. Its population has decreased dangerously, earning it the label of endangered species. No breeding can be verified in Somiedo during the most recent years of research (Álvarez, 2006, p. 117). On the other hand, the population of Cantabrian Brown Bear is showing a positive trend, after declines observed in the 1980s (Fernandez-Gil et al., 2010).

Changes in social and cultural practices are clearly changing the landscape and biodiversity (Rodríguez Castañón, 1997). It is, for example, important to ensure the preservation of pastures and their management (e.g. through the maintenance of paths, small buildings or *brañas*³, fountains and many small management activities) to maintain the diversity of flora and fauna. Thus the social and cultural practices are inseparable from what is perceived as being the unique landscape of Somiedo and Cantabrian mountains today (Rodríguez Pascual, 2009).

³ These *brañas*, from the latin *branus*, are stores for equipment which farmers use in different parts of the mountain from spring to autumn. Their use is conditioned by climate and vegetative cycles

Park management and development

There are also questions relating to overall park management. Changes in management, e.g. six directors since the year 2000, are not good signs of effective management. Furthermore, although the amount of public expenditures grew substantially and sustainable development plans were drawn up (including a rural development initiative named Camín Real de la Mesa) not all the development in the area has been sympathetic. Moreover, some new construction has taken on a very urban aspect despite strict land-use regulation.

The keys to success

A study of the criteria that have contributed positively to the improvement of the social, economic and environmental conditions in Somiedo, based on the views of a panel of experts and over a hundred in-depth interviews, highlighted the following:

- The importance of the establishment of the park being promoted by the local population and authorities.
- The commitment of the regional government and its ability to communicate plans effectively with local people.
- The positive attitude of a population that are in a position to help achieve the park's objectives (e.g. many people looking for employment alternatives etc).
- Respect for the ecological and cultural characteristics of the area.
- The genuine discussion that took place over the development of the *Use and Management Master Plans*.

- The wide agreement of the way forward while plans were brought into being.
- An agreed, hierarchical and prompt execution of small projects.
- The self financing of many small business initiatives, favoured by the existence of considerable spare capacity amongst the local population.
- The incorporation of new entrepreneurs committed to the area.
- The capacity for hard work shown by the entrepreneurs.
- The good use of positive synergies between different organisations involved in the development of the park.

Some very remarkable strengths should be recorded: the fact that the population is conscious of the great value of the natural and cultural resources; that the park has a credited brand including an icon; and the fact that the rural society has taken on initiatives that would have been deemed unthinkable just a quarter of a century ago. Despite this, some problems persist, such as the ageing population, albeit less than was once predicted; the perceived limited added value of maintaining traditional activities; and the abandonment of part of the park previously used for small livestock.

Conclusions

It is clear that the existence of favourable conditions, in this case nature, location and the positive action of a group of people with a shared vision, can encourage significant changes in the economic and even social organization of a territory. In a particularly charming interview, one elderly woman, Teresa Marrón, managed to express perfectly what had transpired during the first 10 years of the nature park: “*The park brought everything to life*”.

Throughout its short history, Somiedo Natural Park has been a point of reference for other regions, especially those that depend on natural resource use and exploitation but have experienced a similar collapse of traditional ways of life, together with deteriorating social and economic conditions. As a result, Somiedo has become a place of great interest to those involved in setting up new protected areas or trying to reshape existing ones. It has hosted a number of conferences related to natural resources and development, it has been the subject of research in many scientific fields and it has been a focus of action by many environmental NGOs.

The sudden increase of resources from the public budget, following the initial success of the park, has however created difficult challenges. Recent substantial funds for rural development seem to have introduced a less successful form of development which has tended to over-emphasise tourism. Nevertheless, Somiedo preserves its enviable natural conditions and provides a glimpse of a new deal where local and global aims, as well as economic and ecological goals, can be achieved.

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Germany: Managing biodiversity conservation in Nature Parks

Martina Porzelt and Jörg Liesen

Summary

Covering about 27 per cent of the country's land surface, the 104 Nature Parks in Germany are assigned a category V in the IUCN system of protected area management categories and are governed by the German Federal Nature Conservation Act. The primary purpose of Germany's Nature Parks is the preservation, development and rehabilitation of landscapes shaped by various types of land use, including the diverse species and habitats native to these areas. Environmentally sustainable land use is the key to achieve this purpose. In addition to this, Nature Parks provide a particularly favourable environment for the promotion of sustainable regional development and sustainable tourism. The Lüneburger Heath and the Southern Black Forest Nature Parks highlighted in this chapter are examples which show that nature tourism products can help to generate value from species and habitat conservation efforts, and that tourism development in the Nature Parks is conducive to sustainable regional development.

The Association of German Nature Parks (VDN), the umbrella organisation of Nature Parks in Germany, developed the German Nature Parks' Quality Campaign (*Qualitätsoffensive Naturparke*) and guidelines for improved nature park planning. These two nature park management tools were designed to help the parks accomplish their specific tasks in the areas of management and organisation; environmental protection and landscape conservation; environmental education and communication; recreation and sustainable tourism, and sustainable regional development, and to evaluate the success of nature park conservation efforts, thereby also ensuring effective biodiversity conservation.

The strength of the administrative organisations responsible for many of Germany's Nature Parks is that they provide for knowledge exchange and cooperation between stakeholders from various backgrounds in the different regions, such as land owners, communities, planning agencies, educational institutions and private businesses, thus allowing for the coordination of disparate interests and contributing to the success of a large number of relevant projects related to environmental protection. Therefore, one of the key objectives for the future is to strengthen the role of the Nature Parks as drivers of sustainable development in rural areas which contributes to the conservation of Biodiversity.



Pasture beeches in the Southern Black Forest Nature Park

Introduction: Nature Parks in Germany can help protect biodiversity

In many European countries Nature Parks have become established large-scale protected areas. Due to their primary dual purpose of ensuring sustainable conservation and the sustainable use of cultural landscapes, Nature Parks are becoming increasingly important to ensure that the biological diversity of Europe's cultural landscapes will be conserved in the long term.

Most of the Nature Parks in Germany are funded and managed jointly by associations of local community and rural district authorities, other special interest associations or, in some German states, state or federal authorities. The Nature Parks have no administrative authority over the land on which they are situated, so they depend on the cooperation of communities, farmers, woodland owners and other land owners (Liesen and Köster, 2005). In 2006 the VDN presented its 'Petersberg Programme' for Nature Parks in Germany, a ten-point action plan that contains the general nature park development goals for the coming decades (Liesen et al., 2008) and also places the work of the Nature Parks in the context of efforts to implement the Convention on Biological Diversity (CBD). Of particular importance in this regard



- 1 Schlei
- 2 Hüttener Berge
- 3 Westensee
- 4 Aukrug
- 5 Holsteinische Schweiz
- 6 Lauenburgische Seen
- Mecklenburgisches Elbetal/Flusslandschaft Elbe-MV
- 8 Sternberger Seenland
- 9 Nossentiner/Schwinzer Heide
- 10 Mecklenburgische Schweiz und Kummerower See
- 11 Flusslandschaft Peenetal
- 12 Insel Usedom
- 13 Am Stettiner Haff
- 14 Feldberger Seenlandschaft
- 15 Wildeshauser Geest
- 16 Lüneburger Heide
- 17 Südheide

- 18 Elbhöhen-Wendland
- 19 Bourtanger Moor – Bargerveen
- 20 Dümmer
- 21 Steinhuder Meer
- 22 TERRA.vita
- 23 Weserbergland
- 24 Elm-Lappwald
- 25 Solling-Vogler im Weserbergland
- 26 Harz/Niedersachsen
- 27 Münden
- 28 Drömling
- 29 Harz/Sachsen-Anhalt
- 30 Unteres Saaletal
- 31 Fläming
- 32 Dübener Heide
- 33 Saale-Unstrut-Triasland
- 34 Stechlin-Ruppiner Land
- 35 Uckermärkische Seen
- 36 Westhavelland

- 37 Barnim
- 38 Märkische Schweiz
- 39 Hoher Fläming
- 40 Nuthe-Nieplitz
- 41 Dahme-Heideseen
- 42 Niederlausitzer Landrücken
- 43 Schlaubetal
- 44 Niederlausitzer Heidelandschaft
- 45 Hohe Mark – Westmünsterland
- 46 Teutoburger Wald/Eggegebirge
- 47 Schwalm-Nette
- 48 Deutsch-Belgischer Naturpark Hohes Venn – Eifel
- 49 Rheinland
- 50 Siebengebirge
- 51 Bergisches Land
- 52 Ebbegebirge
- 53 Homert
- 54 Rothaargebirge
- 55 Arnsberger Wald
- 56 Diemelsee
- 57 Kellerwald-Edersee
- 58 Habichtswald
- 59 Meißner-Kaufunger Wald
- 60 Lahn-Dill-Bergland
- 61 Rhein-Taunus
- 62 Hochaunus
- 63 Hoher Vogelsberg
- 64 Hessische Rhön
- 65 Hessischer Spessart
- 66 Bergstraße-Odenwald
- 67 Eichsfeld-Hainich-Werratal
- 68 Südharz
- 69 Kyffhäuser
- 70 Thüringer Wald
- 71 Thüringer Schiefergebirge/Obere Saale
- 72 Erzgebirge/Vogtland
- 73 Zittauer Gebirge
- 74 Rhein-Westerwald
- 75 Nassau
- 76 Südeifel
- 77 Vulkaneifel
- 78 Saar-Hunsrück
- 79 Soonwald-Nahe
- 80 Pfälzerwald
- 81 Neckartal-Odenwald
- 82 Stromberg-Heuchelberg
- 83 Schwäbisch-Fränkischer Wald
- 84 Schönbuch
- 85 Schwarzwald Mitte/Nord
- 86 Südschwarzwald
- 87 Obere Donau
- 88 Bayerische Rhön
- 89 Haßberge
- 90 Frankenwald
- 91 Bayerischer Spessart
- 92 Steigerwald
- 93 Fränkische Schweiz-Veldensteiner Forst
- 94 Fichtelgebirge
- 95 Steinwald
- 96 Frankenhöhe
- 97 Hirschwald
- 98 Nördlicher Oberpfälzer Wald
- 99 Oberpfälzer Wald
- 100 Oberer Bayerischer Wald
- 101 Bayerischer Wald
- 102 Altmühltal
- 103 Augsburg-Westliche Wälder
- 104 Nagelfluhkette



The Black Grouse

is the Programme of Work on Protected Areas (PoWPA), adopted by the Seventh Meeting of the Conference of the Parties to the CBD. Nature Parks are intended to achieve the self-proclaimed objective of reducing the current rate of loss of global biodiversity at global, regional and national scales and to contribute to sustainable development (UNEP/CBD, 2004).

In order to achieve these objectives on a national level, the German federal government developed a National Strategy on Biodiversity and a Federal Action Plan for the Conservation of Biodiversity, in which Nature Parks play a prominent role (BMU, 2007; 2010b; 2011; Scherföse, 2009). Nature Parks in Germany already contribute significantly to the implementation of the EU biodiversity strategy adopted by the European Commission (European Commission, 2011), thus supporting the integration of economics and biodiversity, as suggested by UNEP and the European Commission's Reports on the economics of ecosystems and biodiversity (TEEB, 2010a; 2010b).

Nature Parks in Germany work to conserve biodiversity in various ways, either directly by implementing traditional species and habitat conservation strategies and establishing habitat networks, or indirectly by developing natural habitats and landscapes through marketing regional products, developing nature tourism product components, effective visitor management, and meaningful cooperation with agriculture and forestry businesses (Pieper et al., 2010; Liesen and Appelhans, 2011; Liesen, 2011). The following section describes two cases of successful species and habitat conservation efforts in Nature Parks, a success thanks to sustainable regional development and sustainable tourism.

Examples of species and habitat conservation projects in Nature Parks

1. Conservation of Black Grouse in the Lüneburger Heath Nature Park

The Black Grouse (*Tetrao tetrix*) is a highly endangered species in Germany (Bundesamt für Naturschutz, 2009). Extensive habitat loss and conversion, such as the loss of large stretches of heathland, have reduced the Black Grouse population to just a few birds. Increasing isolation and the ongoing loss of natural habitats threaten to reduce the already dwindling population in the lowland and low-mountain regions even further (Bauer et al., 2005).

In order to implement specific measures and activities to protect the natural habitats of the Black Grouse mentioned in accordance with the EU Council Directive on the conservation of wild birds, suitable development strategies must be defined that allow the few remaining habitats to be kept in the best possible condition. Lüneburger Heath Nature Park, located southwest of Hamburg, was one of several areas where the Black Grouse population had been steadily declining for many years, their number dropping to an all-time low of just over 20 birds in 1998 (Stiftung Naturschutzpark Lüneburger Heide, 2009).

However, a project initiated in 2005 to conserve the Black Grouse population in the area has had considerable success. Thanks to the efforts of the Lüneburger Heath Nature Park Foundation, which coordinates the state-funded project in cooperation with various project partners and with financial support from the state government of Lower Saxony, the



Non-forested land in Lüneburg Heath Nature Park, the natural habitat of the Black Grouse, the European Nightjar and the Woodlark

Black Grouse population increased to 78 birds in 2007. In 2010 the total Black Grouse population was estimated at up to 220 in the Lüneburger Heath as a whole, and at about 2,000 throughout Germany. Within the nature protection area of the Lüneburger Heath Nature Park (which protects 5,600-hectare of the heathland area) recent estimates put the population at 66 birds (in 2011).

The protected area consists mainly of heathland and a transition zone between woodland and heathland. The increase of the Black Grouse population in the heath is the result of concerted efforts, which include a predator control programme targeting foxes and wild boars, a Black Grouse monitoring programme and systematic heathland conservation and development measures. The vast stretches of heathland in the Lüneburger Heath Nature Park require appropriate and ongoing maintenance to remove emergent pioneer tree species such as silver birch (*Betula pendula*) and Scots pine (*Pinus sylvestris*) or to prevent their growth. This is achieved through sheep (German Grey Heath, 'Heidschnucke') and goats grazing the land, by removing spontaneous forest vegetation by mechanical means ('Entkusselung'), and by mowing the area or partially clearing it by fire (Wormanns, 2010). The mechanically harvested wood is processed into chips and burnt at the nearby wood chip-fuelled cogeneration plant to supply households in the area with district heating. Between 500 and 600 hectares of heathland are kept clear of emergent woody vegetation in this way every year, allowing for the conservation not only of a landscape much appreciated by many visitors, but of the

natural habitats of other rare species such as the European Nightjar (*Caprimulgus europaeus*) and the Woodlark (*Lullula arborea*).

This example shows that protection of biodiversity and economic development are not necessarily mutually exclusive. On the contrary, efforts to conserve biological diversity can improve the economic and ecological development of rural areas in a way that will also benefit future generations (Liesen, 2008).

2. Common pastures in the Southern Black Forest Nature Park

The Southern Black Forest Nature Park is situated in the federal state of Baden-Württemberg in Southwest Germany. Characterized for its mountains (up to 1,493 m) and hills this area has a high percentage of conifer forest and pasture. The pastures, known as 'Allmende pastures' (from German 'Allmende', meaning 'common land'), with their broad-crowned beeches and the grazing Hinterwald cattle, are a unique characteristic of the Southern Black Forest. 'Allmende pastures' are known for their rich biodiversity, the characteristic pasture beeches – a special growth form of the European beech (*Fagus sylvatica*) – and the traditional small-scale farming operations. The unusual disfigured shape of the beeches is caused by grazing animals which influence the appearance of the trees throughout their lifetime. Pasture beeches are found on old pastures in the Southern Black Forest, many of which extend across entire mountain ridges. Farmers' co-operatives have been using these pastures as grazing land for their livestock for centuries.

The Southern Black Forest Nature Park has partnered with stakeholders working in agriculture and forestry to jointly implement a large-scale environmental protection project. The project aims to preserve this natural habitat for endangered species such as two species of grasshoppers, *Oedipoda caerulescens* and *O. germanica*, the European adder (*Vipera berus*) and the smooth snake (*Coronella austriaca*). Habitat management, which consists mainly of maintaining the pastures and preventing rock sides from overgrowth, is showing some success. The first appearance of *O. caerulescens* was confirmed and the population of *O. germanica* is increasing. This project is funded by the German federal government, the state government of Baden-Württemberg and the nature conservation association 'Feldberg-Belchen - Oberes Wiesental', an administrative organisation, which is designed to ensure the long-term protection of the Allmende pastures in the region. Results for other species are expected in the near future (Röske, 2011).

The management of the Southern Black Forest Nature Park, in cooperation with the 'Schwarzwaldverein' hiking society, has signposted several round trip hiking trails to the 'Allmende' pastures to allow visitors to enjoy this unique historical cultural landscape (Pieper et al., 2010). The milk from cattle grazing on the Allmende pastures is used to make a number of traditional cheese varieties, which are then marketed directly by the farm owners and the nature park restaurants along the 'Cheese Route'. This provides an ideal way to combine traditional small-scale farming, biodiversity conservation and sustainable tourism.

Tools for the management of Nature Parks in Germany

1. The German Nature Parks' Quality Campaign

Germany adopted the 'National Strategy on Biological Diversity' to implement the CBD at a national level in 2007. The aim of the strategy is to significantly minimize and eventually halt the threat to biological diversity in Germany with the consequence to increase biological diversity in the long-term. The strategy formulates a concrete vision for the future, and specifies quality targets and action objectives for all biodiversity-related topics. The target deadlines range from the immediate term through to the year 2050. One goal of the strategy is to improve the management of protected areas: 'By 2020 a well-functioning management system for all large protected areas and Natura 2000 areas should be established' (BMU 2007).

Target-oriented management is essential to increase the contribution of the Nature Parks to the conservation of biodiversity. VDN developed the 'Petersberg Programme' as an overall concept for the development of Nature Parks and the German Nature Parks' Quality Campaign as an instrument to



Hinterwald cow grazing on an 'Allmende' pasture in the Southern Black Forest Nature Park

monitor and assess the effectiveness of their activities, and to ensure that qualitative progress is in line with the general positive quantitative development of the Nature Parks. The Nature Parks' Quality Campaign was specially developed for the evaluation of management effectiveness as it has to meet the specific needs and objectives of German Nature Parks. It allows tracking of progress over time as it is able to supply consistent data. Furthermore, it can be used for broad level comparisons among Nature Parks. In this regard, it is important to take into account the substantial differences between Nature Parks in the different German states, not only in terms of their general purpose, but in terms of the availability of human and financial resources, factors which have a great influence on the way Nature Parks are operating (BLAB, 2002; 2006).

The German Nature Parks' Quality Campaign was developed by the VDN in close coordination with the Nature Parks and with funding from the Federal Agency for Nature Conservation (BfN) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and was officially launched in 2006 (Köster et al., 2006; Porzelt and Köster, 2010).

At the core of the German Nature Parks' Quality Campaign is a set of evaluation criteria for Nature Parks, which allow for the measurement of the past performance of the Nature Parks and the monitoring of changes in their performance during certain periods of time. The scope of requirements for the development of the criteria was deliberately set to extend far



The Smooth Snake

beyond the scope of authority of many of the Nature Parks. This decision was based on the fact that the success of a nature park depends not only on its own performance, but also relies heavily on the level of commitment of its partners in the region.

The performance assessment questionnaire is divided into various sections containing 128 questions concerning the four main areas of work of the Nature Parks:

- a) Environmental protection and landscape conservation (habitat networks, environmentally friendly agriculture, agri-environmental programmes, NATURA 2000 areas, sustainable forest management, etc.);
- b) Recreation and sustainable tourism (Nature Parks and tourism marketing; nature-, sports- and activity-based tourism products; accommodation and hospitality, etc.);
- c) Environmental education and communication (visitor information, guided tours and educational events, information and literature on the Nature Parks concerned, online resources, public relations, etc.);
- d) Sustainable regional development (cultural activities, regional business activities and regional products, nature park partnerships, settlement development and building culture, environmentally friendly mobility, etc.).

The questionnaire also contains questions concerning issues of management and organisation such as nature park planning. The four main areas of work are consistent with the priorities defined in the German Federal Nature Conservation Act and the VDN's own mission statement regarding Nature Parks. A Nature Park Factsheet is included in the questionnaire to collect general structural data and information, but none of this information is used for the evaluation. In addition to completing the questionnaire, Nature Parks participating in the

Quality Campaign are also visited and evaluated by specially trained Quality-Scouts, all of whom are employees of Nature Parks in other German states. It is their commitment that allows the Nature Parks to share experiences and valuable ideas. Parks with a score of at least 250 out of 500 possible points are certified as Quality Nature Parks, while parks with a score lower than this minimum are certified as German Nature Parks' Quality Campaign Partners. This certification is valid for five years. Participation in the Quality Campaign is voluntary and free of charge. By developing this instrument the VDN has created a system for the evaluation of the management effectiveness of Nature Parks.

The development of quality assessment criteria is a major and essential step in the work of the Nature Parks. The Quality Campaign enables the administrative organisations responsible for the Nature Parks to evaluate their own performance, manage resources and continually improve their work, with support being provided to the Nature Parks in all areas of operation. This has initiated a nationwide process of goal-directed Nature Park development which already boasts as many as 65 participants. The evaluation process was revised during 2009 and 2010 (Porzelt and Köster, 2010).

As well as enabling Nature Parks to continuously improve their performance and the quality of their products, the Quality Campaign helps them to win more general support for the work of Nature Parks among the general public, the private sector and political decision-makers. This is another way for Nature Parks to serve as drivers and coordinators of sustainable regional development in the future. One of the most crucial steps every Nature Park must take, therefore, is to convince the project partners that they are part of the Nature Park, and that their work and their commitment make a significant contribution to the development of the region and the Nature Park as a whole. This gives the Nature Parks the opportunity to demonstrate to politicians, the private sector and society in general that they play an essential role in the conservation of cultural landscapes and the protection of habitats and endangered species, and that they provide an environment for recreation, living and running businesses.

An evaluation of the Quality Campaign conducted in 2010 (Porzelt et al., 2010) confirmed that it is a valuable and necessary self-evaluation tool which facilitates the future strategic development of the Nature Parks, and which has already received widespread support among Nature Parks and both state and federal institutions. The performance assessment criteria and the scouting process help the Nature Parks to identify possible areas for quality improvement. The scouting process is particularly appreciated by the Nature Parks because it provides for meaningful exchange 'on an equal footing'. Meanwhile 82 out of the 104 German Nature Parks applied to take part in the evaluation process over the next four years. In 2011 16 Nature Parks already have been re-evaluated.

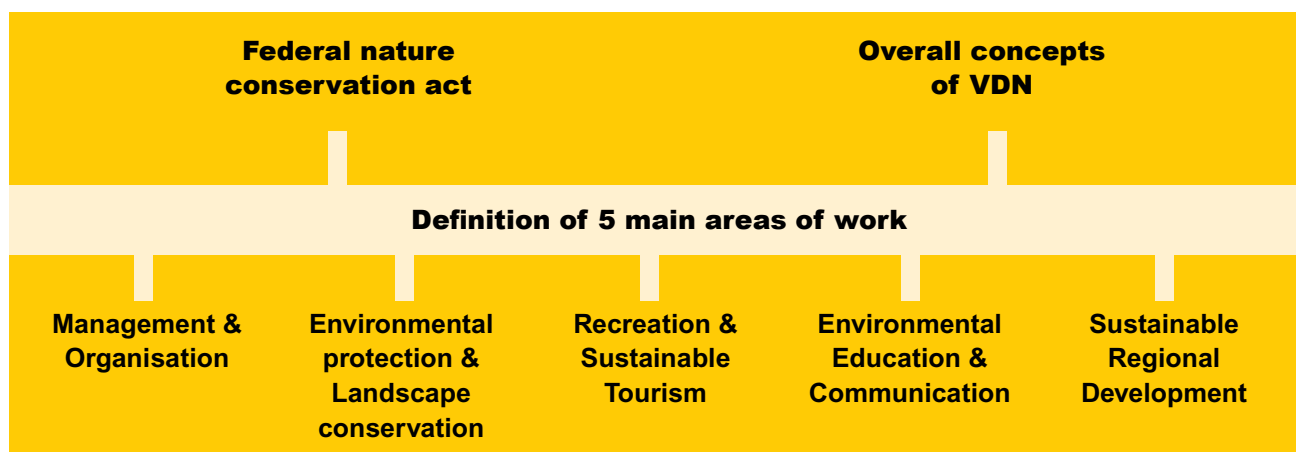


Figure 1: Quality assessment criteria and their basis in federal legislation and the VDN mission statement (VDN, 2010)

The foregoing discussion shows that the Quality Campaign not only makes a major contribution to the development of high-quality Nature Parks in Germany, but also offers the Nature Parks the opportunity to contribute to the achievement of the goals of the 'National Strategy on Biological Diversity'.

2. Nature Park planning

Proper nature park planning is of utmost importance, not only for the work of the Nature Parks themselves, but also for the success of species and habitat conservation efforts. The planning process includes the definition and regional coordination of the future development objectives and the projects planned for each Nature Park. This makes Nature Park planning an important management tool which facilitates the development of the Nature Parks in line with the purposes defined in the federal and state nature conservation acts.

Nature park plans are integrated blueprints for development based on regional consensus, which serve as guides and common points of reference for both the nature park administration and the regional actors involved. Nature park plans also serve as an important basis for discussion and decision making regarding the coordination and implementation of measures with political, administrative and other actors, and the acquisition of external funding. However, to be able to fulfil these roles effectively, nature park plans must be very specific as to the recommended course of action and allow for a high degree of flexibility. Successful implementation of such a plan depends on the general situation in the region and the federal state in which the Nature Park is located, and several other factors shown in the diagram below.

Successful nature park planning requires an integrative planning process, appropriate financial and human resources for the Nature Park and sustainable cooperation networks and linkages.

However, the actual development and implementation of nature park plans often give unsatisfactory results because many plans have very little to do with the specific needs of the parks and are already out of date by the time the

implementation starts. Another reason is that Nature Parks often do not coordinate their own plans with other plans and actors in the region, despite the fact that this is an indispensable requirement for the success of such a plan. In 2008 the VDN carried out the project 'Optimised Implementation of Nature Park Plans', funded by BfN and BMU and designed to enable Nature Parks to plan activities that are the most relevant to their actual needs (Porzelt et al., 2008a; 2008b; 2010). The project included a systematic analysis of the critical factors for the success or failure of Nature Park planning, which had not previously been done, as well as recommendations for optimisation. Based on the project results, a number of recommendations were made as to how the Nature Park plans might be implemented in practice. These recommendations were then used to develop a set of guidelines which included several handy checklists (Porzelt et al., 2008b).

Cooperation between the partners in the region is not only an essential prerequisite for the successful implementation of nature park plans and the successful work of Nature Parks in general, but also benefits the entire region, the environment and the people who live there. As a result, the responsibility to fulfil the objectives of the Nature Parks is shared by several actors, and the details of the Nature Park plans can be integrated with other planning efforts relevant to a Nature Park very early in the process. Limited availability of human and/or financial resources is one of the most common obstacles to successful nature park planning, not only during implementation, but also during development. Actors who become too focused on pursuing their own interests and a lack of 'nature park awareness' can also contribute to the failure of a plan.

The following set of recommendations for the situation- and region-specific optimisation of nature park planning processes is an outcome of the project:

- **Screening at the beginning of the planning process:** The screening is used to define the objectives, details and timeline of the nature park plan, as well as the exact course of action required for implementation. The screening needs to answer three essential questions in developing

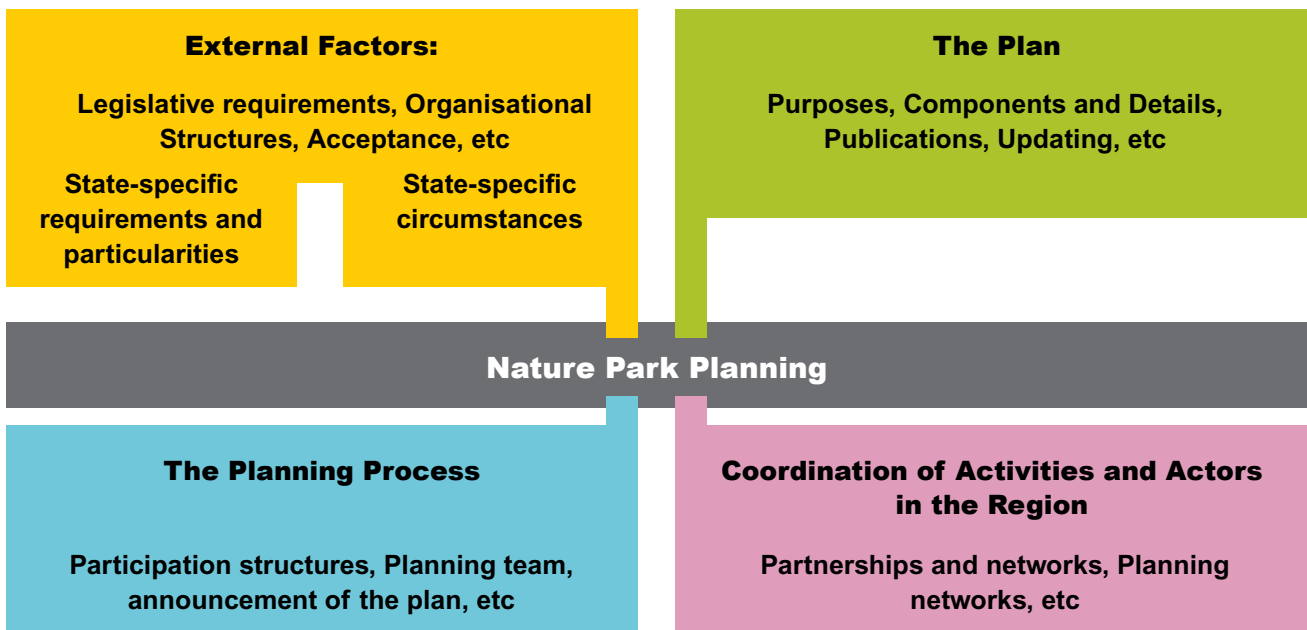


Figure 2: Factors influencing nature park planning (BTE, 2009)

a nature park strategy to ensure efficient preparation of the actual nature park planning process: ‘Where are we?’, ‘Where do we want to be?’ and ‘How do we get there?’. The use of available regional expertise can help to avoid duplication of work and reduce costs.

- **Definition of standards:** Standards to be defined include a nature park-specific mission statement, complete with detailed objectives and implementation strategies for each area of activity, and an effective strategy for audience-focused communication of relevant information related to nature park planning. Nature park plans must allow for a certain degree of flexibility to ensure that they can be easily adapted to changing circumstances, such as a new funding environment and changes in the set of actors involved. Nature park plans should be modular. The core modules are:
 - a) Status assessment, including an analysis of strengths and weaknesses,
 - b) Mission statement and objectives,
 - c) Project and activity planning.
 The modular design allows for careful, step-by-step development, the definition of specific planning periods for each individual module and the selective publication of the mission statement or other modules.
- **Integration:** Integrating nature park planning more closely with other planning processes is one of the most important and most difficult steps in the process. It is essential for nature park plans to include specific information on how to ensure proper coordination with other planning processes, including linkages which facilitate integration with other planning processes, specific statements and recommendations concerning integration with other planning processes and the

definition of general objectives of cooperation.

- **Involvement of stakeholders:** Nature park planning can be successful if the external actors involved in the process are enthusiastic about, and committed to, their goals and projects, if they understand how each of the other partners benefits from the project, and if the partners in the region ‘all pull together’. Given this, the establishment and maintenance of sustainable cooperation networks and linkages is an essential prerequisite for successful nature park planning.
- **Regular updating and evaluation of the Nature Park plans:** These recommendations were incorporated into checklists to provide the nature park management with a quick overview of the project results and recommendations. More detailed information, best practice examples from various German Nature Parks, specific recommendations and suggestions for further reading are included to provide practical guidance for administrative organisations responsible for the Nature Parks.

The German Nature Parks’ Quality Campaign is a useful tool for the optimisation and evaluation of nature park planning. The VDN suggests that these two management tools be used together to ensure successful management.

Conclusions

Nature Parks in Germany are progressive instruments which put cooperation in the regions at the centre of development and encourage people to work together and become committed to environmental protection in combination with sustainable regional development. It is important for the states and communities in Germany to understand that Nature Parks serve as strategic instruments for the integration of

environmental protection and sustainable development in rural areas, and that investments in these Nature Parks are crucial investments in the future of the regional infrastructure. The work of Nature Parks can improve the ecological, economic and social development of rural areas in a way that will also benefit the conservation of biodiversity.

Studies show that Nature Parks can be key drivers of regional development and, consequently, can help save or create jobs in rural areas. One such example is the Altmühltal Nature Park, which provides as many as 483 jobs every year in tourism alone (Fredlmeier, 2004; Job et al., 2005; Römer, 2002). Given this, it makes sense to use regional development funding allocated under the EU's Common Agricultural Policy (CAP, Pillar 2) for already existing nature park networks, provided that these funds are used effectively and exactly where they are needed. Environmental protection could thus be used as an opportunity to facilitate and promote the development of rural areas (German Platform Proposal EU-CAP 2013, 2011).

Examples from France, Austria and other European countries show that Nature Parks can serve as an effective tool for regional development (Liesen and Köster, 2005). Nature Parks in Germany are extremely useful tools and provide particularly suitable regional scenarios, because

- they have a strong, long-lasting organisational structure,
- they benefit from established networks of regional actors and strong community involvement, and
- they are areas which are defined by regional boundaries which cut across administrative borders.

In light of the above considerations, it is all the more important to significantly strengthen the role of the Nature Parks as actors, not only in the area of environmental protection, but also in their capacity as facilitators of rural development, sustainable tourism and environmental education.

Hence, promotion of the Nature Parks in Germany is promotion of environmental protection. However, it is also clear that Nature Parks are not impervious to general trends which lead to a loss of biodiversity in Germany. Even so, Nature Parks might be particularly likely to provide solutions to pressing issues that threaten biodiversity, and not just in the Nature Parks themselves. Sustainable land use to facilitate the implementation of the nature protection objectives in agriculture and forest management is one of the most promising approaches in this regard.

The strength of the administrative organisations responsible for many of the Nature Parks in Germany is that their close cooperation with land owners, communities and planning agencies enables them to balance the interests of various stakeholders, and in so doing contribute to the success of a large number of projects to advance environmental protection. Strengthening the role of the Nature Parks in Germany as coordinators and facilitators of sustainable rural development is an important strategic objective for the future.

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Mozambique: Protecting biodiversity in coastal forests

Rito Mabunda

Summary

Mozambique's colonial legacy of exclusionary protected areas and forest reserves often deteriorated during and after independence due to both lack of management expertise and lack of community support, providing an opportunity to develop a new conservation model. The Matibane Forest Reserve protects commercially important and endemic tree species in north-eastern Mozambique. It is being developed as a category V protected landscape. It includes both important coastal habitat and examples of rare and endangered woodland habitat types, with a relatively intact core area and buffer zone. Preliminary surveys point to a rich biodiversity but more thorough research is required. Further work is now required to evaluate the various goods and services provided by the protected area and ensure that a fair portion of these values reach the local communities who are supporting conservation.

Introduction

Conservation practice has been widely associated with the Yellowstone National Park model in America, where large areas are protected with few or no human habitation or use, apart from tourism, allowed. This has been by far the dominant conservation model in Africa. Classified as category II within the IUCN category system, this type of protected area is frequently criticised in the African context for not adequately balancing management between the needs of conservation and those of pastoralist or forest-dwelling peoples, who have often had long, but not legally formalised, associations with the land or water protected. This association is often critical for local communities whose livelihoods rely on subsistence use of natural resources for a wide range of necessities such as food, shelter and medicines; placing restrictions on these livelihood resources can have disastrous consequences.

The development of a more balanced approach to protection, which uses all the models outlined in the IUCN category system and a full range of governance types (Dudley, 2009), has been slow to take hold throughout the African continent and thus there are relatively few examples of category V protected areas, let alone those with long-term biodiversity data. However, there are a few countries, such as Mozambique and Madagascar, which are beginning to



Matibane Forest Reserve

explore different management and governance models in areas that have high biodiversity and offer the potential to balance conservation with sustainable use. These landscapes typically are characterized by long histories of human, nature and wildlife coexistence and, if successfully managed, could stand out as new conservation models for Africa in the future.

One such area is explored in this case study. The Matibane Forest Reserve protects commercially important and endemic tree species in Nampula Province in north-eastern Mozambique. Protected for over 50 years under a range of different management regimes, recent surveys have found the forest to be well preserved. The communities neighbouring the reserve, who have long used the resources from the forest, are clearly willing to collaborate in its conservation. Conservation interest in the forest reserve is high, with several international NGOs and agencies funding projects in the area, which is considered to be of high biodiversity value. Baseline vegetation studies have been carried out but more monitoring and research activities are clearly needed to ensure effective conservation and sustainable use in the future.

Description of the protected landscape

The Coastal Forests of Eastern Africa are widely recognised as one of the most important areas for biodiversity conservation worldwide according to range of conservation prioritisation



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Logged tree in Matibane Forest Reserve

exercises carried out by WWF, Conservation International and Birdlife (Ahrends, 2010). Much of the forest area has been converted to agriculture or urbanised, and only about 10 per cent of the original vegetation, which once covered 29,125 km², remains in pristine condition in some 400 patches of lowland forest (CI, undated and Ahrends, 2010). According to current estimates Mozambique contributes to about two-thirds of the total area still covered by the coastal forests, the rest being in Kenya and Tanzania (Albano, 2004). Despite the fact that most of the remaining forests are small and highly fragmented they are areas of remarkably high biodiversity with greatly varying species composition, particularly among less mobile species. For example, forests that are only 100 km apart may differ by 80 per cent of their plant species composition (CI, undated).

The most common strategy used by both colonial and post-colonial forest administrations in Africa in the 20th century was the establishment of forest reserves. Initially this approach was used to secure the state's access to prime natural forests, but it has also constituted a means to protect watersheds as well as economically and scientifically valuable tree species (Virtanen, 2005). Between 1943 and 1974 the colonial government in Mozambique established 15 forest reserves covering just under 500,000 ha of forest – or about 1.4 per cent of the forested area of the country (Black, 2005). After independence in 1975, however, forest reserves in Mozambique were virtually abandoned, even though legally they still belonged to, and were managed by, the government (Virtanen, 2005). Uncontrolled exploitation of forestry and wildlife resources affected many areas, including the forest reserves (Hutton et al., 2001).

In 1997 an assessment by the National Directorate of Forests and Wildlife in Mozambique concluded that some 48 million ha, or 60 per cent of the country, had potential for forest and wildlife management. By the new millennia some 10 million ha (12.6 per cent of the country) had been gazetted as protected areas: 2.75 million ha have been declared national

parks, 1.95 million ha declared as game reserves, 450,000 ha as forest reserves and about 5 million ha as hunting areas (Mansur and Cuco, 2002). By 2008 the level of protection had risen to 18 per cent (Republic of Mozambique, 2009), but questions remain about the effectiveness of this protection (USAID, 2008).

The Matibane Forest Reserve is located in the Mossuril district of Nampula province in north-eastern Mozambique, approximately 30 km south of the port of Nacala. The Reserve covers an area of about 4,200 ha, but its exact boundary has not been clearly delineated. It is easily accessible by road from Mossuril, the principal town in the area (Müller et al., 2005). The topography is flat to slightly undulating, the soils are sandy and the Reserve moves from forest to coastal dunes (TFCG, 2007).

Although the original area of the reserve has shrunk, it maintains a well preserved core protected area despite the fact that until recently very little management had been undertaken. Growing recognition of the conservation importance of the area has led to increased interest in its management. In 2005 a review by WWF suggested the area be classified and managed according to Category V principles in order to ensure the preservation of the ecological value of the terrestrial and marine ecosystems as a whole, whilst not excluding the local community who have long had close associations with the site and who collect resources from the Reserve (Müller et al., 2005).

Biodiversity importance

Matibane Forest Reserve is important for its rare and unusual vegetation types. The Reserve was proclaimed in 1957 to protect Mécrusse (*Androstachys johnsonii*), a commercial timber species that was overused in the past for house construction in the area (Müller et al., 2005). The tree is known locally as Simbirre and the wood is extremely hard and durable (Hyde and Würsten, 2010).

It was not possible to carry out biodiversity research during the armed conflict that followed the declaration of independence in 1975, and by the end of the war knowledge of the status of Mozambique's biodiversity was poor. Although in recent years there have been several research projects aimed at documenting Mozambique's biodiversity the current conservation status of Mozambique's flora still remains fairly poorly known (Hutton et al., 2001). However from the existing data it is clear that the fauna and flora diversity across all major species is high and in line with regional averages (USAID, 2008). There are some 300 species of plants listed on the Mozambique Red List, 85 per cent of which are confirmed or suspected endemic and near endemic species.

As noted above the Matibane Forest Reserve originally was declared to protect stocks of the commercially important

Mecrusse. However, from a conservation perspective, the reserve is important for the *Icuria dunensis* Wieringa (Leguminosae: Caesalpinioideae) an endemic tree species found in large communities on the reserve's sandy, coastal dunes. This tree species forms nearly monospecific forests on older dunes in dry land. The timber is valuable, but the wood is not durable; the bark is stripped to make canoes. The tree was assessed as endangered (i.e., at very high risk of extinction in the wild) in the Mozambique Plant Red Data List of 2002 (Izidine and Bandeira, 2002) and The National Biodiversity Conservation Action Plan for Mozambique has prioritised the conservation of coastal forests that harbour *Icuria dunensis* (Proforest, 2007). To date 21 species of small mammal, a few large mammals and some 40 species of birds have been recorded in the reserve (TFCG, 2007).

Governance type and mechanisms

Matibane Forest Reserve is currently managed by the National Directorate of Land and Forestry and the marine resources are managed by the Fisheries Ministry (TFCG, 2007). In a country where almost 70 per cent of the population live below the poverty line and over 80 per cent of the poor are located in rural areas, poverty alleviation is a priority for rural development (Virtanen, 2005). Government policy has thus in recent years recognised the role of forestry and wildlife in alleviating poverty in the rural areas through active participation of communities in the management of forest and wildlife and as beneficiaries of the revenues from their sustainable use (Soto et al., 2001).

Sitoe and Enosse (2003) provide an overview of the management status of the forest reserves in Mozambique. In general, the study showed that there were ongoing initiatives to promote more diverse forms of governance in forested areas and of the 13 forest reserves studied, five had developed co-management regimes between the Forest Service and local communities. Matibane was one of pioneering forest reserves in this respect. Community participation in forest reserves management was initiated in the late 1990s with the aim of improving site conservation. Although the study noted that improvements in co-management practices were still needed, overall the results showed that local communities were willing to collaborate in the protection of forest reserves. Initially, however the challenge for this new type of governance regime has been to maintain the interest of the community when they were not seeing any tangible benefits from forest reserve management. It was concluded that the identification of income-generating activities compatible with forest protection was a major priority.

Over the last decade many projects have continued to help develop effective co-management in the reserve. A community forestry project that operated between 2000 and 2003 prepared the neighbouring communities to collaborate in forest conservation (Müller et al., 2005). Natural resource



A protected tree species in Matibane

management committees have been established and their members trained in participatory management techniques and resource monitoring (Mansur and Cuco, 2002). The UNDP/GEF Small Grants Programme has recently funded a project aimed at helping local communities in the Matibane area to increase their understanding of the need to preserve natural resources, improve their livelihood support activities and household income. The project aims to promote sustainable use of forest and coastal marine resources of the region while preserving the rich biodiversity and scenic landscape of the region (GEF, undated).

Other values

Coastal communities in Mozambique pursue diverse livelihood strategies combining agriculture, fishing, forestry and use of non-timber forest products. Subsistence cultivation of cassava and maize is the main economic activity in the rural areas of the coast, while forests and woodlands provide a wide range of products for local use (e.g., food products including fruit, tubers, honey, mushrooms, and bush meat in the form of birds and wild animals) and income-generation. Other non-timber forest products include fibre for ropes, mats and wall coverings, fodder for livestock and medicinal plants. Fuel wood is the primary energy source whilst charcoal, the major source of household heat in urban areas, is a source of income in rural areas. Most villages also have sacred forests harbouring the graves of ancestors (Mugo, 2006).



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The research team undertaking a biodiversity assessment in Matibane

Management

Matibane Forest Reserve was gazetted in 1957. Forest reserves were developed as a land management option in colonised countries around the world. These reserves were based on the model of state ownership and management generally governed by a forestry service run by experts from the colonial power (Sheail, 2010). A study for the UK's Department for International Development (DFID) of the evolution of colonial forestry and natural resource management policy in Mozambique over the period 1900-1975 found that forest reserves and forestry policy seem not to have been a priority for the colonial rulers of Mozambique with records showing frequent complaints from forestry and wildlife officials of a lack of funds and personnel to carry out their mandate. Although initially timber production was the primary objective of the forest reserves in Mozambique, the focus of management moved towards nature protection across all of Portugal's overseas colonies following the 1955 Decree Law 40.040 which included the provision for each colony to establish a Council for the Protection of Nature. The DFID study notes that during this period there was very little mention of the interests of local resource users in either the protection or exploitation of forests in documents written by state bodies or officials (Black, 2005).

Following independence Mozambique had practically no professional national capacity to manage its protected areas as the colonial powers had relied largely upon Portuguese experts (Virtanen, 2005). The move to co-management and more locally controlled decision-making processes thus made perfect conservation sense. About 70 per cent of Mozambique's 17 million inhabitants live in rural areas, generally near natural forests. Local communities thus have developed long-held traditions and are well acquainted with forest resource management practices that supply many of their basic needs (Mansur and Cuco, 2002).

Since 1994 the Government of Mozambique has adopted a number of policies and passed legislation in support of improved natural resource management. These measures have been accompanied by institutional strengthening, and gradually the management of natural resources is improving (Hutton et al., 2001). Wildlife and forest policy centres on the principle that it is important that those who use and benefit more directly from resources participate in the management and planning processes related to these resources (Salomão and Matose, 2007). The Land Law (1997) recognises and protects traditional rights to land, including forests. The Forest and Wildlife Law (1999) delineates the rights and benefits of forest-dependent local communities, including:

subsistence-level use of forest resources; participation in the co-management of forest resources; community consultation and approval prior to allocation of exploitation rights to third parties; and the development benefits derived from timber production under a concession regime (Ribeiro, 2009).

The Forest Service is responsible for preparing and implementing plans for forest reserves in Mozambique, but most reserves do not have management plans in place. Matibane is however one of the few reserves which does have a management plan, although according to an assessment by the FAO this is not currently being properly implemented, mainly because of a lack of funds (FAO, 2008). The management plan stresses the need for a community management scheme that includes exploitation of non-timber forest products such as medicinal plants, building materials, fibres, and fruits, among others (Müller et al., 2005). Local people have also been trained to carry out management functions such as law enforcement, conducting forest inventories, developing natural resource management plans and developing participatory zoning (FAO, 2008). Through a UN funded programme, and with the support of technical staff from the district and provincial services for forestry and wildlife three communities surrounding Matibane Forest have been trained in the management of forest nurseries, the use of Geographic Information Systems, and the management of forest fires (UN, 2009).

Legal status

During the colonial period the Portuguese colonial rulers declared that all land in Mozambique belong to them, however the majority of the African population continued to administer the lands it used in accordance with customary law. The National Land Strategy and the recent Forest and Wildlife law seeking to increase local community participation and benefits, 'arms' the community with 'power' to question activities taking place in or proposed for their areas (Chilundo et al., 2005).

Assessment of success or failure of biodiversity conservation

As noted above due to the long period of colonisation followed by armed conflict, together with the vast size of the country, lack of trained personnel and lack of operational support, large areas of Mozambique are poorly documented from a biological perspective (Hutton et al., 2001).

In 2005 the WWF Mozambique Country Office commissioned a study to evaluate the coverage of the forest reserve network in Mozambique and to assess if the reserves are of adequate size and distribution to facilitate ecological function, conservation of habitats and plant genetic resources, as well as utilization functions where applicable. The vegetation in Matibane Forest Reserve was assessed by driving slowly for approximately 10 km from South to North and more or less through the middle of the Reserve, then back for 2

km and from there along a different track westward for 2 km. Frequent stops were made for closer examination of the species composition. The main vegetation type of this Reserve is layered dry forest, dominated in most parts by *A. johnsonii*. In some areas *I. dunensis* was the most common tree species. Other typical trees were *Azelia quanzensis*, *Albizia forbesii*, *Albizia glaberrima*, *Balanites maughanii*, *Brenaniodendron carvalhoi* (Cynometra), *Fernandoa magnifica*, *Lannea* sp *Markhamia obtusifolia*, *Mimusops caffra*, *Monotes* sp. *Ozoroa* sp. *Rourred coccinea* subsp. *boiviniana*, *Schrebera trichoclada* and *Sclerocarya birrea*. Small red-heart (*Hymenocardia ulmoides*) was prominent in the species-rich shrub layer, which contained a large component of evergreens. There were many trees and especially shrubs that could not be instantly identified (Müller et al., 2005).

Overall the survey report concluded: *The impression was gained that this forest has as yet not been fully explored and is in need of further floristic investigation.* It continues: *the Reserve consisted of a core area of between 2,000 and 2,500 ha, which was covered with well-preserved dry forest, with a canopy cover of up to and in some part over 75 per cent. There was evidence of past logging throughout, but there were also limited areas where the vegetation cover looked nearly pristine. The core area was surrounded by a buffer zone, which had been opened up by past agricultural activities. It was composed of roundish open areas covered with grassland and surrounded by degenerated or regenerating dry forest and covered with mainly Hyparrhenia spp. Close to the core, these areas were 30 to 40 m in diameter, their diameter increased away from the core, to up to 100 m. There were no signs of continued agriculture in the buffer zone and it seemed that the openings are maintained by regular bush fires.* Overall the assessment concluded that the reserve had a well protected core area and buffer zone, and is generally well managed (Müller et al., 2005).

Reasons for trends in biodiversity

Government commitment to coastal forest conservation activities is high and in general the forests of Mozambique are less fragmented than in other countries in the region (Mugo, 2006). Rates of deforestation in Mozambique are generally modest, according to the little information that exists, although these rates are accelerating (USAID, 2008). Coastal forests in particular are declining in favour of expanding agriculture land, tourism facilities and human settlements (Albano, 2004). For example, more than US\$100 million is being invested in at least three luxury hotels on the coast of Mossuril district, Nampula province (High Commission of the Republic of Mozambique to the UK) and Nampula province has the highest deforestation rate in the country, with the Provincial Services of Forests and Wildlife (SPFFB) estimating that 1.18 per cent annual deforestation; meaning some 33,000 ha of forest is lost per annum (Hall and Lovera, 2009).



Matibane Forest Reserve

Lessons learned, future needs and long-term predictions

Forests in Mozambique have not been well studied and their biological values remain virtually unknown. These gaps in knowledge clearly have a major impact on the ability to develop an effective long-term conservation programme in the country. Some of the key needs to develop a better information base were developed in a workshop organised by WWF in 2002. These included:

- Research on indigenous knowledge of the coastal forest flora and fauna should be undertaken.
- A standardised assessment is needed to develop an agreed baseline against which forest area changes can be measured. Completing a baseline habitat area analysis across the coastal forest of East Africa is required, with particular emphasis on the forest resources of northern Mozambique. Targeted biological surveys are also needed in the priority conservation areas in Mozambique. Threat Reduction and Management Effectiveness assessments across a sample of coastal forest sites are needed to provide a baseline for tracking change.
- The economic values of the coastal forests have not been clearly established. Many of the new participatory and joint forest management arrangements are based on an assumption that coastal forests can be managed to provide economic benefits for local people sufficient to generate incentives for conservation. However, the actual benefits that can be derived and conservation linkages need to be tested. A study is therefore required to understand the economic contributions of coastal forests to National Gross Domestic Product (GDP) and local livelihoods (Mugo, 2006).

Given the location of the Matibane Forest Reserve along the coastline, conservation organisations working in the area have strongly supported a recommendation that the reserve be extended to include the marine ecosystem. This would align

it better to the surrounding land area and result in a more natural landscape unit. Further, adding neighbouring habitats with their transitional zones (ecotones), would enhance the conservation value of the reserve (Müller et al., 2005) and should make the area more resilient to the impacts of climate change. However such an expansion would require even more effort in terms of research and monitoring.

Other priority actions to ensure effective conservation of the Reserve as highlighted by Müller et al., (2005) include:

- The need to strengthen community participation;
- Identification of income-generating activities for the local communities that are compatible with forest protection;
- More clearly defined zoning to separate core conservation and sustainable use zones;
- Updating of the biodiversity inventory (include terrestrial and marine ecosystems); and
- Development of ecological monitoring systems.

Some progress on these activities is on-going thanks to a UNDP-supported project which has put out a tender to update the Forest Reserve inventory and prepared TORs for the recruitment of a consultant to update the management plan of the Reserve. Restoration activities have also begun, in an area selected by local communities, with the support from technical experts, to plant regenerated seedlings of *Mecrusse* species in the Reserve (UNDP, 2009).

There is clearly considerable support from both the local community and conservation professionals to ensure that Matibane Forest Reserve can be managed according to the model encapsulated by the IUCN category V description to protect, conserve and develop the area's dual aims of livelihood support and biodiversity conservation. If the various recommendations made above are implemented, then in years to come Matibane should provide a truly excellent example of a cultural landscape and seascape that has high and secure biodiversity value.

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Colombia: Makuira, the cosmological centre of origin for the Wayúu people

Julia Premauer and Fikret Berkes

Summary

Makuira National Park, in the arid Guajira peninsula of northern Colombia, is both an oasis providing habitat for endemic species and a cultural and sacred landscape of the Wayúu people. Wildlife conservation objectives of Makuira are primarily the management of its cloud forests and high bird endemism. Makuira is entirely within a legally owned indigenous ancestral territory. Its governance has characteristics of an ICCA (Indigenous and Community Conserved Area) and to some extent of a co-managed protected area. It is a cultural landscape and the protected area management coincides with the description of a category V protected area.

This chapter discusses the role of indigenous taboo and sacred places in effective biodiversity conservation. Wayúu cosmology is well aligned with the conservation of the cloud forest ecosystem. In addition, some contemporary threats to biodiversity have been managed by collaboration between indigenous and protected area authorities. This collaborative problem-solving practice has not been without conflict, but has had some positive outcomes for both parties. At the landscape level, the forest cover has remained constant and conservation seems to have been effective through a combination of Wayúu institutions (e.g. their legal ownership and relative autonomy over their territories) and the presence of protected area authorities.

Introduction

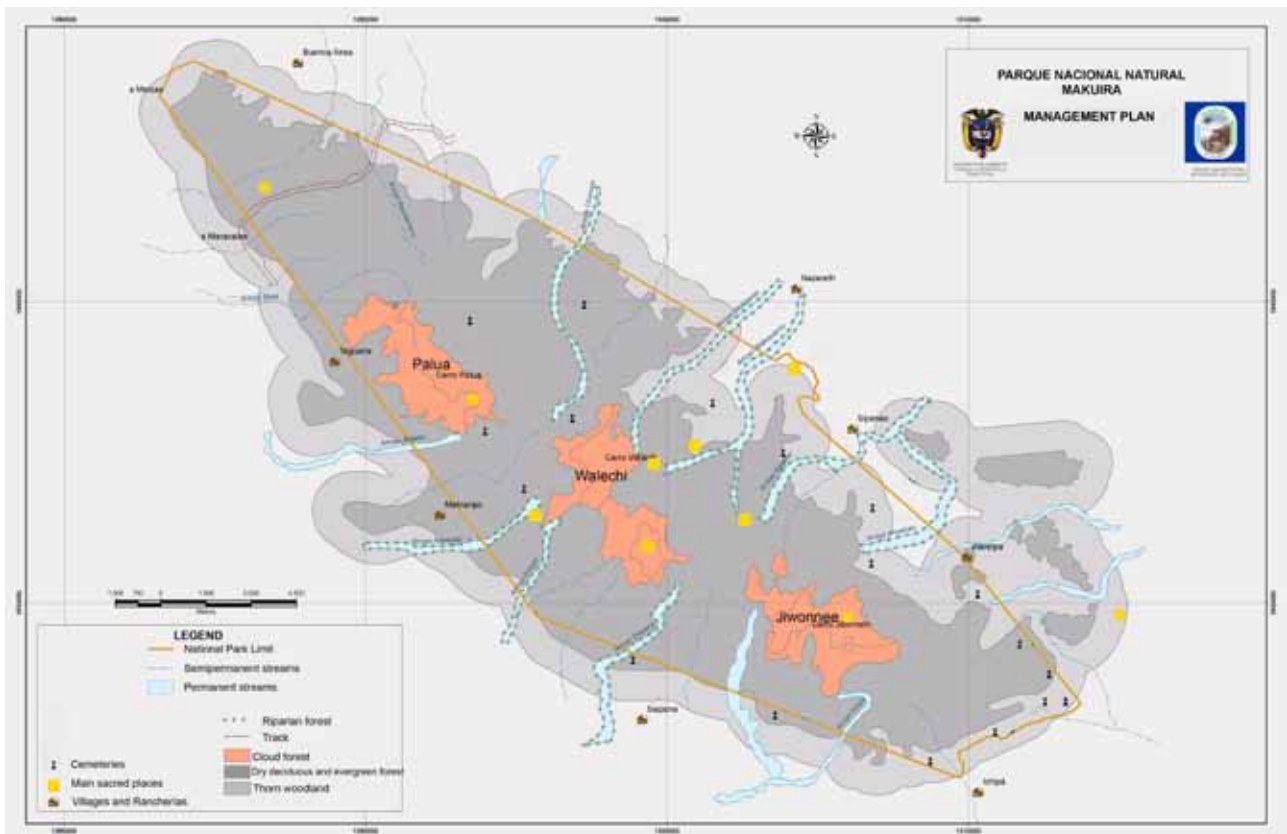
Colombia provides a suitable setting for the study of beliefs and cultural practices that make biodiversity conservation successful, and is an example consistent with the notion that biological and cultural diversity are directly related (Pretty et al., 2009). Colombia is ranked as the third mega-biodiverse country in the world (Mittermeier et al., 1997) and the first in terms of bird diversity with approximately 1,878 species (Salaman et al., 2010). The country owes its high species numbers and ecosystem diversity to its exceptional geographical position connecting Central America with South America, its two coasts on the Caribbean Sea and the Pacific Ocean, its three Andean *cordilleras*, and its lowlands (tropical savannahs and rain forests). Likewise, Colombia is rich in ethnic diversity with 87 officially recognized indigenous peoples, 64 Amerindian languages, a variety of dialects, as well as afro-Colombian and Romani communities (DANE, 2007).



The dry evergreen forest.

Over the last century, Colombia has developed legal mechanisms for protection of biologically diverse areas and given legal recognition to a great number of collectively owned indigenous lands, making it possible for the two domains (i.e., the biological and cultural) to interact synergistically. The country's main strategy for conservation is a national system of protected areas that includes state, private and community areas. Many indigenous territories have legal status of *resguardo* (an institution which dates from colonial times) which grants collective land tenure for the resident indigenous group. These areas are not for biodiversity conservation *per se*, as their owners have, at least on paper, autonomy to manage their land and sustain their continuity as peoples according to their own wishes. However, the importance of indigenous territories in Colombia's Amazon basin for conservation has been noted as they cover 80 per cent of the forested areas and hold high biodiversity values (van der Hammen, 2003).

There is growing international interest in experiments with different governance types of protected areas. A number of countries, including Colombia, are exploring such diversification (Kothari, 2008). Colombia has added several governance types including local and regional reserves, private protected areas, indigenous territories, collaboratively managed protected areas



Map 1: Makuira National Park vegetation types and main sacred places (adapted from UAESPNN, Makuira Management Plan 2005-2009)

and ICCAs, according to Kothari (2008). His analysis is somewhat misleading in the case of Colombia, since indigenous territories are not necessarily managed for conservation. However, in some places where indigenous territories do overlap with officially declared protected areas under the auspices of the government authority, Parques Nacionales Naturales de Colombia, these can become collaboratively managed protected areas. In fact, 59 such ICCAs in Colombia overlap partially or completely with 29 National Parks (Riascos et al., 2008).

This chapter focuses on an indigenous *resguardo* which overlaps with a national park, and is managed collaboratively between the indigenous owners and Parques Nacionales.

Biodiversity importance of Makuira

Makuira covers 25,000 ha and is one of nine protected areas in the Caribbean region of continental Colombia. It is located in the peninsula of La Guajira in the north-eastern part of Colombia on the border with Venezuela. In contrast with the surrounding lowlands of xerophytic (dry-adapted) vegetation, the small and isolated Makuira mountain range (which is about 30 km long by 10 km wide) has permanent humid forests on its peaks and upper northeast slopes due to its position in relation to the northeast Trade winds. The kind of cloud forest (dwarf cloud forest) found there, is the only example of this ecosystem in Colombia (UAESPNN, 2005) growing at such

an unusually low altitude (under 1,000 m), and almost entirely reliant on horizontal precipitation. The maximum elevations of the Makuira range are three massifs (*Jiwonnee* 735 m, *Walechi* 853 m and *Palua/Paaluwo'u* 865 m) connected by intensely dissected topography.

Studies on plant diversity in la Guajira and Makuira are scarce, and not entirely comparable with one another. In the late 1970s surveys on Makuira's plant diversity reported 345 species, grouped in 89 families (Sudgen and Forero, 1982); a more recent and less comprehensive study found 122 species, belonging to 41 families (Rey-Cáceres, 2007). Makuira has five basic vegetation types: thorn woodland, very dry deciduous forests, dry evergreen forest, riparian forest and cloud forest (Map1). The dwarf cloud forest grows above 500 m and is one of the main conservation objectives of the protected area. Makuira has one species with restricted distribution, the cycad (*Zamia muricata*) and one endemic species of the Boraginaceae family (*Cordia macuirensis*), both reported with healthy populations in all three peaks (Rey-Cáceres 2007). All forest types, and especially the cloud forest, have been consistently reported to be in a very good state of conservation (Sudgen and Forero 1982, Rey-Cáceres 2007).

As a bio-geographical "island", Makuira's management plan discusses the need for research on connectivity. Two connectivity strategies are discussed: watershed connectivity and biological connectivity, in particular in relation to species



A view of Makuira's dry deciduous forests

migration corridors. Makuira is directly connected to four coastal lagoons to the north and supplies them with fresh water. The series of lagoons on the north and the west side of the peninsula are also considered a corridor (the Guajiran corridor), but the nature of this connectivity requires further research. With regards to species migration corridors, research is needed to define possible connectivity between Makuira and the nearby mountain ranges of Jarara and Perijá, and with Sierra Nevada de Santa Marta 150 km away. In addition, international connectivity may be expected with Venezuelan ecosystems and the Greater Caribbean Region, especially with migratory bird species (UAESPNN, 2005).

Conservationists agree on the importance of Makuira due to its geographical location and high bird endemism, especially in the deciduous and evergreen dry forests (BirdLife International, 2011). Makuira has 140 resident bird species with seven endemic sub-species; it is also an important area for migratory species due to its position in relation to one of the main north-south flyways (Marinkelle, 1970; Andrade and Mejía, 1988; Rey-Cáceres, 2007). The endemic sub-species are: Rufous-vented Chachalaca (*Ortalis ruficauda lamprophonia*), Buff-breasted Wren (*Thryothorus leucotis collinus*), Red-legged Honeycreeper (*Cyanerpes cyaneus gemmus*), Pale-breasted Thrush (*Turdus leucomelas cautor*), Caribbean Motmot (*Momotus momota spatha*), Golden-winged Sparrow (*Arremon schlegeli fratuelis*) and Scrub Greenlet (*Hylophilus flavipes melleus*) (Rey-Cáceres, 2007).

Listed as an "Important Bird Area" for conservation by BirdLife International, Makuira National Park is unfortunately attractive to poachers. Outsiders from the Venezuelan city

of Maracaibo frequently used to poach bird species for the pet market. This situation stopped a number of years ago following the confiscation of several bird-cages through a collaborative effort by Park and Wayúu authorities. These cages were filled with birds ready to be sold as pets (personal communication, María Fernanda Acosta, 2009). To understand the reasons for the Wayúu participation in conservation, there is a need to comprehend Wayúu worldviews and Park-Wayúu relationships.

Indigenous conservation and sacred places

The area of Makuira is a cultural landscape, shaped by agriculture, grazing and selective forest use. It contains culturally protected features (cloud forest and other landscape elements that are valued by the Wayúu), some of them under local protection long before the area came under government conservation. National parks of course aim to conserve biodiversity and other Western values that are not always congruent with indigenous values. However, in the present case, some of the Wayúu and Parks values seem to be consistent enough that the Wayúu are willing to work with Parks authorities. There is conservation cooperation between the government and indigenous authorities in several places in Colombia, such as the Alto Fragua Indiwasi protected area (Borrini-Feyerabend et al., 2004). But what makes Makuira unique is the relatively low-conflict interaction between the two groups. To understand this indigenous-government cooperation in Makuira, one needs to investigate the nature of Wayúu conservation/protection values which are based on respect and taboos and cultural institutions.

Table 1: Sacred, dangerous and mysterious places present in Makuira mountain range.

Kinds of places	Example	Restrictions and institutions	Sanctions
Places of mythological events	Stone of <i>Wolunka</i>	Go with care and respect	
	“ <i>ii</i> ” places of clan origin	Leave offerings	
<i>Pulowi</i> places (water)		<i>General for all places:</i> Do not go alone; after dusk; if it is raining; if menstruating	Warning dreams Spiritual illnesses Accident Madness Death
	<i>Jiwonee, Walechi</i> and <i>Palua</i> peaks (Cloud forest)	<i>Specific:</i> Taboo location: do not go unless a dream tells you so. If you need to go, take gifts	
	Water springs and water holes	If it needs maintenance, one should drink <i>chirrinche</i> while working.	
	Places in some streams	Avoid these places	
Places linked to ancestors and dead relatives		<i>General for all places:</i> Go with care and respect; do not go alone; take gifts to the dead	People are sanctioned through dreams and by relatives Social stigma; gossip Accidents
	Old burial places and cemeteries	Proper code of behaviour during wakes and funerals	
	A place where a violent death happened		
Enchanted places	Stone of Destiny Particular houses, stones, trees, hills	Do not go after dusk Leave offerings	Risk of getting lost Accidents

Source: Premauer, unpublished field notes.

There are several characters that play a major role in Wayúu cosmology. *Juyá* (the one who rains) is not a force that causes rain but the rain itself, a male entity that travels the peninsula fertilizing *Ma'a* (earth). As *Juyá* travels around the peninsula he visits his wives known as *Pulowi*. *Pulowi* is a multiple and dangerous feminine being, known as ‘*ninfá*’ (water spirit) or ‘Deer Charmer’. She is the owner of a vast herd comprising all wildlife, including marine fauna. *Pulowi* is associated with the sea, with specific places on the land (mainly related to surface water), and patches of forest. The relations between these characters explain many things in the Wayúu life, including their social organization and the way they manage the access and use of their lands (Perrin, 1987).

The Makuira range as a whole is sacred for the Wayúu (Asociación Wayúu Araurayu, 2004). It is both at the heart of the Wayúu mythological origin as a people, and it is *Pulowi*’s abode, especially the upper parts of the mountains. More specifically, Makuira has a great number of dangerous, sacred or mysterious places where appropriate behaviour is to be

followed (see Table 1). First, there are sacred places related to mythological times. One often hears people saying that all Wayúu originally come from the Upper Guajira region. It is not surprising then that Makuira and its surroundings hold the *ii* (places of origin) of all clans. One example is the water stream *Wotkasainru* in Makuira that has the stone of *Wolunka*, a specific rock that marks the place where the myth tells how *Wolunka* (a female mythical character in Wayúu oral stories) lost her toothed vagina enabling the Wayúu people to be created by *Juyá* and *Ma'a*. Later *Ma'a* gave birth to the first Wayúu of each clan in the *ii* places and the clan territories were established according to that (Asociación Wayúu Araurayu, 2004). Makuira is depicted in oral stories as the gift that *Juyá* gave to *Pulowi*. The mists of the cloud forest is called *youramá*, “white maize water”, or the semen that *Juyá* leaves to *Pulowi* (Asociación Wayúu Araurayu, 2004), reminding everybody that there is a love affair between the rain and the forest.

Second, there are places where *Pulowi* dwells that are regarded as both sacred and dangerous. Of all water related



Fenced water hole known to have a *Pulowi*

locations in the mountain range, the cloud forests are the most prominent. These forests have the strongest taboos and access to them is restricted. People do not go there unless a dream tells them to, or if they need medicinal plants or a plant for making the Wayúu traditional hat. Other *Pulowi* places are scattered all over the landscape in certain spots in streams, water springs, waterfalls or ponds. The presence of *Pulowi* calls for a number of restrictions and rules to be followed, such as avoiding going by oneself, being there after sunset, or, if menstruating, spending the night there. Offerings such as tobacco or *chirrinche* (an alcoholic beverage locally distilled from sugar cane) and other respectful behaviours are required if someone has to go. There are many accounts of spiritual illnesses, accidents and warning dreams associated with *Pulowi*; there may even be death if certain limits have been trespassed.

Third, there are sacred places related to ancestors. Clan ancestors old burial grounds (as well as modern cemeteries) are sacred and of highest importance for the Wayúu. In the Wayúu worldview, dead relatives remain in *Jepirra* (a place of abundance where the dead live until the second burial), communicating with the living on a regular basis through dreams until the second burial is performed a number of years later (Perrin, 1987). Burial places deserve high respect, and failing to behave respectfully may cause the *yoluja* spirits (the soul of a dead person) to harm people. It is important to take *chirrinche*, coffee and food to share with the dead. Burial

grounds and cemeteries are also key landmarks that testify that a certain part of land belongs to a particular clan.

In short, Makuira holds many places that require codes of conduct to respect the beings that dwell there and avoid personal harm. From the Park's point of view, the *Pulowi* places are also the ones which align best to the conservation objectives, as they are directly related to protecting the cloud forest and the main locations that provide water to Makuira and its surroundings.

Wayúu self-governance and protected area governance

The governance of Makuira range is mostly indigenous self-government and to some extent collaborative management with Parques Nacionales. In 1984, two thirds of the Guajira peninsula 'Wayúu ancestral territory' was declared Wayúu *resguardo*. Wayúu *resguardo* authorities are self-governing local authorities, with rights and responsibilities according to their customary practices, including land management through family territories. The Wayúu social and political organisation is based on matrilineal extended families that belong to a specific clan territory where their cemetery is located (Guerra-Curvelo 2002). In the Makuira area there are 54 Wayúu territories. They have a decentralised political organization in which each extended family territory has a chief who is normally the oldest maternal uncle, *ta'áula*, 'my uncle'. *Ta'áula* is the knowledge-holder of his territory



Wayúu authorities in a meeting with Parques Nacionales

and the keeper of its oral history. He is in charge of anything that pertains to the territory or family members living there according to their customs, including the control of the integrity of the land and access of strangers.

Makaira National Park was declared in 1977, with the objective to protect its unique natural ecosystems, hydrologic resources and to safeguard Wayúu territory. Parques Nacionales' institutional presence in the area however began almost 20 years later with the arrival of the first park manager in 1996.

Makaira is listed as an IUCN category II national park on the World Database on Protected Areas. However, on more detailed review the area of Makaira more closely meets IUCN category V criteria, due to the fact that its area is entirely within an indigenous ancestral territory and has long been managed under indigenous values. The vegetation and fauna of the whole peninsula area has been influenced for centuries by human-environment interactions including hunting, harvesting forest products, livestock-raising and horticulture. According to records from the 16th Century, Makaira has been managed as a cultural landscape with an economy based on horticulture and fishing in the nearby coasts (Moreno 1983 cited by Guerra, 2002). Livestock has been present mainly in the lower altitude forests of the mountain range for over one hundred years.

In terms of management, the UAESPNN (Special Administrative Unit for National Natural Parks) has a mandate to develop a formal case-by-case Special Management Regime

(REM) for those areas where national parks and *resguardos* overlap. Since 2006, the Makaira team has been working on the pre-implementation phase of joint governance or co-management. The team has implemented a participation strategy involving all 54 *ta'alaula*, to discuss the REM and to negotiate joint agreements with each family group as part of the development of the management plan. The resulting management plan will be based on the establishment of zones for different uses inside the Park area, which should accommodate both Park and Wayúu concerns. An early example of this, negotiated in 2004, is the agreement that tourists should not be allowed in the upper parts of Makaira's three massifs and that tourists should always take a local guide when visiting Makaira.

Over the years, an informal reciprocal relationship and a collaborative problem-solving practice has developed between Park staff and the Wayúu. This relationship is based on the needs of each party. On the one hand, the management of the park is constrained by remoteness and isolation (e.g. no roads, no electricity etc), the presence of illegal paramilitary groups, a lack of resources and a ratio of only 1.75 staff to every 1000 km². On the other hand, the Wayúu have difficulties in dealing with outside interests in the area and in particular with development and mining projects. The Park-Wayúu relationships are by no means smooth all the time, but they have brought some positive developments for both parties. The

Park provides the 'face' of the State in such a remote location where government presence and services are notoriously scarce. The Wayúu want to carry on with their lives, as the owners of their territories. Their interest lies in the protection of their land and their way of life. Therefore, if the Park helps to protect Wayúu rights from outsiders and, in turn, they help the Park staff with control and monitoring, such reciprocity provides a partnership to the benefit of both parties. In this context, Wayúu autonomy and the legal recognition of title to their ancestral land have been key for the conservation of the Makuira area.

Conclusions

The five vegetation types of Makuira, and especially the cloud forest, were there in the 1970s when the protected area was created and the first biodiversity inventory carried out; and are still there today. Part of the reason for this apparent management success is that indigenous institutions regarding access, use and control of resources are in place, providing a traditional knowledge and management system that underpins conservation. Wayúu sacred and dangerous places could be understood as systems of local resource governance which, although fundamentally different in nature, achieve a similar outcome as Western conservation (Berkes, 2012). The lack of systematic data makes it difficult to evaluate precisely the biodiversity trends at Makuira. Nevertheless, at the landscape level, the forest cover has remained and conservation appears to have been effective.

Wayúu cosmology is well aligned with the conservation of the cloud forest ecosystem and most water resources as restricted places. However, a second necessary factor has been the collaboration with Parques Nacionales, which has proved effective in dealing with outsiders trying to access the park resources and has provided a presence of government authority in the park. In practical terms, the Wayúu continue managing their territories according to their norms and institutions. The collaboration between Parques Nacionales and the Wayúu authorities has helped to reduce illegal activities in the area, such as bird poaching and extraction of wood. Parks authorities also work with the Wayúu in dealing with outside interests involving mineral prospecting in Makuira. However, the Park-Wayúu partnership is still a project in progress; some complicated themes still need to be negotiated like regulation of the numbers of goats and sheep in the mountains.

Given the history of human-environment interactions in Makuira, conservation management as a government protected area can be understood as a continuum that started with the Wayúu style of indigenous conservation and has turned into a jointly managed conservation initiative. It is not yet full co-management with a formalized sharing of rights and responsibilities, but the current collaborative management partnership has been able to address contemporary needs and threats. Conservation 'purists' may not be comfortable

with the conservation in Makuira that also addresses local needs. Conversely, indigenous rights 'purists' may see Wayúu partnership in the park as compromising local autonomy. For example, in Africa, Sheridan (2009) argues that local people would lose control of sacred forests if they acquired the status of government protected areas. However, this Colombian example shows that protected area-indigenous partnerships can work. The *resguardo* status, or similar legal recognition of rights, is very important to any kind of ICCA, and even more so if the ICCA is co-managed as a protected area. This requires the legal recognition of territorial ownership, resource use rights, and governance autonomy, although contested, in a kind of 'nation-to-nation' management agreement.

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Australia: Dhimurru, looking after our land and sea

Ben Hoffmann, Steve Roeger, Sue Stolton and Phil Wise

In 1990 on behalf of the elders Roy Dadaynga Marika articulated Dhimurru's Vision: *The land will exist forever. It must be protected so that it will remain the same, so that it can be seen in the same way that the elders saw it in the past. Our vision and hope is that Yolngu will continue to use the land for all the generations to come (Dhimurru, 2008).*

Summary

Australia has undergone significant environmental change since European colonization with many once common plant and animal species extinct or threatened with extinction. Since 1996, Indigenous people in Australia have been given formal (but not statutory) responsibility for regional conservation in a manner that reflects their rights and responsibilities to care for their traditional land and sea estates (often referred to in Aboriginal English as 'country') through the development of Indigenous Protected Areas (IPAs). IPAs now make up over 23 per cent of Australia's National Reserve System.

The Dhimurru IPA covers the land and sea country of the Gove Peninsula region of north east Arnhem Land in the Northern Territory situated on the north western corner of the Gulf of Carpentaria. Dhimurru has been something of a leading light for the IPA movement being the first Indigenous environmental agency in the Northern Territory to establish an IPA, the first to negotiate collaborative management of the IPA with the Northern Territory Parks and Wildlife Service, the first to develop a Sea Country Plan, and the first to negotiate a Shared Responsibility Agreement with the Australian Government.

The Dhimurru IPA comprises some of the traditional land of the Yolngu people. Its management approach is unique in that it balances Aboriginal tradition, practices and knowledge with mainstream management and science to ensure the conservation and management of both Indigenous and western values. It is a successful model both in terms of conservation and management. Dhimurru has played a particularly important role in marine turtle research and monitoring, including the use of satellite transmitters to track turtle migration and setting up patrols on beaches in the IPA to rescue and gather data about marine turtles that become entangled in abandoned fishing nets (so called 'ghost nets').



Bawuli with *Brachychiton* seeds

The protected landscape

IPAs are areas of Indigenous Freehold Tenure that are part of the Australian National Reserve Network but with management responsibility resting with the local Indigenous organisations rather than state or federal conservation agencies. The Dhimurru IPA is located in the far north east of Arnhem Land in Australia's Northern Territory, and protects much of the Gove Peninsula adjacent to the Gulf of Carpentaria. The Dhimurru IPA is adjacent to the Laynhapuy Homelands and the Yirralka IPA. The Gove Peninsula itself is characterised by bauxite plateau country with a coastline of sandy beaches. The IPA includes islands but excludes mining leases (e.g. the Rio Tinto Alcan Gove mining leases) and town lease areas. The coastline has extensive coastal dune systems, rocky headlands



Djawulu teaching the young kids the Brolga dance.

and granite outcrops, with partially vegetated rock and sand islands and tidal inlets of mangroves. Inland, vegetation ranges from sparse grasslands covering the primary sand dunes to relatively tall open eucalypt woodland on the sand plains and plateau further inland. Numerous small patches of monsoon woodland occur behind coastal dunes and areas associated with springs and creek lines (Harrison et al., 2009).

Aboriginal people have free-hold tenure over 50 per cent of the land area and over 80 per cent of the coastline in the Northern Territory. The Yolngu are the Aboriginal people of north east Arnhem Land, comprising 64 per cent of the region's population. They are the traditional owners of all the land in this region; an ownership recognised by the Aboriginal Land Rights (Northern Territory) Act of 1976 (Kennett et al, 2004). In general the area is not subject to high density settlement or major degradation of natural values (Langton et al, 2005). This is in part because the spread of 'European' culture into this area came only in the 1930s and did not to fully dispossess Yolngu from their land (Trudgen, 2000).

Dhimurru

The recognition of Yolngu land ownership and ultimately the development of the IPA can be traced back to the establishment of a bauxite mine and alumina refinery on the Gove Peninsula in the 1970s. The concern of the Yolngu people for the well-being of their land and threats to their autonomy and authority marked the beginning of the Land Rights movement in Australia. The eventual outcome of this movement and the empowerment provided to Yolngu by Land

Rights provided a vehicle for Yolngu to establish the Dhimurru¹ Aboriginal Corporation (nee Dhimurru Land Management Aboriginal Corporation) and the Dhimurru administered access permit system which provides a means for non-Yolngu people to apply for access to Yolngu land.

During the 1990s the Northern Territory government sought to enter into a joint management arrangement with traditional owners to establish a national park at Cape Arnhem. However, the Yolngu wanted to retain control of their lands and were concerned that joint management arrangements such as those proposed would see them losing the effective control so hard won through Land Rights. Yolngu repeatedly declined to enter into a joint management arrangement without a fundamental shift in the way such arrangements were structured. The development of the IPA programme in 1996 was a substantial step in the right direction providing a framework for conservation of the area enabling traditional owners to determine conservation objectives and the means for achieving them.

In March 2007 the Federal Court of Australia upheld an appeal by Yolngu traditional owners with respect to exclusive occupation rights to the sea country granting land rights extending down to the low tide mark in the Northern Territory. The intertidal zones are now recognised as Aboriginal 'land' and access is determined by Yolngu traditional owners through the Northern Land Council (Dhimurru, 2008). This court decision provides increased opportunity for Dhimurru to extend the IPA to include more marine estate within the IPA. The Dhimurru IPA is to date the only IPA in Australia to encompass marine areas having an area of approximately 101,000 hectares which includes 9,000 hectares of marine. Following on from the launch of its Sea Country Plan and aided by the decision outlined above Dhimurru is moving toward a substantial extension to its IPA to include marine areas adjacent to its current boundaries. It should be noted however that tenure itself is not a prerequisite to the declaration or recognition of an IPA and that the current marine extent of the Dhimurru IPA was included and recognised on the basis that the areas encompass registered sacred site complexes.

Dhimurru, the organisation and its associated IPA are widely regarded as a leading model of conservation and management, having a reputable track record of innovative environmental management and a tradition of developing productive partnerships with government and non-governmental organisations. In particular, Dhimurru's management approach is unique in that traditional owners are able to balance Aboriginal practices with mainstream management and science to ensure the conservation and management of both Indigenous and western values. Formal recognition of Dhimurru's successes includes considerable coverage in conservation literature worldwide and a wide range of awards.

¹ Dhimurru in Yolngu language is the name for the east wind and references the life giving rain that it brings.

In the following sections we elaborate on the significance of the biodiversity and biodiversity values within the north east Arnhem region, the contributions that Dhimurru has made to conservation, and how this relates to the Dhimurru's successful approach to conservation management.

Biodiversity importance and values

Indigenous lands of northern Australia are gaining increasing recognition for their significant conservation and biodiversity values (Altman et al., 2007, Woinarski et al., 2007) – recognition which does not surprise the Yolngu: “*We have always known that we have some of the most culturally and ecologically significant shores and sea country in Australia. Finally it seems the non-Indigenous world has caught up*” (Djawa Yunupingu, Dhimurru, 2006).

Compared with the recent loss of wildlife in most areas in Australia, the ecosystems of north east Arnhem Land are notable for their relative intactness. The Dhimurru IPA is particularly important for its high plant diversity and intact animal assemblages. It has the largest Quaternary dune system in Australia and contains important feeding and nesting sites for seabirds (Woinarski et al., 2007) and marine turtles (Walker Painemilla, 2010). Islands within the IPA support internationally significant breeding populations of Bridled (*Onychoprion anaethetus*) and Roseate Terns (*Sterna dougallii*), and several islands and islets are listed as internationally-recognised *Important Bird Areas* by Birds Australia (Chatto, 2001). 18 threatened species were recorded within the IPA in the 1990s, including three plant, 14 vertebrate and one butterfly species, and a range of fauna were regarded as ‘species of conservation concern’, including four bird species, nine reptiles and three mammals (Gambold et al., 1995). Since then a further plant, the extraordinary *Erythroxylum* located near Gove in East Arnhem Land, has been classified as Vulnerable. This one plant, stranded from relatives by the receding waters of the last ice age, but only recently ‘discovered’ by scientists, is possibly more than 10,000 years old and survives by sprouting copies of itself (Phillips, 2010). A number of plant and vertebrate species occurring in the IPA are restricted within the Northern Territory to the broader north east Arnhem region (Gambold et al., 1995).

Three broad terrestrial vegetation types have been identified.

- The primary vegetation of Eucalyptus, Darwin Woolly Butt (*Eucalyptus miniata*) and Stringybark (*E. tetradonta*), open woodland with a perennial Sorghum grassland understorey.
- Coastal areas of Stringybark, Darwin Woolly Butt and Smooth-stemmed Bloodwood (*E. bleeseri*) woodland also with a perennial Sorghum grassland understorey.
- Coastal dunes which consist of a wide variety of vegetation types including *Casuarina equisetifolia* woodland, monsoon vine-thickets, mixed grasslands, *Melaleuca* or grassland swamps, and mixed shrublands (Dhimurru, 2009).



Map 1: Dhimurru IPA (dark grey area)

Nature and culture

For the Yolngu, it is rather misleading to describe biodiversity and cultural values separately in terms of IPA management. As the management plan states: “*Our land and sea are infused with significance and meaning; no part of the landscape is without heritage and cultural significance*” (Dhimurru, 2008). The Dhimurru cultural heritage management plan notes that the area contains a rich variety of tangible and intangible cultural heritage values embodied in features such as sacred places, ancestral burial places, areas of traditional natural resource use, places of historic significance resulting from the Mission period, artefact assemblages consisting of stone and contact artefacts, shell middens illustrating changing responses to changing environments and grinding surfaces representing thousands of years of plant and pigment processing (Dhimurru, 2009).

But what is probably more significant here is the cultural value system of the Yolngu people which has influenced the management of their land for millennia. Families are at the centre of Aboriginal culture and land is seen as the embodiment of the deeds of past generations, and is thus literally related to those who own it (Holcombe, 2009). Caring for country is thus an integral part of life, and at the centre of the Yolngu concepts of caring for country is the sustainable utilisation of the land. The flora and fauna of the area have long been utilised as a source of food, medicines and material for the manufacture of tools. A number of species also function as ‘bio-indicators’, e.g. flowering signals the availability of desirable seasonal resources such as Djinydjalma (Mud Crabs) or Guku



Combined effort: Conservation Volunteers Australia, NT Parks and Wildlife and Dhimurru Rangers remove a large net

(sugarbag, wild honey). Many plants also play an important role in ceremonial and ritual aspects of Yolngu life.

Just as unorthodox for western conservationists is the Yolngu perception that species of conservation concern can legitimately be captured for food and ceremonial purposes. Indeed the Marine and Coastal Committee Taskforces strategy, *Sustainable Harvest of Marine Turtles and Dugongs in Australia – A National Partnership Approach* (2005), noted the threat of Indigenous harvest to these marine animals. But to see traditional use as a threat is to misunderstand the relationships between people and country. The Yolngu see the sea, and mammals within it, as sacred; a belief which drives their conservation efforts (Wild and McLeod, 2008). As the Yolngu state: *“we believe our wellbeing and turtle wellbeing are inseparable. To put it another way, we belong to turtles and turtles to us; we sustain them and they us”* (Dhimurru, 2006). In other words, the Yolngu relationship with their land and sea country, and its resources is fundamental to the religious, social and economic life and well-being of the Yolngu. Having their traditional activities seen as a threat is thus much disputed by the Yolngu, who feel: *“insulted that our long tradition of guardianship, management and use of these animals is*

diminished by such claims; as is our hard work in recent years embracing and using the new tools and methods available to us from contemporary conservation science and management” (Dhimurru, 2006). Traditional harvest is allowed under Northern Territory legislation.

Governance

All IPAs go through a process of public declaration, are declared under one or more IUCN categories, have a management plan and are entirely managed by Indigenous land owners. Dhimurru is listed on the Collaborative Australian Protected Areas Database 2006 and the World Database for Protected Areas as a Category V - Protected Landscape/Seascape.

The Dhimurru IPA is managed by Dhimurru Aboriginal Corporation on behalf of the Yolngu traditional owners. Seventeen clans are eligible to be members of the Corporation, which is governed by an elected Board whose Directors are members of the clans. The Board meets regularly to make operational and administrative decisions on behalf of the members (Dhimurru, 2008). The Corporation is accountable to the traditional owners who have control over decisions made on their lands. Their management structure draws on both Yolngu

and Ngapaki (non-Aboriginal people) knowledge available to guide research, training and management programmes (Marika et al, 2009). Dhimurru's partnerships with expert agencies such as Parks and Wildlife and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) are fundamental to this both ways approach. The IPA Vision Statement spells out the nature of the relationship – Dhimurru will rely on advice and assistance from Ngapaki but only Yolngu, those who own the law, will make decisions about what will happen on country.

Management

Dhimurru's overarching management paradigm is that any such management is a continuation of the "care and guardianship" of the Yolngu's country "as our ancestors have done" (Dhimurru, 2006). The use of traditional techniques of land management continues, including regulated harvesting of resources, and is secured through the relationships between rom (law/protocol), manikay (song/ceremony), gurrutu (kinship), bunggul (dance), wanga (homeland) and miny'tji (art) (Wild and McLeod, 2008).

Use and management of the IPA must be sustainable and protect the ecological and heritage values that are the result of generations of Yolngu management to ensure Yolngu children can see and use their land the same way as their ancestors have done. Management activities are separated into eight key areas: managing country and heritage protection; managing people; wildlife protection, management and research; sharing knowledge and public education; training and staff development; partnerships with others; tourism and business development; and monitoring and evaluation (Dhimurru, 2008).

The management of the IPA has also been formalised, documented and further developed in partnership with non-Indigenous science and knowledge. Management of the IPA is guided by the 2008-2015 management plan which has six overarching principles:

1. Yolngu control and empowerment
2. Respect for Yolngu values
3. Both ways management involving both Aboriginal and 'mainstream' traditions and practices
4. Continued development of collaborative partnerships
5. Ngapaki recreational values
6. Conservation and enhancement of natural and cultural values.

The day-to-day management decisions are conducted in partnership with the Northern Territory Parks and Wildlife Service (NTPWS) whose role and shared responsibilities are detailed in a Section 73 agreement under the Parks and Wildlife Act. Following the creation of the Dhimurru IPA, Dhimurru and the NTPWS came to a 21-year arrangement in 2002 to collaboratively manage the Dhimurru IPA. The agreement established Dhimurru as the primary land management agency under its own internal rules of governance. NTPWS provided a staff member to assist with training and day to day management,

as well as representation on an advisory group which meets three times a year. Functionally, the agreement provided an avenue for the flow of knowledge and skills both ways between the NTPWS staff and Dhimurru's Yolngu staff, which provided mutual benefits to both organisations. This collaborative arrangement was the first such arrangement for an IPA and has been so successful that there are now several NTPWS officers placed within Indigenous ranger organisations throughout the Northern Territory.

Dhimurru has an access permit system, enforced by the Dhimurru Rangers and the Northern Land Council, with assistance from NTPWS, which enables local residents and tourists to visit designated areas for recreation. Fees raised help fund management costs, with additional funds contributed by government and non-governmental organisations and Rio Tinto Alcan Gove (nee Nabalco and Alcan) (Walker Painemilla, 2010).

Dhimurru continues to consolidate and expand its activities. It has grown from a shoestring organisation employing four staff in 1992/3 to its current staffing of 21 and is now one of the most significant non-government Yolngu employers in the region.

Adaptive management and conservation actions

Research, monitoring and resulting conservation action have been key components of Dhimurru IPA activities since its inception. The conservation management of sea mammals in the Gulf of Carpentaria provides an excellent focus to illustrate the success of the IPA approach and the management challenges faced by the Yolngu.

The Gulf of Carpentaria has globally significant populations of Green (*Chelonia mydas*), Flatback (*Natator depressus*), Olive Ridley (*Lepidochelys olivacea*) and Hawksbill (*Eretmochelys imbricata*) turtles, collectively known as Miyapunu by the Yolngu. One major conservation issue is the impact of ghost nets on marine turtles. Between 1996, when monitoring began, and 2006 over 300 turtles have been found in ghost nets, with just over half being alive and released back into the sea (Dhimurru, 2006). Traditional owners, conservationists, scientists and government representatives from all parts of the Gulf of Carpentaria have developed a project, GhostNets Australia, to remove these nets from the coastline. The nets collected by Indigenous rangers are recorded in a variety of ways (location, size, configuration and animal entrapments) by the community groups involved in the project. The collated net data assists in negotiations with Australia's northern neighbours to address the problem of ghost nets at source. Website available identification charts and data sheets have been developed for the project to aid local community monitoring and reporting effort (Dhimurru, 2006).

Ghost net management is one of the activities included in the Northern Territory Regional Action Plan for the

Management of Dugongs and Marine Turtles, an initiative of the North Australian Indigenous Land and Sea Management Alliance (NAILSMA), of which Dhimurru is a member.

Through this document the Yolngu expressed their desire to focus on marine turtle conservation by:

- maintaining existing turtle recovery and rescue through ghost net and marine debris removal and monitoring programmes;
- extending and developing existing management arrangements, including surveillance and enforcement capacity and the supervision and monitoring of customary harvest;
- actively contributing to environmental and social impact assessment processes associated with mining and processing operations;
- developing educational tools and programmes for Yolngu, fishers, tourists and mine employees; and
- contributing to the development and implementation of marine management plans and strategies at the regional state and national levels (Dhimurru, 2006).

Other research partnerships to collect information on marine turtles distribution and abundance in the region and to quantify the Indigenous harvest of eggs and turtles have had a particularly important impact on turtle management and monitoring in the IPA. Captures by Yolngu hunters of Green (Dhalwatpu) and Loggerhead (Garun) turtles, previously tagged at nesting beaches in Queensland and Western Australia, led the Yolngu to question their received wisdom that these animals lived, fed and nested in local coastal-marine waters and that Loggerhead turtles nested under the sea. It became clear that western knowledge had concluded a quite different view respect to Loggerhead Turtle nesting, marine turtle biology and migratory behaviour; a situation which required further investigation (Kennett et al., 2004).

Dhimurru rangers visited the Mon Repos Sea Turtle Research Centre in Queensland where they saw a Loggerhead nesting. Following the trip Djalalingba Yunupingu, a Senior Lawman for Loggerhead turtle, spoke publicly of the profound impact of witnessing Loggerhead laying eggs on the beach in Queensland and learning that Loggerheads from his country travelled all the way to Queensland and Western Australia to nest. But questions still remained. Dhimurru thus developed a satellite tracking programme to trace the migrations of Green turtles as they left the nesting beaches of north-east Arnhem Land (Kennett et al, 2004). Unexpectedly, the Yolngu found that their Green turtles did in fact remain in the Gulf of Carpentaria with most travelling to foraging grounds in the south-west, a finding confirmed by genetic studies, in which the Yolngu also participated (Kennett et al, 2004b). The findings from this research show that the monitoring and management

plans developed in Dhimurru IPA can make a real difference to the successful conservation management of the marine turtle populations in the area.

In response to concerns of over use by Yolngu of marine turtles as a traditional food source, Dhimurru developed a research and monitoring project to assess the number and type of eggs and adult turtles being harvested by Yolngu. The research was based on interviews with hunters and traditional owners, datasheets delivered to communities to record details of egg collection or turtle capture, ground surveys of selected beaches where eggs are regularly harvested, and monitoring of stock-piled turtle shells. The results found that hunters targeted adult turtles, mostly female, and in some locations nesting females. The monitoring programme showed that there was regular unmanaged visitation to Cape Arnhem, and that the rate of egg harvest at this site was comparatively high. The management response to these findings has included the fencing off of the northern end of Cape Arnhem to prevent both Aboriginal and non-Aboriginal access to important nesting beaches. Yolngu hunters are also being urged to respect traditional hunting ways in which turtles are harpooned in the water and not taken while nesting (Kennett et al, 2004). These management actions and the research findings relating to turtle life cycles require Yolngu elders to fuse carefully any new information into a framework of traditional Law and ecological knowledge that has been accumulated over countless, ancestral generations observing turtles (Kennett et al., 2004).

Another important conservation activity that has produced outstanding results is a joint project with CSIRO to manage Crazy Ants within the north east Arnhem region. The Yellow Crazy Ant is listed as one of the world's worst invasive species because of its dramatic impacts on the environment and agriculture (Walker Painemilla, 2010). This project has now confirmed 26 localised eradications. Other initiatives include collaboration with researchers who described a new species of fly after Dhimurru *Metatrachia dhimurru* (Winterton and Woodley, 2009) and surveys for the rare northern hopping-mouse (*Notomys aquilo*) at Nanydjaka (Woinarski, 2004).

Monitoring activities

The 2008 management plan sets out the aim to extend surveys, mapping and monitoring in the Dhimurru IPA. It notes the need to:

- Increase the use of Yolngu scientific knowledge, skills and understandings to manage better country and wildlife through recording the knowledge of senior custodians about Yolngu natural and cultural resource management.
- Extend wildlife surveys, mapping and monitoring including a faunal survey of Cape Arnhem (which has now been completed); this includes the development of collaborative research and the need to complete the on-going marine habitat survey and mapping project.



Large Baru (crocodile) trapped and removed from the Town Lagoon

- Extend habitat survey, mapping and monitoring.
- Improve systematic and ongoing review and evaluation processes (Dhimurru, 2008).

Although current activities are focused on achieving conservation success, particularly in relation to marine mammals, the Dhimurru Sea Country plan highlights the shortcomings of the current research and highlights the lack of long-term monitoring. The plan states: *It is clear to us that careful and sustained monitoring of turtle populations, and nesting behaviour is essential for their survival and proper management. For information to be useful it needs to be collected over a long period of time (at least 10 years) and will need to be collected in a systematic and standardised way. This complex task is too large to undertake on our own and needs to be coordinated across northern Australia and linked to other sites the turtles migrate to.* The plan thus suggests the development of a Gulf of Carpentaria marine turtle management strategy that “*provides protection for turtles and their habitats, and that acknowledges the primary role of Indigenous*

people and allows for ongoing subsistence harvest of turtles and eggs”. The plan thus calls on the Parks and Wildlife Service and their Dept of Natural Resources Environment and the Arts to coordinate the range of research, monitoring and management programmes and projects required and suggests a five-step approach to monitoring selected ‘index’ beaches:

1. Use the Parks and Wildlife Service’s initial mapping of turtle rookeries and discussion with traditional owners to identify index beaches.
2. Work out monitoring arrangements that combine aerial survey with ground-based survey using local resources, according to capacity. For example at Dhimurru we would value a systematic, monitoring role that could become part of our routine on country ranger role.
3. Continue on the ground management actions that include our marine debris and ghost net projects, control of feral pigs who destroy nests, restricting access to vulnerable beaches and working with our leaders to ensure correct customary use.

4. Concurrently collect and record customary knowledge under the direction of traditional owners.
5. Establish data recording and ensure information sharing (Dhimurru, 2006).

The Sea Country plan also calls for more local-scale monitoring of the fisheries industry in the Northern Territory. The plan questions the sustainability of fisheries and notes that regional monitoring can obscure local impacts. The plan calls for finer scale information to support environmentally and culturally sustainable locally based area management.

Finally, Dhimurru is leading the way in the development and implementation of an information system, the Dhimurru Information Management System, which provides a seamless platform for uptake, processing and reporting of field data. The system also has provision for managing sensitive cultural information through a user authorisation system.

Lessons learned and future challenges

Yolngu are tackling some serious ecological issues by adapting traditional knowledge and environmental practices to ensure the maintenance of culture, conservation and economically important species and habitats for future generations. Despite the size of the challenges, the great number of unique achievements and the overwhelming number of awards received by Dhimurru Aboriginal Corporation in its relatively short existence are clear testament to the success of the Dhimurru management framework and ideals. Dhimurru is managing country as an integrated social-spiritual-ecological system, not just focused on 'fixing' the physical elements of country but improving human knowledge and relationships to this system (Kennett et al, 2004).

There are many managerial and operational factors that are synergistically attributable to Dhimurru's successes. One is land security and the ability of the Yolngu to exercise governance structures. Many constructive partnerships made between Dhimurru and government and non-government agencies have also clearly created greater outcomes than would have been possible with any single agency attempting such work alone. Other factors include inspiring leadership and effective management practices, as well as a willingness to innovate (Bauman and Smyth, 2007).

But despite all of the successes, many major challenges remain. First is conservation management with the uncertainty of climate change. Climate change predictions for the Northern Territory are based on quantified trends of increased rainfall and temperatures, a longer wet season, and intensified, but not necessarily more frequent, cyclones. Dhimurru is working with the Charles Darwin University on a new scenario modelling project to help the Yolngu explore what their country may look like with climate change and

how they can respond to these changes through adaptation measures (Puig et al, 2009). Once again showing how the management of Dhimurru although based on tradition is prepared to adapt to changing circumstance and knowledge.

Similarly, ways of enhancing management authority over the IPA marine area as well as how to extend this management over areas outside the IPA remain largely untested (Bauman and Smyth, 2007). The step towards this has been the development of the Sea Country Plan, more recently Dhimurru has embarked on a further planning project working with the Department of Natural Resources, Environment, The Arts and Sport and Queensland University. This project is collating existing natural and cultural resource information on the marine environment immediately adjacent to the Dhimurru IPA as well as undertaking further primary research articulating cultural connections. The project aims to develop an understanding of what might be a realistic seaward extension to Dhimurru's management programme and IPA and how sea country zoning might be implemented to assist in management planning and implementation. The project is using tried and tested Marxan software to create zoning plans incorporating natural and cultural resource information. The use of Marxan to process cultural heritage data is a novel and ground breaking initiative.

In the short to medium term some of the projects Dhimurru will be undertaking include: moving to declare a seaward extension to its IPA; develop a strategic approach to biodiversity management, undertake cultural landscape mapping across the IPA; and embark on a fire mapping and research project aiming to reinforce cultural burning practice whilst promoting conservation outcomes. Meanwhile Dhimurru will continue to deliver on its management plan commitments including, cultural heritage, biodiversity, visitor management, and IPA commitments.

Conclusion

The Yolngu have been custodians of north east Arnhem Land for thousands of years, and have developed highly complex social and religious systems that clearly define their relationships with their land and sea country, and the biodiversity it contains. Despite radical changes to their traditional livelihoods in modern times, their connection to country remains strong, and thus the landscape and its wealth of flora and fauna remain fundamental to the religious, social and economic life and well-being of the Yolngu. Through the development of Dhimurru and its IPA, the formal recognition provided by governments at all levels ensuring the Yolngu as the region's primary land managers have proven to be a great success, and a new model as a successful conservation strategy. These successes are partly responsible for the significant increase in the IPA programme, giving traditional owners the ability to conduct conservation for the national interest, which will no-doubt lead to further conservation benefits for Australia.

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Steve Roeger has a Degree and a Bachelor of Applied Science in Natural Resource Management. He currently works for the Dhimurru Aboriginal Corporation as their Executive Officer and has been in this position for the past ten years. During his tenure with Dhimurru Steve has seen the organisation through a period of expansion extending its land management programme to include introduction of a dedicated Sea Country team and a women's ranger team. Steve has held positions on the Alligator Rivers Advisory Committee, the Cobourg Peninsula Marine Park Board, the Kakadu Region Social Impact Assessment Advisory Group, and more recently the Garma Festival organising committee.

Phil Wise was employed by the Parks and Wildlife Service of the Northern Territory for 11 years in various locations. Between the years of 2003-2008 he was based in Nhulunbuy and was the first ranger to work alongside Dhimurru under the unique "section 73 Agreement" between the two organisations. He provided site-based management advice and assistance, as well as fulfilling the role as a conservation officer for the region. The both ways management approach employed by Dhimurru was a source of inspiration and learning to Phil, and the cross cultural context of the daily work provided many positive outcomes and challenges. Phil now works as a wildlife biologist with the Save the Tasmanian Devil program, based in Tasmania however he tries to maintain the strong bonds with the land owners and other colleagues in North East Arnhem Land.



Mexico: Wildlife conservation on community conserved lands in Oaxaca

Elvira Duran, James Robson, Miguel Briones-Salas, David Barton Bray and Fikret Berkes

Summary

Oaxaca is one of the most biologically diverse states in Mexico, itself a mega-diverse country. Yet the vast majority of its forestlands are owned and managed by local and indigenous communities, with very few government-run protected areas. This chapter is one of the first attempts to collate empirical data on the rich and varied wildlife found across Oaxaca's communal territories, and to better understand the role played by indigenous and community conserved areas (ICCAs) in the protection of that wildlife and its habitat.

Introduction to the protected landscape

Across the world, government-run protected areas have long been considered the most effective way to maintain habitat for healthy wildlife populations (Mace et al., 2010). However, alternate or complementary paradigms of indigenous and community conserved areas (ICCAs) and co-management, whether formal or informal, have more recently emerged (Berkes, 2009). ICCAs are based on the assumption that many areas under various forms of community control or access have been conserved, whether actively or passively, and that this sector should become a major conservation strategy along with public protected areas¹ during the twenty-first century (Chape et al., 2008). Although local approaches to conservation are nothing new – indeed, they enjoy a lengthy tradition among many cultures – only now are their existence and effectiveness being more widely acknowledged (Berkes, 2009; Boege, 2008; Dowie, 2009).

Mexico has a strong tradition of community forest management, particularly in community management for timber production (Bray et al., 2008). The country is also emerging as a major centre for the formal recognition of ICCAs, with community management now extending to more active forms of conservation (Robson, 2007). While Mexico continues to consider the establishment and strengthening of a national network of public protected areas as its principal conservation strategy, in May 2008 the country's



Zapotec community lands, northern Oaxaca

environmental legislation was modified to incorporate an additional mechanism for protecting wildlife habitat and biodiversity: *Áreas Voluntarias de Conservación* or Voluntary Conservation Areas (VCAs)². Under this mechanism, territory decreed by indigenous and other local communities as ICCAs (as well as private protected areas) could be officially recognized and certified by the National Protected Area Commission (CONANP) for their contribution to meeting Mexico's biodiversity conservation goals (Ortega et al., 2010). The VCA initiative was borne out of a realization that new types of protected areas were needed given the high degree of communal ownership over much of the country's territory.

Given this context, and focusing on the southern Mexican state of Oaxaca, we look at the role that ICCAs and larger community-dominated landscapes play in providing viable habitat for mammals and other forms of wildlife. These local ICCAs show the potential to form an alternative conservation strategy in Mexico that can complement government-run

¹ IUCN recognises four governance types of protected areas: government run protected areas; co-managed protected areas (shared management with governmental and non-governmental actors); private protected areas and Indigenous or community protected areas.

² VCAs constitute a new federal protected area category to be incorporated into the National Registry of Protected Areas (*Registro Nacional de Áreas Naturales Protegidas*) (Martin et al. 2010b)

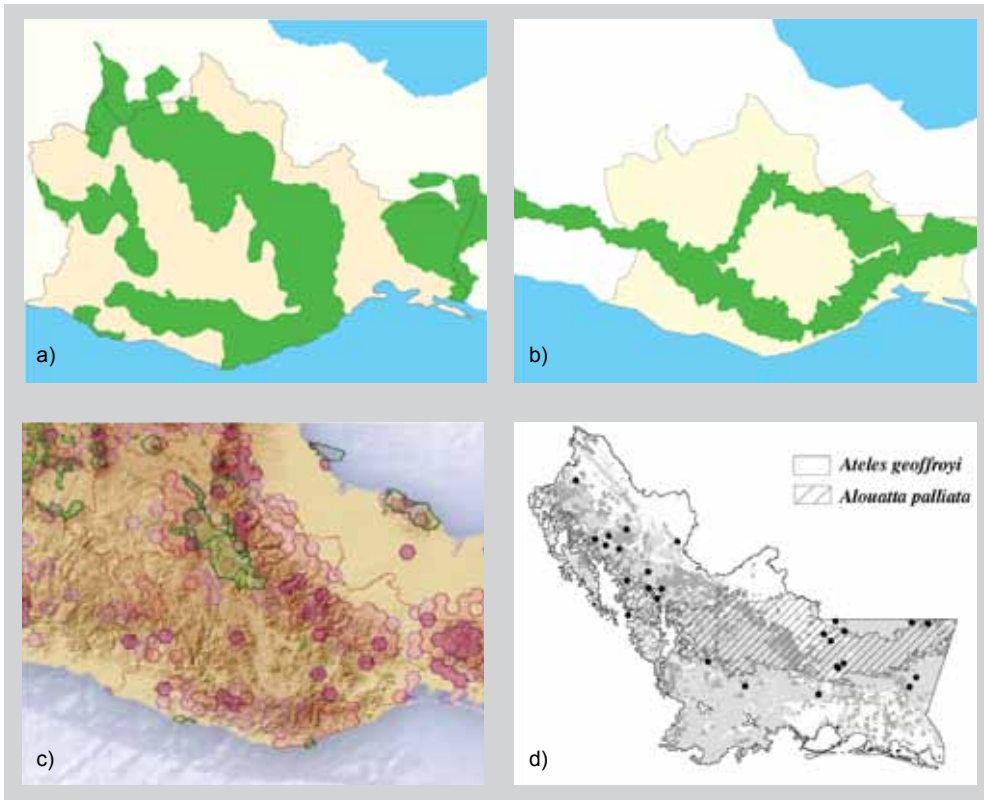


Figure 1: Clockwise from top left: a) Terrestrial regions with priority for conservation in Oaxaca (Arriaga et al. 2000); b) Partial jaguar corridor around Oaxaca state (www.panthera.org); c) Priority areas for conservation biodiversity (darker shade of hexagons denoting higher priority (CONANP-CONABIO, 2007); d) Predicted areas for distribution of spider monkey (*Ateles geoffroyi*: complete area) and mantled howler monkey (*Alouatta palliata*: diagonal lines), both restricted to east and northeast Oaxaca (modified from Ortiz-Martínez et al. 2008).

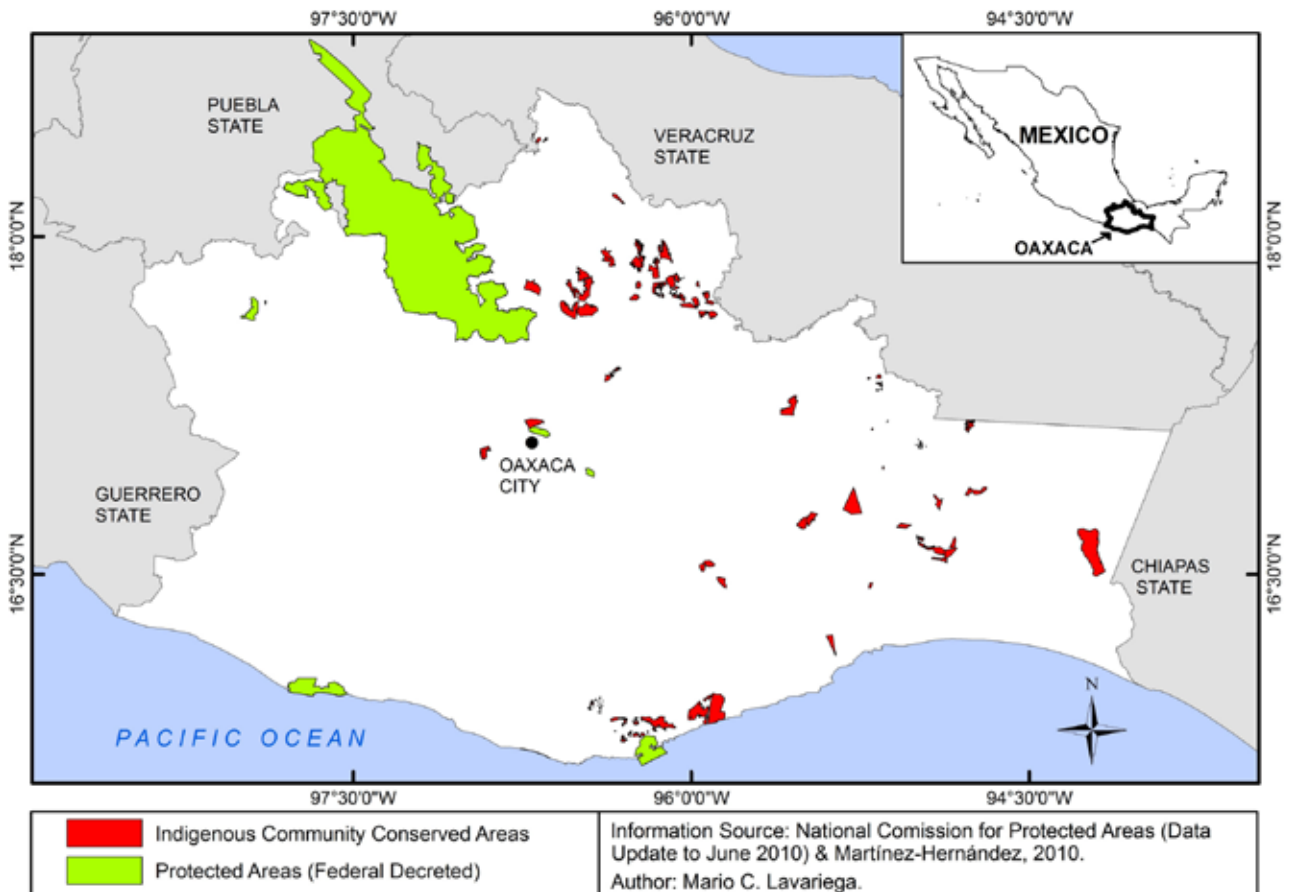


Figure 2: The location of public protected areas (green) and certified ICCAs (red) as of June 2010.



Forest vista, community lands in Chinantla region of northern Oaxaca

protected areas. Although Oaxacan ICCAs can incorporate a mix of different conservation approaches, and thus fall under several IUCN protected area categories, analysis shows that the majority are compatible with category V protected areas, where the “interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value”.

Oaxaca: A biological and cultural heritage

Oaxaca covers 9.37 million hectares or 4.8 per cent of Mexican territory, and is home to almost 3.5 million people (INEGI, 2009).

Of these, over 40 per cent are indigenous and represent 16 distinct ethno-linguistic groups (CDI-UNDP, 2006), just over a quarter of all such groups found in Mexico. Over a third of Oaxaca’s population is still comprised of people who speak an indigenous language (Hernández-Díaz, 2007). In addition to high cultural diversity, Oaxaca (along with Chiapas, Veracruz and Guerrero) forms part of the most biologically diverse region in the country (García-Mendoza *et al.*, 2004). Two main factors account for this. First, it marks the confluence of the neo-arctic and neo-tropical biogeographic regions. Second, it is situated where the country’s two main mountain chains meet. The result is a uniquely complex physiographic landscape, a highly varied

mix of topographic, geological and climatic conditions, and a wide range of temperate and tropical forest ecosystems.

Despite this rich biological and cultural heritage, Oaxaca is one of the most impoverished and marginalized states in Mexico from a socio-economic standpoint. It has the second highest mortality rate, the second-highest proportion of households without sewage, electricity or potable water, and the second-lowest level of schooling in the country. A reported 26.9 per cent of the working population is outside the (formal) wage economy (INEGI, 2009). Restricted employment opportunities and low pay have encouraged hundreds of thousands of men and women to migrate to other parts of the country and further north into the U.S. Over the past decade, Oaxaca has joined a small number of Mexican states to become a net exporter of migrant labour (INEGI, 2009).

While much of Oaxaca’s territory is considered a biodiversity hotspot (Arriaga *et al.*, 2000; CONABIO-CONANP, 2007; Figure 1 a & c), most of this biodiversity is found on communal rather than public lands, with an estimated 72 per cent of state territory classified as community common property under Mexico’s agrarian legislation (Martin *et al.*, 2010a; Ortega *et al.*, 2010). Only 4.56 per cent of Oaxaca’s territory falls within a state or federal protected area, with a total of eight protected areas accounting for about 327,977 ha (Figure 2). Almost 90 per

Table 1: Fauna species in Mexico and Oaxaca according to taxonomical group and endangered status

Group (Class)	Species in Mexico	Species in Oaxaca	National Percentage	Endangered Category*
Continental Fish	384	127	33.07	11
Amphibians	285	133	46.67	58
Reptiles	693	245	35.35	143
Birds	1 100	736	66.91	195
Mammals**	450	190	42.22	65
Total	2 912	1 431	49.14	472

* The Mexican Law for endangered species is known as NOM-59.

** Mammal data includes updated registers in the Oaxaca mastozological collection (Briones-Salas, 2010).

cent of this area is found within a single large biosphere reserve. In contrast, a total of 104 ICCAs, covering a total of 127,300 ha, had been formally certified by the federal government as of June 2010 (Martínez-Hernández, 2010).

The number of informal ICCAs in Oaxaca, however, is much higher; including areas likely to be certified in the future as well as others that exist fully outside the VCA process and are based upon internal community agreements. Many have been established quite recently; Martin et al. (2010b) found that owner communities decreed 126 ICCAs between 2003 and 2009, thereby more than doubling the state's protected area coverage.

Besides wildlife conservation, it is important to note that indigenous community lands in Oaxaca are also recognized for their contribution to preserving agro-diversity in maize, beans, peppers, cabbage, tomatoes, and many other edible domesticated and semi-domesticated crops (Boege, 2008).

Wildlife on Oaxaca's community lands

Despite the fact that government and public recognition of ICCAs and other local conservation initiatives have grown in recent years, their contribution to protecting wildlife is not well documented. To help fill this gap, in this section we present a synthesis and analysis of available data on fauna found in ICCAs and community lands across the state's important ecosystems.

The available data suggest that Oaxaca harbours close to half of all wildlife species found in Mexico, including many species at risk (Table 1; García-Mendoza et al., 2004).

The inventories compiled to date show how abundant wildlife is on community lands, suggesting that viable habitat is contained within local landscapes that incorporate a mix of productive, low-intensity use and protected land uses along altitudinal gradients and across vegetation types (Peterson et al., 2003; Bray et al., 2008; Briones-Salas, 2010; Figel et al., 2011).

Table 2 provides a summary of existing mammal inventories for the state. Oaxaca's mammals have been

recognized for both their high richness and endemism. While most are small mammals and thus garner less attention from conservationists, government and the general public, they still remain important from an ecological perspective (Briones-Salas, 2010).

In addition, the presence of emblematic species – such as jaguar (*Panthera onca*), puma (*Puma concolor*), margay (*Leopardus wiedii*), ocelot (*Leopardus pardalis*), yaguarundi (*Herpailurus yagouaroundi*), Bobcat (*Lynx rufus*) and tayra (*Eira barbara*) – have also been documented (in both ICCAs and production landscapes) (Martínez-Hernández, 2010; Figel et al., 2011; Luna-Krauletz, 2011). Indeed, recent work shows that at least six carnivore species that have been prioritized under Mexico's current conservation planning are found across the communal lands that dominate Oaxaca's territory.

Threats to Oaxaca's flora and fauna have emanated from a variety of types of human disturbance. Forest composition, structure and regeneration (and thus habitat quality) have all been altered through agriculture, fires, the collection of hardwoods for fuel and pine and oak for timber, and cattle grazing. Urbanization, tourism development, mining and road building have been important large-scale drivers. The degree of impact, however, varies from region to region. While the Mixteca region has been heavily impacted historically, across the rest of Oaxaca, it is the more accessible coastal areas, central valleys and eastern lowlands that have been more affected than the relatively isolated and marginalized highland regions. Here, a low-moderate disturbance regime through low-intensity logging and small-scale rotational agriculture have led to a more pronounced spatial heterogeneity in forest structure and composition, and created a forest-agricultural mosaic that comprises a complex mix of vegetation types and natural features (Robson and Berkes, 2011). It is in these areas that the majority of ICCAs are found.

In terms of key ecoregions within Oaxaca (Arriaga et al., 2000; Figure 1a), ICCAs and other land use practices have

Table 2: Mammal reports from different taxonomic levels by location

Level	Orders	Families	Genera	Species (% in Oaxaca)
Protected areas	8	18	42	60 (31.4)
ICCAs	9	21	60	70 (36.6)
Protected areas and ICCAs	9	22	68	105 (55.0)
Oaxaca State	11	28	114	190

Source: Original georeference data from national inventory held by CONABIO, plus updated data from Oaxaca's Mastozoological Collection (Briones-Salas, 2010). The list of protected areas and ICCAs used was updated as of June 2010 (Martínez-Hernández, 2010).

helped to protect important tracts of high conservation value forests (HCVFs). They include HCVFs in the Chimalapas region in the Isthmus of Tehuantepec, which constitutes the largest remnant of northern tropical rain forest in southeast Mexico, and the upper Chinantla (Papaloapan region), which comprises one of Mexico's largest extensions of intact cloud forest (Peterson et al., 2003; Bray et al. 2008; Ortíz-Martínez et al., 2008). Community-owned bays and watersheds in Huatulco, on the southern coast of Oaxaca, include coastal ecosystems and tropical dry forest that also harbour a rich variety of wildlife (García-Mendoza et al., 2004).

These very same areas have been identified by the Mexican government (CONABIO-CONANP 2007) as extreme priority regions for future conservation initiatives. As of June 2010, the Chimalapas, Chinantla and Huatulco regions accounted for 96 of the 104 certified ICCAs in Oaxaca. Specifically, the Isthmus of Tehuantepec included 45 certified ICCAs that cover 53,313 ha; the Papaloapan region had 24 certified ICCAs covering 50,740 ha; and the Huatulco (Costa) region incorporated 27 certified ICCAs covering 8,815 ha (Martínez-Hernández, 2010). Little is known empirically about the degree of ecological connectivity between such ICCAs. However, given that many can be found on neighbouring communal territories, there is little doubt that networks of conservation lands (albeit incomplete and not planned in a formal sense) do exist and are increasing in size.

As mentioned previously, a substantial number of informal ICCAs are recognized by community decision only (Martin et al., 2010). As one example, the communities of Santiago Comaltepec, Yolox and Ixtlán de Juárez in the Sierra Norte of Oaxaca have, among them, more than ten thousand hectares of (contiguous) montane tropical forest under informal community protection and have not sought certification from the government. Indeed, while an increasing number of ICCAs are being certified under the VCA mechanism, many are not and thus still considered to



Camera trap pictures from top to bottom: *Panthera onca*, *Puma concolor* and *Mazama Americana*

Table 3: Critical wildlife habitat found on Oaxaca's community-owned lands

Geopolitical region	Forest Type / Habitat	Notable Wildlife species	IUCN Redlist ¹	CITES ²	NOM-059 (Mexican Norm) ³	Principle human activities
Tuxtepec / Papaloapam	Tropical rainforest	Spider monkey (<i>Ateles geoffroyi vellerosus</i>)	Endangered	Appendix II	Extinction risk	Agriculture, ranching, ecotourism, conservation
		Tapir (<i>Tapirus bairdii</i>)	Endangered	--	Extinction risk	
		Toucan (<i>Ramphastidae</i> spp.)	--	Appendix I	--	
		Parrots (<i>Psittacidae</i> spp.)	--	Appendix I/II	--	
	Cloud forest, temperate oak and pine forests	Jaguar (<i>Panthera onca</i>)	Near Threatened	Appendix I	Extinction risk	Agriculture, ecotourism, conservation
		Mazate (<i>Mazama americana</i>)	Data Deficient	--	--	
		Cabeza de Viejo (<i>Eira barbara</i>)	Least Concern	Appendix III	Extinction risk	
		Crested Guan (<i>Penelope purpurascens</i>)	Least Concern	Appendix III	Endangered	
Sierra Norte	Temperate pine-oak forests, small extensions of cloud forest, tropical dry forest	Puma (<i>Puma concolor</i>)	Least Concern	Appendix II	--	Forestry, agriculture, ecotourism, conservation
		Jaguar (<i>Panthera onca</i>)	Near Threatened	Appendix I	Extinction risk	
		Yaguarundi (<i>Herpailurus yagouaroundi</i>)	Least Concern	Appendix I	Endangered	
		Bobcat (<i>Lynx rufus</i>)	Least Concern	Appendix II		
Istmo	Tropical rainforest, cloud forest and semi-deciduous tropical forest	Tapir (<i>Tapirus bairdii</i>)	Endangered	--	Extinction risk	Agriculture, ranching, conservation
		Jaguar (<i>Panthera onca</i>)	Near Threatened	Appendix I	Extinction risk	
		Mantled Howler Monkey (<i>Alouata palliata</i>)	Least Concern	Appendix I	Extinction risk	
		Harpy Eagle (<i>Harpia harpyja</i>)	Near Threatened	Appendix I	Extinction risk	
		Scarlet Macaw (<i>Ara macao</i>)	Least Concern	Appendix I	Extinction risk	
		Cinnamon-tailed Sparrow (<i>Aimophila sumichrasti</i>)	--	--	Extinction risk	
		Resplendent Quetzal (<i>Pharomachrus mocinno</i>)	Near Threatened	Appendix I	Extinction risk	
Cañada	Tropical dry forest	Macaws (<i>Ara macao</i>)	Least Concern	Appendix I	Extinction risk	Ecotourism
Valles Centrales	Tropical dry forest and cloud forest*	Saw-whet owl (<i>Aegolius acadicus</i>)	Least Concern	--	--	Agriculture, urban services, tourism
		Big Small-eared Shrew (<i>Cryptotis magna</i>)	Vulnerable	--	Special Protection	
		Barred Parakeet (<i>Bolborhynchus lieola</i>)	Least Concern	--	--	

Geopolitical region	Forest Type / Habitat	Notable Wildlife species	IUCN Redlist ¹	CITES ²	NOM-059 (Mexican Norm) ³	Principle human activities
Sierra Sur	Temperate pine-oak forest, tropical dry forest and semi-deciduous tropical forest	Pygmy spotted skunk (<i>Spilogale pygmaea</i>)	Vulnerable	--	Endangered	Forestry, ranching, agriculture
		Frog (<i>Plectrohyla labedactyla</i>)	Data Deficient	--	--	
Costa	Coastal lagoon, small areas of mangrove	Freshwater crocodile (<i>Crocodylus acutus</i>)	Vulnerable	Appendix I	Special Protection	Ecotourism

* Includes private lands (some voluntary initiatives for conservation), state parks and common lands. ¹Version 2011.2, ²CITES update April 2011, ³NOM-059 Mexican Norm 2010.

constitute 'unprotected' lands by government conservation agencies; unfortunate given the reality of local land use practices, which have been shown to be compatible with biodiversity conservation (Robson, 2007; Robson and Berkes, 2011).

Table 3 lists the critical habitat maintained by local initiatives in the Chimalapas, Sierra Norte-Chinantla, Cañada, Sierra Sur and Costa regions. Examples include those designed to directly benefit jaguar (*Panthera onca*), spider monkey (*Ateles geoffroyi vellerosus*) red macaw (*Ara macao*) and green macaw (*Ara militaris*), in addition to species that require very specific and interconnected habitat conditions such as freshwater crocodile (*Crocodylus acutus*), tapir (*Tapirus bairdii*), several bird species, and endemic amphibians such as *Plectrohyla labedactyla*, a frog that has only been found in the southern Oaxacan community of San Vicente Lachixio (Ochoa-Ochoa *et al.*, 2009; IUCN Redlist).

The data from these numerous studies and inventories suggest that Oaxaca's wildlife is found predominantly on community-owned, managed and conserved lands, rather than government-run protected areas. For example, the study by Illoldi-Rangel *et al.* (2008) developed ecological niche models for 183 terrestrial mammals in a systematic conservation planning exercise, with forty-five species selected for further analysis based on their listed status as endangered, threatened or endemic. The study showed that the majority of these species were not present in established state or federal protected areas but rather found on community-owned lands. The most important terrestrial eco-regions in Oaxaca were identified as montane cloud forest and pine-oak forests; with the largest tracts owned by local and indigenous communities, and managed for both domestic and commercial end-uses.

Conservation in a multifunctional landscape

Although sustainable timber production, and other forms of resource use that fall under IUCN Category IV, can be considered compatible with high biodiversity, many communities are now moving beyond production to adopt stricter forms of community conservation. Indeed, the recent certification of ICCAs constitutes a new and progressive effort by the Mexican government to acknowledge such grassroots efforts. Despite this trend, it should be noted that local people have been maintaining high biodiversity on their lands long before the country's conservation planners formally recognized them. ICCAs in Oaxaca, as well as some adjacent common lands, are clear examples of category V areas, in that they recognize the importance of landscapes with significant associated habitats, flora and fauna and associated cultural features (Dudley, 2008). These areas are reflective of long-term human-environment interactions that are based on a mix of traditional and more contemporary agricultural and forest management practices, where wildlife conservation and the maintenance of agricultural biodiversity are key goals.

Community conservation initiatives form just one component of a multifunctional landscape model, which combine multi-crop production for subsistence, pasturelands for grazing, forestlands dedicated to logging, the protection of ecosystem services, wildlife refuges and the harvesting of non-timber forest products. Such a model appears quite distinct from the more systematic conservation planning approach that the federal government currently promotes (Robson, 2007). Whether explicitly conservationist or not, ICCAs are but one facet of hybrid (contemporary-traditional) land use systems where low-to-moderate forest disturbance regimes combine



Figure 3. Wildlife as conservation icons among Oaxacan indigenous communities: Jaguar pawprint used by Chinantec communities to spearhead their conservation initiatives.

with elaborately crafted resource institutions to help maintain forest cover and quality (Bray et al., 2008; del Castillo et al., 2009; Figel et al., 2011). If we return to Table 2, it is worth noting that a significant number of Oaxaca's mammals are not found within either government protected areas or ICCAs.

In this way, while government-certified ICCAs are welcomed as forming a valuable public policy tool for conservation in regions where biological and cultural diversity are clearly interconnected, planners and strategists should not lose sight of the fact that biodiversity in such places is more often associated with common property governance regimes and usable resources (such as sustainable logging and ecotourism) rather than national parks or biosphere reserves.

ICCAs, in this context, constitute part of much larger territorial land use plans that integrate zones designated for habitat and watershed protection with agricultural (productive) areas, low impact logging and urban zones. Extractive activities are regulated and/or restricted; with sets of written rules (community statutes) clearly defining (and limiting) whom has access to, and use of forest resources. Locally elected communal authorities are responsible for rule enforcement, as well as supervising and monitoring all areas under use or protection (Bray et al., 2008, Robson, 2007). Such management is indicative of the multiple values – both intrinsic and extrinsic – that many communities afford their lands and natural resources. Planning of this kind often involves alliances between the local community, government agencies and NGOs or technical advisors; an example of the multi-scale governance considered important for in situ conservation in real-world settings (Bray et al., submitted).

One unresolved key issue concerning ICCAs and their future governance arises from the lack of certainty in the legal framework and set of incentives for their establishment and government certification. The modification of Mexico's

environmental laws that provides for the certification of ICCAs was passed in May 2008, yet as of late 2011 no regulations to govern these certified areas had been issued, creating considerable uncertainty with respect to the rules. As well, it has not yet been established what levels of support may be forthcoming from the federal government for officially certified ICCAs. Mexico's large-scale payment for hydrological services program (CONAFOR, 2010) has overlapped with many of the ICCAs and provided a short-term incentive and has been an important stimulus for community organizing around them in some cases (Bray et al., submitted). However, the future of this programme is not clear and there is no international agreement on the role of environmental services programs in biodiversity protection (Herkenrath and Harrison, 2011).

Time will tell whether official protected area status actually helps or hinders community conservation over the long term. Much depends on the type and degree of government involvement in these novel institutional arrangements. The other likely threat to local conservation initiatives in Oaxaca concerns the fact that to cover many of the associated costs (maintenance, monitoring, surveillance etc.) communities are dependent upon the existence of a productive rural population with an active presence on the land. The ongoing abandonment of farming and forestry amid elevated rates of rural out-migration (Robson and Berkes, 2011) has seen the pool of knowledgeable land users dwindle; a trend that could undermine local capacities to maintain land use patterns and manage community-conserved areas.

Lessons learned, future needs and predictions

Across the community lands of Oaxaca, the presence of big cats, tapir, crocodiles, macaws and monkeys act as an indicator of the success of local resource management strategies and decision-making. Community efforts, through the establishment of ICCAs, are creating an important portfolio of category V protected areas in Oaxaca that are a product of historic and contemporary human-environment interactions. This chapter has shown how these areas are home to threatened or endemic species, and thus show potential for fitting into broad-scale approaches to conservation in Mexico. Indeed, Oaxaca's ICCAs compare most favourably to public protected areas for delivering biodiversity conservation. This chapter, however, is no more than a first attempt to collate available data on wildlife found in community lands. There is an urgent need for an integrated and participatory system of monitoring that can properly evaluate the effectiveness of Oaxaca's ICCAs as a conservation policy option.

This is crucial if ICCAs are to realise their potential, not only as protectors of Oaxaca's impressive and important wildlife, but also to provide long-term benefits to the people involved in these kinds of local conservation initiative. An



Zapotec multifunctional landscape

important challenge for ICCAs and adjacent landscapes where nature conservation, human presence and land management practices overlap is to ensure that bio-cultural diversity can be harnessed to generate tangible social and economic gains; crucial indeed given Oaxaca's standing as one of the most impoverished and marginalized states in Mexico. This is beginning to happen with local people able to appreciate the economic benefits that may result from the formal promotion of biodiversity-friendly activities. In the Chinantla, for example, the jaguar has become an icon around which communities have organized their conservation projects (Figure 3); recognition among such communities that specific species can be used as leverage to access streams of conservation monies and promote non-extractive uses such as eco-tourism and payment for environmental services.

The emergence of certified ICCAs gives communities formal recognition for their efforts if they choose to pursue it. These ICCAs may benefit from the new approach of the Convention on Biological Diversity (CBD) to promote and support socio-ecological production landscapes (CBD, 2010), and also regional and local actions (Herkenrath and Harrison, 2011). In addition, there is potential for formal and informal community biodiversity conservation strategies and activities to be recognized and rewarded in Mexico's REDD+ planning. The country's National Forest Commission

is planning some of its 'early actions' around REDD+ for Oaxaca (CONAFOR-SEMARNAT, 2011), so the degree to which they incorporate existing community initiatives to control deforestation will be an important test of the programme's capacity to adopt environmental justice as a core component.

Finally, the quickening pace of global climate change means the disruption of ecological communities and forced range changes or extinction for those species unable to adapt (Rands et al., 2010). As such, there is a pressing need for areas of habitat under various degrees of protection to exist well-beyond public protected areas (Chape et al., 2008; www.panthera.org – see Figure 2b). As part of well-managed community lands, ICCAs can provide connected natural and semi-natural habitat with public protected areas that maximize the capacity of species to adjust to rapidly shifting conditions. While existing public protected areas have been called “the cornerstone of conservation efforts” (Mace et al., 2010), grassroots initiatives like those in Oaxaca will have to become a second ‘cornerstone’ of conservation to help stem biodiversity losses due to multiple threats in the twenty-first century (Dowie, 2009). The recently announced goal of the CBD to expand terrestrial (and inland water) protected areas to 17 per cent globally, cannot be met without them (Herkenrath and Harrison, 2011).



Tropical dry forest after Summer rains, northern Oaxaca

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India: Community conservation at a crossroads¹

Neema Pathak Broome and Nandita Hazarika

Summary

Over the last decade Khonoma, a village in northeastern India inhabited by the Angami, one of the indigenous or tribal people of the state of Nagaland, has demonstrated a resolute will to conserve biodiversity and wildlife. By establishing and strengthening systems of natural resource management and conflict resolution, including through the development of the Khonoma Nature Conservation and Tragopan Sanctuary, the village is exemplifying a search for appropriate and sustainable development. All this is embedded in the traditional ethos of the village, coupled with an openness to experiment with new technologies and ideas from outside the village. The results are impressive enough to warrant more attention for this historically well-known warrior village, this time in the annals of India's environmental movement. However, despite many successes the village today stands at crossroads as it struggles to find incentives that will sustain conservation in the long run whilst maintaining its relevance for the local population.

Description and history of the protected landscape

Khonoma village, located about 20 km from the state capital, Kohima, in the northeastern state of Nagaland in India, is home to the Angami tribe. The village, referred to as Khwunoria (named after the Angami term for a local plant, *Glouthera fragrantissima*), is estimated to be around 700 years old and is spread over an area of 123 km². The total population of the village is about 3,000, comprising 630 households.

Khonoma is famous for its forests and a unique form of agriculture, including some of the oldest terraced cultivation in the region (Cairns and Brookfield, 2011). The terrain of the village is hilly, ranging from gentle slopes to the steep and rugged hills of the Barail mountain range. The hills are covered with lush forestland (sub tropical and temperate broadleaf forest), rich in various species of flora and fauna.



Flower of the aconitum genus

The area includes the broadleaf and bamboo forests of Dzuku valley which borders the states of Manipur and Nagaland. There is no official survey of land use, but a rough estimate by residents is that between 20 to 30 per cent of the village is under agriculture and settlement, the rest under forest. The state bird of Nagaland, Blyth's tragopan (*Tragopan blythii*), is found and protected in the forests of Khonoma (Zafar-Il Islam and Rahmani, 2004). This pheasant is nationally and globally endangered with very small populations restricted to some North Eastern states in India such as Arunachal Pradesh, Nagaland and Sikkim and some small populations recorded from Myanmar and China. The bird faces serious threats from deforestation and hunting².

Nearly two hundred years ago, advancing British troops found themselves facing a determined warrior tribe in the highlands of Nagaland. The Angami men of Khonoma, famed for their martial prowess and strategic skills, fought a resolute battle to safeguard their territory, inflicting heavy casualties

¹ This study is based on the case study on Khonoma by Neema Pathak (Pathak, 2009); which in turn was based on information sent by Tsilie Sakhrie, a social worker from Khonoma village, and information collected during a field trip to Khonoma village by Ashish Kothari, Neema Pathak and Shantha Bhushan of Kalpavriksh in February 2005 (Kothari, 2005; KTDB, 2004). The information presented here was updated after a visit to the village by Nandita Hazarika and Goutam Narayan in February 2011 and by Ashish Kothari in November 2011.

² For more details see: www.birdlife.org/datazone/speciesfactsheet.php?id=239

on the foreign soldiers. The village is recorded to have resisted British rule in the region from 1830s to 1880. Finally a truce between the two forces stopped further bloodshed, but Khonoma village had etched its name into the history of Indian resistance to the colonial invasion. The area was once again the scene of violent clashes in 1956 when the Indian army tried to end a movement, based initially at Khonoma, for Naga independence. Nagaland became a state within the Indian union in 1963, with one distinctive condition that the land, and the forests in particular, remain under local control. The result being that today some 88 per cent of the forest is in local control in contrast to only about 10 per cent in India as a whole (Cairns and Brookfield, 2011). The struggle for independence continued throughout most of the twentieth century with a more or less permanent peace being agreed only in the 1990s.

Christianity was introduced in the village in 1890. Today most of the villagers are of this faith; as a result a number of animistic rituals and beliefs have now been given up.

Governance, conservation and legal status

The governance structure in Nagaland is a combination of customary decision-making processes combined with the statutory system set up by the state and central governments. The village is divided into three hamlets (*khels*), each with several clans, each clan comprising several families. The clan is itself a decision-making unit, and selects members to represent it in larger village-level bodies. These include the village council (which has overall responsibility for all affairs), the Village Development Board (recipient of government funds for developmental purposes) and the *ruffono* (a recent innovation to bring all village institutions under a common umbrella). Traditional institutions such as decision-making by the *gaon buras* (village elders) have been integrated into the village council's decision-making processes. The youth are part of either a student union or a youth association; the women are members of the Khonoma Women's Organisation. In addition, all villagers are part of an 'age group'. Such groups are formed by boys and girls in the age group 12-15 (born within specified dates), who carry out social activities like construction of rest-houses and village paths, and the formation of singing and dancing groups. Each age group is assigned a guardian, who is considered a spiritual parent. The bond lasts a lifetime and members stay together until they are into their 60s and 70s. Citizens of the village who move out in search of employment always remain connected to the village in some form and contribute to its well-being whenever possible.

Wildlife hunting is a way of life for the Naga tribes (including the Angamis and the 14 other tribal groups in the region), and a large number of birds and other animals are killed every year, including the endangered Tragopans. In 1993, 300 Tragopans were reported to be killed for their meat in the village.

Even today it is estimated that there are more than 1,000 guns in the village, used both for ceremonial as well as hunting purposes. But in the 1990s, this magnitude of killing motivated the more ecologically minded people of the village (both resident and formerly resident) to launch a crusade against hunting and began the conservation movement in Khonoma.

In 1998, the Khonoma village council declared its intention to protect about 2,000 ha (20 km²) of forest as the Khonoma Nature Conservation and Tragopan Sanctuary (KNCTS). This act was motivated by some of the village elders, notably Tsilie Sakhrie. Tsilie had been a contractor for the Forest Department in the 1980s where he had been introduced to the idea of dedicating a part of the village forests to wildlife conservation. In the 1980s, Tsilie proposed that the village do something to this effect, but he could not achieve a consensus. In 1995, he became a member of the village council. Concerned by the high number of birds being killed every year, Tsilie again broached the subject. A number of villagers were opposed to the idea, since hunting was so much a part of their culture. However, over the next three years, through extensive discussions in the village, the majority were convinced and the sanctuary's foundation stone was laid in December 1998.

The KNCTS has not been legally notified by the state Forest Department. However, the Village Council Act of Nagaland gives the Village Council authority to devise mechanism for management of forest resources, under which this sanctuary has been declared. Therefore the Village Council and the entire community under the prevalent customary law recognise KNCTS as a legal entity. In 2005, the state forest department initiated a proposal for this area to be declared a Community Reserve under the Indian Wildlife (Protection) Act as amended in 2001. The proposal, however, was rejected by the village community citing various limitations of this category.

Conservation initiatives

The development of the Sanctuary has influenced the management of the entire village area; it was for example decided to ban hunting in the entire village territory extending to 125km², and not just in the sanctuary area. Although not formally recognized as a protected area, Khonoma has all the characteristics which distinguish a category V protected area according to the IUCN definition and guidelines which recognizes the values the importance of landscapes of distinct scenic quality with significant associated habitats, flora and fauna and associated cultural features (Dudley, 2008). There is both an actual and perceived interdependence amongst the various land uses in the landscape, and between these and the cultural practices of the villagers. The forest is seen to be intimately connected to the sustenance of farming, providing both water security and nutrients. Farming has remained organic and diverse, with an explicit understanding that this is good for local people and soils, and that outside consumers would also prefer this. This in turn helps sustain wildlife



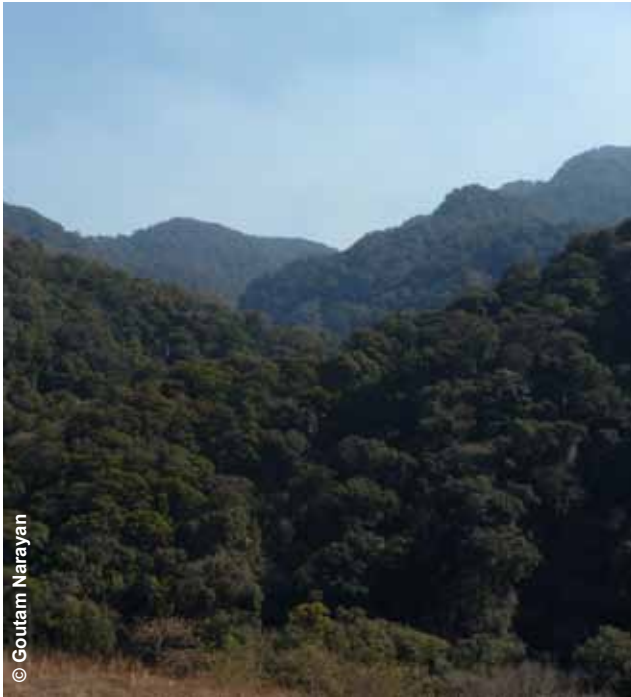
Khonoma village landscape

dependent on the diversity of crops and farming practices, and aquatic wildlife that could be negatively impacted by chemicals. A number of cultural practices and institutional structures relate to the sustainable management of the landscape, including traditional ones like the *kbhel* decision-making processes, and new ones like the Sanctuary Trust (see below). There is however inadequate documentation on this aspect and villagers may not explicitly think of the village landscape in terms of a conserved or protected one.

As well as the declaration of the Sanctuary, the village set up the KNCTS Trust, with a formal set of rules and regulations for the management of the area. Office bearers were chosen from amongst the villagers; with Tsilie chosen as the chief managing director. Rules were laid down for the management of the sanctuary, including penalties for violations, ranging from Rs300-3,000, depending on the seriousness of the violation. The village youth were requested to monitor the implementation of rules and to levy fines, which they could then use for their own village-based activities. Villagers also selected some youth members to be wardens for the sanctuary, to periodically check on the sanctuary to ensure there are no violations.

As the concept of a sanctuary was new to the villagers, they decided to seek help from the government, NGOs and other institutions in order to seek technical and academic support. NGOs such as the Centre for Environment Education (CEE), North-east Regional Cell, assisted in spreading

awareness about the conservation of Tragopans. A six-member team of KNCTS was given an orientation about the sanctuary. A number of environmental awareness expeditions were organised for village members and the importance of having a village map, land records and a survey of flora and fauna were emphasized. Community members visited Chakrashila Wildlife Sanctuary in Assam (a government designated protected area on community land with the consent of the local villagers) to share experiences with other similar efforts and visited Kaziranga National Park to understand the issues related to protected area management. NGOs such as EQUATIONS (based in Bangalore) have helped the local Khonoma Tourism Development Board to carry out an Environment Impact Assessment (EIA) of tourism (KTDB, 2004), in case the village decided to further promote tourism. Another NGO, Aaranyak (based in Guwahati), has helped the villagers conduct a survey of fauna and flora in KNCTS (see below). In 2005, Kalpavriksh (based in Pune and Delhi), conducted a state level survey of community conserved areas (CCAs) in Nagaland followed by a state level workshop with CCA representatives, government and non government agencies to assess the constraints faced by CCAs in the state and opportunities available to deal with those. This helped CCAs, such as Khonoma, to link with each other and learn from each other's experiences. As a follow up to this, Salim Ali Center for Ornithology and Natural History or SACON (based on Coimbatore) in association with Nagaland



Khonoma forest

Empowerment of People Through Economic Development or NEPED (based in Kohima) initiated a project for strengthening Community Conservation in Nagaland in the year 2007, which had Khonoma as one of its sites (Kalpavriksh, 2005; SACON, 2011). The project came to an end in 2010 and currently a follow up is being discussed and considered by a number of agencies.

Conservation is only one of the elements of social empowerment at Khonoma. Visitors to the village are confronted with a bewildering number of activities and processes that its residents seem to be engaged in. Some of these are new, some age-old. Khonoma may well be the only village in India that has a global citizenry with an active self-identity; every year the 1st September is celebrated as the village's 'birthday'. Khonomaians come from far and wide to the village to celebrate, or hold celebrations wherever they may be. There are even Khonoma student unions in Kolkata, Mumbai and Delhi.

Agriculture in Khonoma

Khonoma is well-known in agricultural circles for its sophisticated cultivation techniques. The first British observers to see Khonoma in the nineteenth century were struck by the shortage of agricultural land; a shortage which meant that the Angamis have had to develop systems to prioritise returns from the land as opposed to labour inputs (Cairns and Brookfield, 2011).

Farmers use a form of shifting cultivation (jhum), based on the use of Nepal alder (*Alnus nepalensis*) trees interspersed with the crops. These trees return nitrogen to the soil, helping the land to rapidly regain fertility when farmers abandon it to move on to the next plot. Cairns and Brookfield (2011) report

that a fallow period under managed alder of only two years' duration is sufficient to restore soil fertility for a further two years of cropping. The village also overlooks a wide valley that has been converted into terraced fields, primarily for rice cultivation, made with such precision that their productivity has apparently remained stable over centuries. According to the villagers, Khonoma is home to over sixty varieties of rice, and a diversity of millets, maize, Job's tears (a tall grain-bearing tropical plant), citrus fruits and other crops (grown without using chemical pesticides or fertilizers).

All this has made the village a model for emulation in many other parts of Nagaland through the efforts of the unique inter-departmental NEPED programme. This is especially useful where shifting cultivation has become unsustainable due to shorter cycles of leaving the land fallow after cultivation. Factors that make the system work include clear ownership of land and natural resources within the village boundaries. This provides a strong impetus for working out sustainable modes of land management. But this would not be enough in itself (for such ownership could also result in individuals destroying their lands), were it not coupled with very strong social and political organisations. In the recent times because of changing socio-economic needs there are some changing trends. For example many farmers are now switching to the cultivation of fruits such as peach, plum, apples, kiwi and pears commercially. While the local varieties are still available the stress is on hybrid varieties for better market returns.

Although these changes are comparable with other parts of the southeast Asian region, the circumstances are not identical. Partial transformation of the system into cash-crop farming is based on exploitation of regional market opportunities and is thus economically, and hopefully environmentally, less vulnerable than transformations that rely on specialisation for international markets (Cairns and Brookfield, 2011).

Biodiversity importance

Khonoma, and in particular the KNCTS and the terrace fields where traditional agriculture with a diversity of crops and varieties within crops is practiced using organic supplements, is of outstanding value from a biodiversity, water security and aesthetics point of view. KNCTS is, for example, recognised as one of the 465 Important Bird Areas in India (Zafar-il Islam and Rahmani, 2004).

Preliminary ecological studies by the local population have recorded the use of about 250 plant species, including over 70 for medicinal purposes, 84 kinds of wild fruits, 116 kinds of wild vegetables, nine varieties of mushrooms, and five kinds of natural dyes from the surrounding forests in the village. Local people have recorded about 204 species of trees, nearly 45 varieties of orchids, including the endemic Dzuku lily (*Lilium chitrangadae*), 11 varieties of cane, and 19 varieties of bamboo. Villagers also record 25 types of snakes, six lizards, 14 amphibians and 196 birds - of which English names for 87 have been identified. 72

wild mammals have also been reported by the local people; however English and scientific names for all have not been recorded yet.

There has been limited formal research in the area. No detailed research has been carried out on the mammalian fauna, but the following species have been noted: Clouded leopard (*Neofelis nebulosa*), Leopard (*Panthera pardus*), Serow (*Nemorhaedus sumatraensis*), Barking Deer (*Muntiacus muntjak*), Wild Boar (*Sus scrofa*), Stump-tailed macaque (*Macaca arctoides*), Slow Loris (*Nycticebus coucang*) and Hoolock Gibbon (*Hylobates hoolock*) (Zafar-il Islam and Rahmani, 2004). New bird species to the area are recorded with every survey (see for example: Ahmed et al, 2003 and Choudhury, 2005) and the highest known altitude record for King Cobra (*Ophiophagus hannah*) in the entire northeastern India was recorded at 1700m in Khonoma (Das et al, 2008). Biologist Firoz Ahmed of Aaranyak, in association with some of the village youth, has started to survey the biodiversity and has reportedly marvelled at the level of traditional knowledge; he has reported 20 species of frogs and toads, 14 of which were already reported by villagers.

What makes the area particularly significant is that the cultural tradition of hunting throughout Nagaland has had a major impact on biodiversity. Bikram Grewal, author of the best selling *Birds of India*, eloquently describes the problem: “Nagaland today, in many ways, is a world without life – miles and miles of countryside are enveloped in eerie silence with all life forms having found their way into the cooking pot over the years.” A view supported by Choudhury (2001) who recorded many restricted range bird species being sold for meat in the market of the state capital. The conservation efforts in Khonoma have however resulted in a quite different experience; as Grewal goes on to state, after three days in KNTCS: “...we were rewarded with sightings of such rarities like the Rusty-capped Fulvetta (*Alcippe dubia*), Large Niltava (*Niltava grandis*), Red-faced Liocichla (*Liocichla phoenicea*), Mountain Bamboo Partridge (*Bambusicola fytchii*), Long-tailed Wren Babbler (*Spelaornis chocolatinus*), White-browed Piculet (*Sasia ochracea*) and the Crested Finchbill (*Spizixox canifrons*). Bird life was abundant and many species exhibited interesting plumage variations leading to localized sub-species distributions. Of particular interest were Black-throated Tits (*Aegithalos cocinnus manipurensis*), Red-whiskered Bulbul (*Pycnonotus jocosus monticola*) and Red-vented Bulbul (*Pycnonotus cafer stanfordi*). Khonoma is also the best place to see the endangered Blyth’s Tragopan ...” (Grewal, undated).

Agrobiodiversity is also rich although documentation again poor. However, as noted above, the increasing tendency to plant cash crops in the *jhum* (shifting cultivation) and terraced fields may be leading to loss of agricultural biodiversity. Job’s tears, for instance, are less favoured. Some other millets may be declining due to, ironically, the conservation-related increase in bird populations that feed on them; farmers tend to favour such millets less.



Gateway to Khonoma

Developments, threats and responses

Given its historic past, Khonoma also plays host to many tourists. Some years ago the Government of India recognised the potential of the village to organise itself, and granted it a substantial Green Village fund through the Tourism Department of the state government. The money was used to start a tourism initiative in 2000, to provide basic civic amenities and hygiene measures, reinforce community infrastructure and prepare the village to receive and showcase to visitors its past and its present. However, after the Green Fund was exhausted no effort was made to strengthen the tourism potential. Tourism numbers remain low, with an annual inflow of about 300 visitors, with less than 100 opting for overnight stays. No mechanisms exist for benefit sharing, and currently only five or six households which host home-stays gain from the tourism industry. According to Charles Chasie, a village member who resides in Kohima: “There are differences of opinion among the community members about sharing of tourism benefits as returns are seasonal and limited to a few households only. An effective intervention from outside can play an important role in realising the benefits of tourism in Khonoma and ensuring equitable distribution of benefits.” There is however, concern amongst villagers that a large-scale tourist influx could be counter-productive: hence the importance of the tourism EIA mentioned above (KTDB, 2004).

Other developments are also threatening to impact the area. In the mid-1990s, in an incident reminiscent of the British invasion, the villagers had to physically resist timber merchants who came with several dozen elephants to carry out logging in the area, unfortunately aided by some insiders.

The Dzuku valley, was immortalised by Vikram Seth in his poem 'The Elephant and the Tragopan' (Seth, 1991). The poem is about how the wild animals try to stop a proposed dam that would drown out their valley, reflecting an actual movement by NGOs in Nagaland against such a proposal in the 1990s. The idea of the dam has been replaced by a pipeline proposal, to take water from the valley to Kohima, a project that would hopefully have little ecological impact.

Management challenges

All residents of Khonoma are members of KNCTS by default. There is a board comprising four (three men and one woman) office bearers who are nominated for a period of five years to oversee the activities related to the sanctuary. The latest board was constituted in January 2011.

Khonoma is probably the only place in Nagaland where hunting was banned in the entire village throughout the year. There were occasional incidents when villagers went to other areas to hunt, but the realisation grew that this was unfair. The ban was completely enforced by the village, and seems to have been highly effective with less than 10 violations reported. Maintaining the ban has however proved a challenge and disagreements between the Village council and the KNCTS have developed. Contentious issues are resolved through amicable negotiation; but this does mean that some of the initial management aims have been reviewed. The ban on hunting, for example, created a problem of crop damage by wild pigs and other wildlife, as a response the village first allowed the hunting of the pests that were causing the damage and then in 2009 and 2011 further relaxed hunting ban, as described below.

The Khonoma Youth Organisation (KYO), a powerful village level institution, plays an important role in matters related to hunting. Following the decision to deal with problem animals noted above, the KYO was given the discretion to give permits for killing vermin/pests that damaged crops or preyed on livestock. Following reported increase in damage to local livestock, particularly the mithun (*bos frontalis*), a species of gaur the largest species of wild cattle, by wild dogs (*Cuon alpinus*), the KYO gave permits to hunt wild dogs attacking the mithuns. In 2010, 10 wild dogs were killed with hunting permits. The KNCTS also gave sanction to KYO to penalize individuals if they hunted any other animal than those declared as vermin/pests.

Immense pressure from the community, particularly the youth, continues and KNCTS lifted the ban on hunting for five days in 2009, and for 10 days in January 2011. Though the elders termed these exceptions as a mutiny, they felt that had to give in to the demand amidst great resistance. There was no monitoring of the hunting activities during these days, however the hunters were expressly asked not to kill Tragopans. During this period outsiders were not allowed to participate in the communal hunting and no fee was charged from the villagers. Though deer

and small carnivores were the favourite among the hunters, young boys with catapults happily searched for birds to kill. Searchlights combined with shotguns proved popular with the hunters, who camped inside the sanctuary for easy prey. The Angami Youth Organisation passed a resolution in 2010 to ban the use of airguns completely in the next three years.

Some residents are concerned that this relaxation of the hunting ban will have negative consequences on the local wildlife population. Hunting is a very important aspect of the local culture and banning it for a long period of time may not be feasible. Instead it is clear that the village youth need to arrive at a method of selective hunting, within certain parameters and engage the hunters and others in the village with wildlife population monitoring studies. It would be useful for the village to learn from other experiences, such as the flare-horned Markhor (*Capra falconeri*) project where a successful community-based trophy hunting programme has help restore Markhor populations in Pakistan³, to understand how selective hunting could benefit the community in the long run. The youth group and other members could also be benefitted from the introduction of regular wildlife population monitoring techniques, the results of which could feed back into the management of the KNCTS.

Conservation connectivity

Khonoma's efforts are an exemplar of dozens of similar initiatives across Nagaland. Many settlements in Phek and Kohima districts have displayed notice boards warning would-be hunters of severe penalties, declaring community forest reserves with stringent restrictions on resource use, and so on. Slowly but surely, wild animals are making a comeback, a phenomenon that even a decade back seemed virtually impossible (see other case studies on Nagaland in Pathak, 2009).

Tsilie and other community members have for some time been attempting to propose an extension of the sanctuary to neighbouring forests as a 'buffer zone' to KNCTS. If accepted by the council, the area would increase to over 3,000 ha (30 km²). KNCTS is also adjacent to another community conserved area, Pulie Badze Wildlife Sanctuary (923 ha), which as Zafar-il Islam and Rahmani (2004) discuss in the volume on important bird areas forms a single continuous area of more than 20,000 ha, making the whole area very important for avifauna conservation in southern Nagaland.

Tsilie in his capacity as the president of the Western Angami Public Organisation (an institution that contains the entire western Angami tribal population) has also been discussing with the Southern Angami Public Organisation to declare their areas as protected. Work could also be done to convince Naga tribes in adjoining Manipur, since the Khonoma citizens have relations extending into those villages. If successful, the entire Dzuku and Japfu area could be declared

³ See: <http://www.cfc.unt.edu/nwfp/Markhor.html>



Foundation stone of Khonoma Trust with founder member Tsilie Sakhrie

a community protected area, extending to perhaps several hundred square kilometres. The plans however have not yet come to fruition and much will depend on the changing socio-economic aspirations and their fulfilment.

Lessons learned, future needs and long-term predictions

Khonoma's conservation initiative is all the more noteworthy if one looks at the enormous decline of wildlife across Nagaland in the last few decades. Hunting has been rampant, according to one resident perhaps fuelled by the jump in firearms availability since a truce was declared between the Naga insurgents and the Indian army in 1997. The tribes here eat virtually everything that moves, and though this may not have damaged wildlife populations in the past due to limited hunting technologies, it has of late assumed severely destructive proportions. Around 300,000 animals and birds were killed in Nagaland in year 2008, according to a survey carried out as part of a programme on strengthening community conservation efforts in Nagaland under the Nagaland Empowerment of People through Economic Development (NEPED) (Morung Express 2011). The programme was in collaboration with SACON.

The most important factor for future success is solving the increasingly difficult relationship between the youth groups and KNCTS. There is a need to find a way to manage the sanctuary and follow the principles of regulated hunting

in way accepted by all the villagers, as there is a substantial number of people in the village who feel that there is no direct benefit to the village and the villagers from the sanctuary. There is a fear that people will become indifferent to KNCTS if there are no long term benefits or incentives to safeguard it.

There is an urgent need to help the Village Council work out a sustainable and long term mechanism which will generate income sources for local youth, help share benefits equitably and are linked directly with the conservation of the sanctuary.

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Canada: Reconceptualising wildlife conservation at Poplar River First Nation, Manitoba

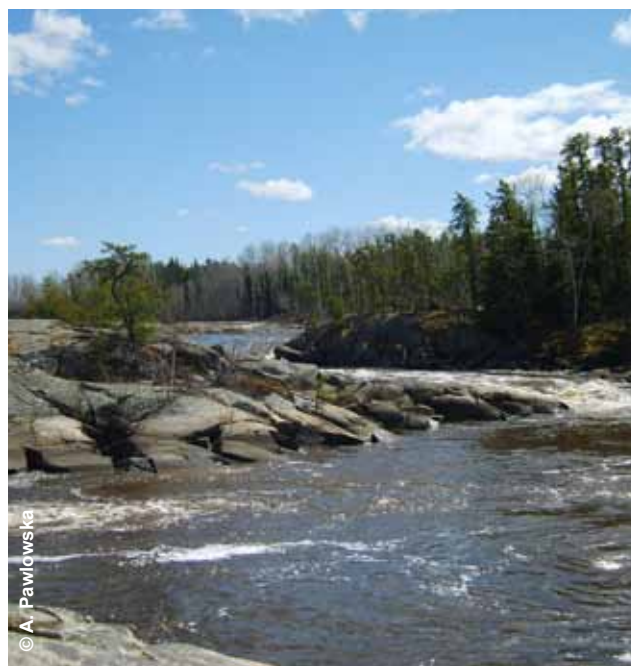
Agnieszka Pawlowska

Protection of the land is the key to our very future. Therefore, to suggest that our traditional lands need not be protected, or that only a part of our traditional territory needs to be protected, is to suggest to us that our lives can be threatened; that our children's future can be compromised or forfeited for some other purpose. It would be disrespectful and immoral for society at large to compromise what we, the Poplar River Anishnaabek, know and assert as the need for life,
Poplar River First Nation, Asatiwisipe Aki Management Plan.

Summary

In Canada, the struggle to access and control land and water has forced Aboriginal people into peaceful blockades and even, at times, violent conflicts over numerous land-claims on the basis of Aboriginal, treaty, rights and title. Examples include the *Kanienkehaka* at *Kanasetake* (Mohawks at Oka), the *Asubpeeschoseewagong Netum Anishinabek* (Grassy Narrows First Nation), or even the *Dene* of the *Dehcho* (Mackenzie Valley). However, the *Asatiwisipe Anishnaabe* community or Poplar River First Nation is setting a precedent for Aboriginal peoples in the boreal forest: in a pre-emptive motion to safeguard their traditional territory they are attempting to establish their Indigenous Community Conserved Area (ICCA) as part of a UNESCO World Heritage Site (Figure 1). The proposal, called *Pimachiowin Aki* 'the land that gives life' in *Anishnaabemowin* (Ojibway language), is a 43,300km² boreal forest territory which comprises of Poplar River's ancestral trapline area, the traditional territories of *Pauingassi*, Little Grand Rapids, and *Bloodvein* First Nations in Manitoba, and *Pikangikum* First Nation in Ontario. Included in this proposal are also two parks, Atikaki and Woodland Caribou Provincial Parks. This extensive boreal forest World Heritage Project Area has support not only from the larger public, but also from the Ontario and Manitoba provincial governments.

The Poplar River initiative of protecting their trapline territory represents an exciting initiative not only from the perspective of IUCN's protected landscape approach (i.e. the category V management category) for wildlife biodiversity conservation, but also for sustainable community development. Here, a community is attempting to go beyond the expected, non-renewable resource development and take control over its own developmental plans in order to forge



Rapids at Poplar River: are a popular spot for tourists and many community activities

an ecologically sustainable vision of community-controlled economic and political development.

What makes this community unique in the UNESCO designation project is that unlike other First Nations communities included in *Pimachiowin Aki*, Poplar River falls under the recently created East Side Traditional Lands Planning and Special Protected Areas Act which allows First Nations on the east side of Lake Winnipeg to play a major role to ensure better protection, management and development of their traditional Indigenous community conservation areas (ICCA). This ICCA is embodied through a World Heritage Site

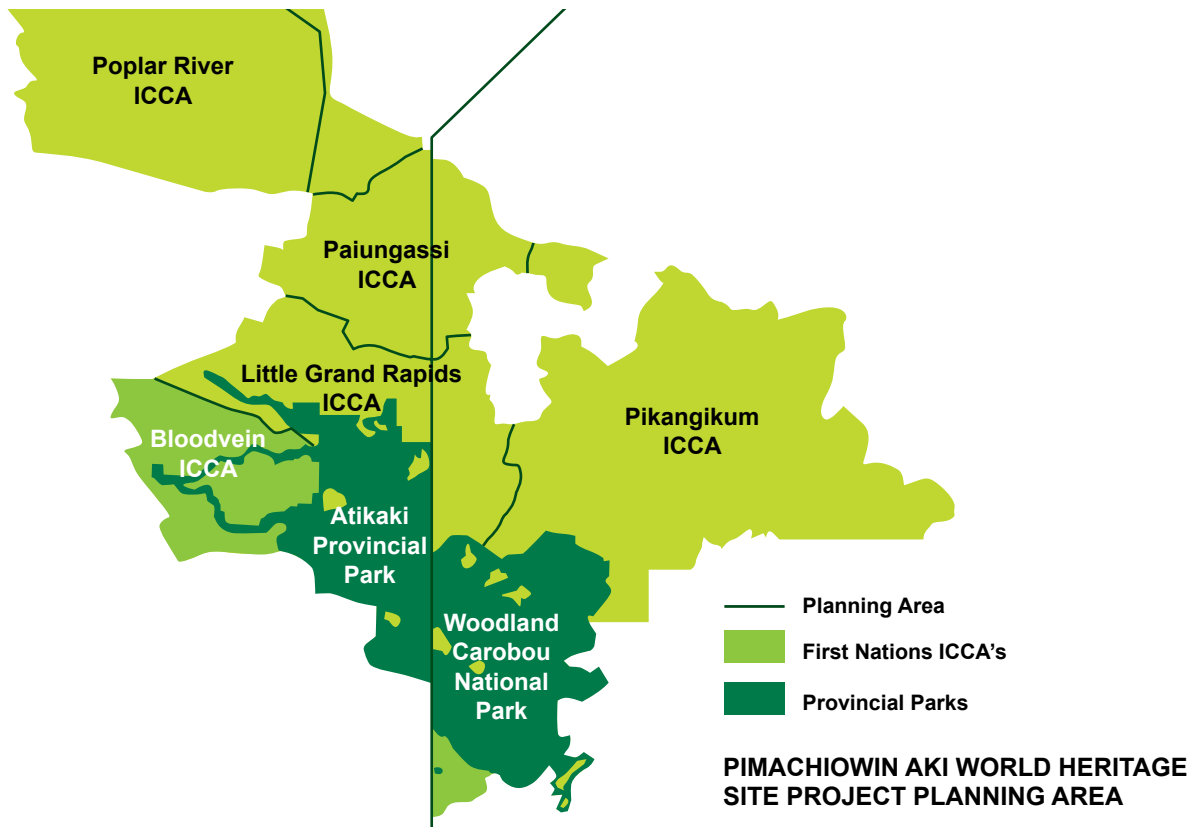


Figure 1: Pimachiowin Aki World Heritage Site Project Area includes five First Nations, each with their own respective ICCA, and two provincial parks. The Poplar River ICCA, called Poplar/Nanawin Park Reserve, is mostly designated for protection. (Map: © A. Pawlowska; adapted from and used with permission of Pimachiowin Aki Corp)

initiative which is primarily a First Nation-driven project. The 8,617 km² protected landscape referred to Asatiwisiipe aki ('poplar river earth' in Ojibway) consists not only of lands, rivers, plants and animals that sustain the integrity of this landscape, but also of sacred and cultural spaces which within this boreal ecosystem, signify the continuous presence of the *Anishnaabek* (Ojibway) in these regions. Indeed, the landscape has a distinct character where the safeguarding of the interaction between culture and landscape is "vital to protecting and sustaining the area for conservation and human management" (Stolton and Dudley, 1999). The Poplar River community approach to land management reflects sustainable economic development whilst also preserving wildlife biodiversity.

The objective of this chapter is to discuss Poplar River First Nation's ICCA in the context of a 'protected landscape' (Dudley, 2008) where the community's goals for sustainable development and wildlife conservation are emphasized in order to ensure the land's productivity for future generations. Some of the issues that will be explored include: how does ICCA in Poplar River exist legally and administratively? How does protection of wildlife and biodiversity function alongside an economically developing Indigenous community? How can natural and cultural heritage be conserved here? Discussed first will be the *Asatiwisiipe Aki Land Management Plan* as the basis for the administration of natural and cultural heritage followed

by an investigation into the ICCA concept as a form of wild biodiversity conservation and sustainability for future generations. Finally, in the concluding section, challenges and future perspectives for the Aboriginal community will be examined.

Protecting the land for future generations

The protection of Asatiwisiipe Aki started with threats of logging, mining and hydro-electric transmission line development. These pressures led the First Nation to the community-instigated goal, articulated in the *Asatiwisiipe Aki Management Plan* "to protect the land from industrial developments, sustaining natural ecological processes for present and future generations" (Poplar River First Nation [PRFN], 2010: 1&5). Recognizing that industrial activities will permanently alter habitats, the management plan administers the conservation of the entire 8,617 km² of land by means of local knowledge in collaboration with scientific knowledge. This Poplar/Nanowin Indigenous community conservation initiative protects the area from a range of activities but also recognizes the continuance of human management with a manifestation of traditional land-use patterns as evidenced by local settlement (Philips and Harrison, 1999; IUCN, 2009).

The *Asatiwisiipe Aki Management Plan* provides a modern framework of the community's traditional knowledge. Embodying a legal outline for the sustenance of landscape

and wildlife biodiversity as well as ecological integrity, the document is intertwined with models of economic ventures and distinct cultural identity. Some of these include forms of sustainable tourism, including eco-tourism and ‘adventure’ trips, harvesting of natural local products by members of the community and the wider public, as well as educating populations about the culture, the traditions and contemporary issues surrounding the Aboriginal community within the Canadian context. The prohibition of commercial uses fulfils the Anishabek vision for legal protection and for the preservation of both, their way of life and the boreal region.

Thus, along with the Atikaki Provincial Park in Manitoba and the Woodlands Caribous Provincial Park in Ontario, the Poplar/Nanowin Parks Reserve is managed for conservation. Unlike the two parks however, the Poplar/Nanowin Park is not a ‘park’, rather, it is a park reserve with a ‘Wilderness and Backcountry Land Use Category’, which allows recreation development and resource extraction that does not compromise the main purpose of the park (Manitoba, 2008; Manitoba, 2010; PRFN, 2010). Although access and harvesting is allowed in the park, conservation management is the primary goal. The area thus reflects the category V management approach.

Furthermore, through the establishment of an ICCA, decisions regarding wildlife biodiversity conservation are based on social, economic, and environmental principles. To ensure control over matters concerning their community, leaders of this First Nation insisted on becoming partners rather than opponents of the provincial government about the future of the boreal forest. After many meetings and negotiations, the Manitoba provincial government passed Bill 6, titled ‘The East Side Traditional Planning and Special Protected Areas Act’ in 2009. With the objective of developing and implementing ‘a new government-to-government relationship’, the Act is intended to provide First Nations communities like Poplar River with the opportunity to plan and manage the natural resources contained within their traditional areas (Manitoba, 2009). Confirming support for the project, a Can \$10 million trust fund was also provided by the Manitoba government that same year.

The new legislations means that the traditional area land-use plans of Poplar River and other First Nations involved in the World Heritage Site Project Area have legal standing. The Act makes the nomination for UNESCO designation important because, if approved by the World Heritage Committee, the site will be governed by Pimachiowin Aki Corporation, a non-profit corporation that currently guides and administers the project. The Pimachiowin Aki Corporation board includes representatives from each of the First Nations involved in the project along with one representative each from the Manitoba Government and the Ontario Government. In other words, the lands that make up the proposed World Heritage Site, specifically those of the five First Nations involved, will be managed in accordance with



Canoe is the traditional means of transport up the Franklin River

whatever approved land management plan these communities have. The Act therefore is the first of its kind in Canada enabling Indigenous self-determination over this community conservation area and without contravening any First Nations rights identified in the federal constitution.

ICCA as a foundation for management of natural and cultural heritage

To reach *Asatiwisipe Aki* one has to fly or take a boat in the summer, or drive on the winter roads when the muskeg (sphagnum bog) and rivers are frozen. The area is located on the Canadian Shield (the large plateau of Precambrian rock that occupies more than 40 per cent of the land area of Canada) and is a landscape dominated by *zhigob* or black spruce (*Picea mariana*) and *ogik* or jack pine (*Pinus banksiana*), *azaadi* or aspen (*Populus tremuloides*), *wiigwas* or white birch (*Betula papyrifera*), and *nipigandag* or balsam fir (*Abies balsamea*) and the ground is covered with ericaceous shrubs, mosses and lichens. The old Lake Aggasiz site provides an essential habitat for black bears (*Ursus americanus*), wolves (*Canis lupus*), moose (*Alces alces*), lynx (*Lynx lynx*) and the threatened boreal population of woodland caribou (*Rangifer tarandus caribou*). Bird species of note include owls (*Tyto alba* and *Athene curvicularia*) and fish species include the lake trout (*Salvelinus namaycush*), pike (*Esox lucius*) and pickerel (*Stizostedion vitreum*) (Voora and Barg, 2008; Pimachiowin Aki, 2010; PRFN, 2010; UNESCO, 2010).

In order to protect this rich biodiversity, activities must be guided and carefully managed. Considering themselves ‘stewards’ of the land (Bruce, 2010), the traditional uses of the



The community rapids are popular with black bears (*Ursus americanus*) who come to feast on the abundant fish

Poplar River Anishnaabek determine the means of access and activities upon the land (Bruce, 2011). As a result, wildlife stewardship is very specific in the *Asatiwisiye Aki* and is guided according to local values; regulations are set out about trapping, fishing and hunting wildlife. Ernest C. Bruce, one of the head trappers in Poplar River (i.e. the main 'steward' of one trapline territory), explains that local guidelines for trapping and hunting not only protect the landscapes, but also help ensure biodiversity in the region. These guidelines, often referred to as traditional ecological knowledge (TEK), encompass the entire eco-system management where selection, need, culture and economics are all taken into account. Bruce himself is selective of the beaver (*Castor canadensis*) he chooses: older males, in specific seasons, are targeted in trapping activities: "when there are too many beaver, they kill each other" and a population crash occurs (Bruce, 2011). Beaver populations as well as other wildlife are controlled by each individual head trapper on his specific trapline; the idea that "the men see what is on their land" (Bruce, 2011) signifies knowledge of the particular territory and consequently, the responsibility for the management of wildlife on it. The head trapper monitors not only the wildlife, but is expected to maintain the health of the trapline ecosystem for future generations. His/her role as 'steward' is to look after that land; although other members of Poplar River can hunt, fish and gather medicines anywhere on the land, to set a cabin or to trap however, traditional protocol involves permission.

The people in Poplar River do not just share the land with wildlife; their livelihoods depend on biodiversity. As a result, control mechanisms to maintain biodiversity are culturally

embedded and 'knowing the land' alongside good governance is expected of each head trapper. The data of populations and the analysis of social behaviour of beaver for example, ensure that the monitoring system reflects the fur quotas sustainably. The data obtained from the Government of Manitoba reflect this practice; fur production has a steady pattern. Every two-three years the numbers of beaver fur exceeds the hundreds (from 104-273 furs) and falls to 3-65 furs in other years (Manitoba, 2010). What is interesting is that although the fur industry plays an important role in community development, the beaver, whose pelt rarely exceeds Can \$50, is the most trapped animal by community members. Other fur-bearing animals such as the lynx or wolf, whose furs range from Can \$100-200 and \$80-160 respectively, are hunted in numbers below five pelts per year (Manitoba, 2010). This shows that culture defines economics in Poplar River: the beaver plays a significant role culturally and thus is trapped more; on the other hand, animals that have greater economic value on the fur market but do not reflect the practices of the local culture, are killed less often. Local people believe that their selection of number and species to kill for fur and subsistence plays a role in stabilizing and building the overall populations of wild biodiversity. In the words of the community, the Anishinaabek are "an integral part of the boreal ecosystem functions" (PRFN, 2010).

In order that wildlife biodiversity in *Asatiwisiye Aki* can be monitored holistically, all kill numbers are shared with other trappers in the community. Communication is an integral part of the social, ethical, cultural and economic responsibilities of each hunter/trapper and all these aspects are further embodied in the *Asatiwisiye Aki Management Plan*. As part of the community's framework, the *Asatiwisiye Aki Ma Ma Wichitowin Mutual Land Relationship Board* will be established to instigate the collection of data in the community. The Board will consist of experienced individuals from the community who will oversee the implementation of the plan. They will also collect data from harvests; currently, all moose and caribou (*Rangifer tarandus*) kills as well as harvest sites are reported to the community. Furthermore, board-approved trapline policy will be made to ensure conservation and fairness; until then, a Lands Management Program is responsible for traditional territory management and government guidelines are followed to the extent that they do not abrogate Aboriginal and treaty rights (PRFN, 2010).

The Poplar River Anishinaabek understand that all species depend on one another; that predator, prey relationships are "part of an intricate web of interrelationships between and among species, including ... the indigenous human in the ecosystem" (PRFN, 2010:15). Having used and directly depended on particular animals, which in turn relate to and depend on other species, both plant and animal, the community's conservation measures are designed to ensure biodiversity and the preservation of species - especially those that are culturally relevant. As a result, local culturally-based



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During winter in Poplar River First Nation accessibility is by ice road

teaching is embedded within the land and resource use framework. For example, Poplar River prefers that only community members hunt moose. The moose must be a bull and can only be harvested in autumn and winter; the meat is distributed to family and other community members. More specifically, a community hunter can only take what he needs for himself, his family, or others he will share meat with, and meat must never be purposely wasted and left behind; no wildlife meat (including ducks, rabbits, geese, moose) can be sold for cash (PRFN, 2010). In other words, for each wildlife harvest, whether moose, rabbit, duck or geese, traditional subsistence values and the cultural practice of 'sharing' are maintained. Essentially, to ensure the continuum of subsistence (provisions in this remote community are very expensive), members of this First Nation are willing to cooperate with any conservation mechanisms as long as their Indigenous resource use rights are respected and maintained.

In *Asatiwisipe Aki*, people are part of the landscape and the community effort to conserve their territory also signifies cultural preservation. Many sites within the forest continue to be used; these include traplines, fishing places, hunting spots, camping sites, resource gathering places and especially *pinsewapikung saagaigan* (Weaver Lake) meaning 'Thunder Mountain Lake' where healing and cultural camps are held every year. Thunder Mountain is a bush meeting place for all the First Nations involved in the Pimachiowin Aki World Heritage Site Project; but more importantly, Thunder Mountain is also, the Elders say, one of the homes of the sacred being, the Thunderbird.

The Poplar/Nanowin ICCA has numerous landmarks considered historically and socially important or even

'sacred'- to members of this community. These include burial grounds and cemeteries; places of myth and origin; places of historical occurrences and homes of spiritual beings to name a few. Historical places can include *Negginan*, an old trading post where families were established and contemporary relationships were formed. Sacred spaces consist of places of sightings of spiritual or important beings like the *Sasquatch* or the Thunderbird; places where sweat lodges have been located and sites of old churches (Catholic). All these sites are sacred to the community; although the definition of sacred oftentimes overlaps with other meanings, these places nonetheless are part of a larger epistemological importance, mythical or real. Indeed, every place in the Poplar/Nanowin ICCA has a story and a reason for preservation. Some of the main reasons for ICCA are outlined in Table 1 and although categorized by specific resources, these rationales have common characteristics. For example, protecting the land is an underlying principle of wildlife biodiversity but with an Anishnaabek world view, it can become a cultural reason for an ICCA to exist in the first place. The categories therefore, are not that distinct from each other.

In order to describe this plural conception of their landscape, the community of Poplar River will build an Anishnaabek Cultural Interpretative/Visitor Reception Centre to serve as the hub for cultural heritage interpretation and preservation. Such an interpretative centre is essential because most sites on *Asatiwisipe Aki* are not easily recognizable to the larger public; in fact, a large segment of the visiting public views the site as an unrelated collection of trees, rivers, swamps and animals within the landscape. As a result, a commonly identifiable cultural or sacred site can only be identified with the help of a local individual who 'knows the land'.

Table 1: Resource protection of the Poplar/Nanowin Rivers Park Reserve, Poplar River First Nation

Type of Resource	Main reason for protection	Examples
Natural	Subsistence living	Hunting and trapping, berry picking
	Community protection ensures future access, use, control of land, sets fur quota	Head trapper makes decisions; trap line territories allocated to 'stewards'
	Biodiversity is conserved	Only older male beavers are trapped in specified seasons
	Intact ecosystem remains preserved	Socio-ecological monitoring based on TEK
	Security from industrial development	Hydroelectric transmission line project (BiPole III) stopped in 2010
Economic	Employment and financial benefits from wildlife use	Fishing; fur industry
	Use of forest products for development	Making picnic tables; firewood; house extensions
	Ecotourism	Adventure activities; camping
	Sustainable economic and social development	Cultural activities; Treaty days
Cultural / Social	Preservation of traditions and cultural way of life	Ensuring continuity of distinct culture; hunting and trapping moose
	Protecting the land through Anishnaabek world view	TEK
	Sacred/spiritually, culturally and historically significant areas	Cemeteries; healing camps at Weaver Lake; Thunderbird eggs
	Community empowerment through social organization	Asatiwisiipe Aki Management Plan
	Allows for creativity in development	Cultural Interpretative/Tourist Center
	Community cohesion and distinct identity	Local dialect; own lands management plan within Pimachiowin Aki
Political	Aboriginal and treaty rights	Indigenous rights; Treaty rights; hunting rights
	Control of traditional lands ensures self-determination	Lands and resource management

Conclusions: Challenges, responses and future perspectives

The Poplar River First Nation ICCA, embodied through a park reserve and included in a World Heritage Site initiative is a First Nation-driven 'life project' (Blaser et al., 2004) that ensures the integral ecosystem of the region whilst also endorsing self-government of this remote community. Having adopted a community-based natural resource management initiative like *Asatiwisiipe Aki Management Plan* and through the Pimachiowin Aki UNESCO World Heritage Project Area, Poplar River is an Indigenous community of local people instigating and autonomously assessing their level of involvement in heritage and wildlife conservation. Supported by the larger government through *The East Side Traditional Lands Planning and Special Protected Areas Act*, which legalizes land-use management plans of Aboriginal people like Poplar River, this First Nation has a meaningful

opportunity to engage in social and economic development as well as in resource management planning on their traditional territories (Manitoba, 2009). Self-determination over community development as well as management and control of biodiversity, can be seen as an extended source of an inextinguishable Indigenous right to self-determination over traditional areas.

Poplar River First Nation is pursuing the goal of economic development through biodiversity conservation. The two concepts appear contradictory in neo-liberal Manitoba but in order to survive as a people, Poplar River must both generate income for their members and preserve their Indigenous culture. Protected landscapes by means of cultural stewardship practices such as those outlined in the lands Management Plan, are the only way to ensure biodiversity conservation in this region. Although arguments exist that protected areas fail to conserve biodiversity and are often associated with

negative concepts such as ‘fortress-conservation,’ biocentrism; elimination of benefits to local populations, exclusion of local peoples or even removing people from lands (Maikhuri, 2001; Berkes and Davidson-Hunt, 2006; Berkes, 2008; Hoole, 2010; Hirschnitz-Garbers, 2011), these critiques “ignore the role local population plays in managing biodiversity” (Hirschnitz-Garbers, 2011:322). In some types of protected areas where local people who rely on the existence of biodiversity actually help preserve biodiversity in the ecosystem. For example, fur-bearing animals in Poplar River are necessary to develop the economy; the hunting of moose for subsistence is embedded in culture; the knowledge of trapping rabbit is essential for food, making moccasins with fur trimming, and for cultural preservation as *Aboriginal* people. Since so much depends on biodiversity, Poplar River First Nation members are determined to ensure that wildlife is conserved.

Preservation of *Asatiwisipe Aki* must be guided by (or at least inclusionary of) local populations; rather than managed ‘from a distance,’ in a government office. Poplar River’s ICCA exists through people who understand best the boreal forest ecosystem. They are located on the land, live off the land and can continue to monitor it for long periods of time. This means that Poplar River’s cultural socio-ecological monitoring records demonstrate long term changes of local biodiversity as well as the environment as a whole. Management of the ICCA is achieved through use of knowledge and heritage that had been handed down through generations by cultural and oral transmission. The knowledge-based monitoring system, the *Asatiwisipe Aki Management Plan*, has its own concepts of philosophy, epistemology, metaphysics intertwined with cultural practices, traditions and customs as well as scientific graphs, charts, maps and quantitative methodologies.

There are many challenges however that must still be surmounted in order to make the ICCA a success. Government interference into the community’s administrative decisions and possible infringement on Aboriginal rights, as well as the establishment of effective co-management between Poplar River TEK and State scientists are the biggest obstacles. Determining whose data is more accurate, whose needs the research may serve and ensuring a balance between cultural pluralisms, terms of negotiation and subsequent consensus of biodiversity conservation are just a few of the frameworks that must be developed (Scott, 1996; Ali, 2003; Nadasdy, 2003; Armitage et al., 2007; Berkes, 2008; Neufeld, 2008). Furthermore World Heritage listing would add another level of non-Aboriginal influence (and authority) into the region.

There is also the necessity of overcoming social and economic difficulties within the community and ensuring that development is sustainable but also generates a flow of capital into the underfunded, overlooked and often misunderstood remote Aboriginal community. “Addressing poverty and affluence”, write Lockwood and Kothari “has been recognized as being a precondition for establishing sustainable



Moose and deer hide as well as rabbit-fur trimming are still used to make items such as moccasins, gloves and mukluks

environmental management” (Lockwood et al., 2006).

Nonetheless, as well as the protection of some of the last few intact boreal forests remaining in Canada, there are many positive aspects to this ICCA. The strengths of this form of wildlife biodiversity and cultural conservation include awareness, support and funding from local, national and international sources. This power can be maximized through education of the public about the distinct and effective non-Western ways of biodiversity stewardship and conservation practices whose fundamentals are based on the local Anishnaabe culture. Support for the fur industry, for Aboriginal rights, for socio-ecological biodiversity conservation measures are all necessary for the Poplar River/Nanowin Park Reserve to be a success. The future of this community holds many opportunities, which can be realised in part through the emergence of new paradigms where traditional local philosophies meet contemporary global mechanisms. Indeed, Poplar River’s initiative of including their community protected site into an internationally recognized World Heritage nomination teaches us that in order to effectively protect natural and cultural heritage, biodiversity and Aboriginal peoples, each community must envision its *own* distinct form of ‘development’, however they choose to define that term.

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Conclusions: Lessons learned and recommendations

Nigel Dudley



Monitoring biodiversity

Protected landscapes vary greatly in form and approach around the world: this might seem like a truism since all protected areas vary, but the extent of variation within protected landscapes and seascapes is at a different level. Their scale, the number of stakeholders, multiple management objectives and tendency towards multiple ownership and governance approaches in protected landscapes renders them particularly complex. One consequence of this is that it is still too early to say definitively how effective they are in conserving wild biodiversity at a global scale, indeed such a generalisation may remain impossible. Nonetheless, the case studies collected here present a generally positive picture of the potential of well-managed category V protected areas to maintain wild species of plants and animals. This final chapter looks at the implications of this and draws together some wider lessons learned from the experiences that have been recounted earlier.

Two broad approaches to wild biodiversity conservation can be distinguished within category V. In the first of these, many indigenous peoples and traditional communities see the protected landscape approach as a way of recognising, maintaining, supporting and sometimes protecting long-

established management approaches that have benefits to biodiversity: case studies from Colombia, Canada, Mozambique and India all demonstrate this model. Here the emphasis is on traditions that either deliberately or perhaps more often incidentally *also* have benefits for biodiversity. Incorporation into a recognised protected area often involves making what had been a more or less unconscious link with wild biodiversity more explicit and more quantifiable than previously, as in the case described from Australia.

In the second approach, which applies in areas where social and environmental changes have already been more substantial, and where traditions have altered or disappeared, the category V model is a landscape-scale approach to conservation. Here there is a mosaic of different management strategies, arrived at either accidentally or as a result of deliberate planning, that can in total support biodiversity. While this may involve the maintenance, reinvigoration or recreation of traditional management approaches, as in Croatia and Spain, it is by no means always the case. The situation in Germany for example shows that some of the management prescriptions used in protected landscapes are far from traditional.



Catalonia, Spain

These two approaches are seldom exactly delineated and may blend into each other or, in a more challenging way for those responsible for management, *change* from one to the other over time. Many managers of category V protected areas in much of Europe are currently struggling with the challenge of maintaining the nature values associated with traditional agriculture in the face of agricultural decline and agricultural intensification; our study in the Balkans illustrates this situation. In cases like this, the biodiversity that depends on traditional land management practices will suffer. But at the same time, recognition of the wider values of such landscapes – as places to live, as a reflection of cultural identity, as a repository for heritage assets, for tourism or for their ecosystem services – can help provide the incentives to maintain approximately the same management approaches but with different objectives; this is well described in the Spanish example. In these situations, the challenge is *managing the transition* between a landscape which has been protected in the past through traditional land use systems and a landscape that is protected in the future through the deliberate maintenance of nature values. The communities involved may be the same, or may be radically different as new socio-economic groups move into rural communities.

Category V therefore has multiple ‘entry points’. These can range from a single indigenous people’s group or community wanting to maintain itself in its traditional homeland,

as described in the Canadian case, to multiple, diverse communities within a landscape or seascape responding to a range of different management challenges and seeking to balance different needs and wants, as in the German study. Although no research has been found on the issue of motivations for protected landscapes, it seems likely that these are more complex than for many other protected area management categories.

Management, including management for biodiversity, is seldom simply about keeping things as they are: protected landscapes are, like other types of protected areas, becoming fragmented and isolated; cut off from other habitats by modern agriculture, urban developments, and new infrastructure; and affected by climate change and other fundamental changes. In India, the Khonoma village is increasingly isolated in its approach to nature as compared with surrounding land use, throwing additional strains on the forest resources. In these circumstances, what might have been a sustainable off-take in the past may no longer be sustainable in the same way. In other circumstances, rising population in and around a protected area means that per capita resource use has to change. The efforts made by the Dhimmiru community in Australia to adapt and change management will need to be emulated widely since similar demographic and land-use changes are occurring in protected landscapes everywhere. One of the lessons from the case studies is that although protected landscapes are

predicated on the idea of tradition and permanence, rural communities often change much more rapidly than is apparent either to the communities themselves or to those looking in from the outside. Protected landscapes, like most other settled areas, will continue to change so that maintaining any of the values for which they were established will require continued adaptive management. It might be noted that protected areas of other categories also face challenges of isolation and fragmentation, and that adaptive management is key in these cases as well.

Community involvement is essential to successful biodiversity conservation in a category V protected area.

In some cases, protected landscapes emerge from the bottom up, as in the Australian example, but may also be perfectly feasible within a more traditional government-controlled framework as described in Mozambique. Whatever the starting point, the fact that management is taking place within some mixture of community and private lands implies that liaison is essential: and all the case studies describe a long process of negotiation between outside conservationists, local communities and often also other stakeholders. This is seldom an easy or a once-off process; discussions are often tough and protracted, as described in Nagaland, and may re-emerge as the resident society itself changes or as a new generation grows up with different ideas and priorities. Attitudes towards, and expectations of wild biodiversity may differ radically within communities and reaching consensus is not only difficult but may not be able to survive over time, as the case study from India illustrates, with younger people wanting to open up hunting options that had previously been abandoned. Because they rely on community support, and typically active engagement by communities and individuals in their stewardship, category V protected areas may at first sight appear to be less guaranteed over time than other management categories but in reality most protected areas rely on community participation, empowerment and support to function effectively.

Motivation for establishment and management of a protected landscape is seldom narrowly utilitarian. Instead, category V draws on a community or nation's pride of place and pride in the biodiversity, nature or scenery that it contains (although the word 'biodiversity' itself is not something that many communities easily relate to). The first inspiration for creating a protected landscape may well be primarily one person's passion, as in India: in these cases the challenge is to inspire others and translate the endeavour into a long-term community effort. In others, it is a community response to a particular set of circumstances or challenges. In Canada, the case study describes pride in the uniqueness of a particular homeland and the desire to maintain this unique value. Indeed, some communities agree to inclusion in a more

formal protected area mainly in order to ensure that such values are maintained for future generations. The extent to which this pride relates to wild biodiversity may vary with time. *Developing* or spreading this feeling of pride may be an important stage in the establishment of a protected landscape and could be a management task, as part of a public outreach campaign or education programme. The transition from a non-formal traditional management system that has developed gradually over time into one formally recognised as a protected area is in every example described as a *conscious* decision that also frequently includes a desire by a community to be *recognised* for management systems that have particular value, or simply recognition that a particular place is very special. In these cases, the ability of category V protected areas to accommodate diverse governance regimes is key.

Once a place becomes a protected landscape or seascape it acquires additional responsibilities in terms of understanding impacts of management on wild biodiversity.

Protected landscapes and seascapes are partly models for management in the wider environment; in other words it is not only important for management to work but for us to understand *how* it works. Monitoring has therefore become an important component in many protected landscapes and seascape. This can involve *baseline monitoring* to understand conditions when the protected landscape is created, as in Mozambique; *continuous monitoring* to track changes in biodiversity over time as described for black grouse in Germany; and in-depth *research monitoring* to answer specific questions about management, as in the management of marine resources in Australia. Monitoring must never just be a sterile research activity but one that feeds back immediately into management as described compellingly in Dhimurrhu. Such iterative systems are currently rather rare. One of the challenges in putting together this volume was to find protected landscapes and seascapes with sufficient data on biodiversity; we did the best we could but many of the examples we have here are still far from rich in information. Improving our understanding of how the category V concept works in practice remains a challenge, particularly in marine areas.

The wild biodiversity in all protected landscapes remains under threat. The pressures of industrialisation, population growth, climate change, an expanding agricultural frontier, the current boom in bioenergy, land grabbing and rising inequality combine to put unprecedented pressure on natural resources within and outside of protected areas. This creates threats not only to wild biodiversity and natural ecosystems but also to local and indigenous communities around the world and to any traditional form of management that does not fit into the precise needs of modern industrialised communities. Maintaining such areas therefore requires a concerted effort. Most of the interest groups we have been discussing in the



Lonjsko Polje Nature Park, Croatia

previous chapters – local communities, indigenous peoples, traditional agriculturalists, nature conservation interests and of course the plants and other animal species that have no direct voice in human affairs – are not strong enough on their own to protect their landscape values. If banded together and speaking with a single voice, their position is far stronger. It is a tragedy that all too often in the recent past indigenous peoples and local communities have come to be in conflict with nature conservationists over the use of land and water, when in many cases the various interest groups all want roughly the same thing. Divided we most certainly will fall. Several of the case studies here show that mutually supportive collaboration is possible. It is never easy, in this or any other sphere of activity, but it can work. Building better partnerships that benefit people and wild biodiversity must be one of the major aims of all categories of protected areas over the next few years.

Some recommendations

We hope that this volume is the start of a much more thorough attempt to understand more about wild biodiversity in protected landscapes. In addition to the general lessons referred to above, several more specific recommendations are offered for discussion:

A dedicated research programme: we need to know more about wild biodiversity in protected landscapes. The importance of monitoring and research has already been discussed. The IUCN Species Survival Commission and World Commission

on Protected Areas have a joint task force concerned with building up and analysing long-term data on biodiversity conservation in protected areas. Category V is currently poorly represented in the global databases, due in part to how categories are assigned in the system, and a dedicated sub-group of the joint task force looking at these issues would fit very well into the wider aims of this group. In particular, the generally poor information about biodiversity in category V is even poorer for protected seascapes and far more research is needed on these approaches in marine and coastal environments. A special focus on non-government protected areas would also be justified.

Better collaboration between sites: a network of protected landscapes and seascapes is needed to test out and compare different approaches to wild biodiversity conservation at a landscape scale. This volume shows that we have some great stories to tell about biodiversity conservation in protected landscapes but also still a lot to learn; connecting up interested sites to share lessons and information would help that lesson-learning speed up. A dedicated task force of the IUCN WCPA Protected Landscapes Specialist Group would be one potential framework for such collaboration.

A clearer boundary between category V and category VI. At present there is still some confusion between category V and another of IUCN's protected area management categories: category VI, which covers mainly natural areas with some

sustainable use. Some of the examples in the current volume could have been classified as category VI with minor changes in management objectives. Greater efforts to clarify the distinct roles and purposes of the two approaches would be useful; something that might best be achieved by joint effort between the category V and category VI task forces.

Better collaboration between knowledge networks: bringing together western science and traditional knowledge. Several of the examples discussed here make the case for bringing trained scientists into protected landscapes to coordinate monitoring and research. But at the same time, many protected landscapes and seascapes are predicated on the traditional ecological knowledge (TEK) and deep associated understanding about population patterns of plant and animal species and the impact of changing weather patterns. Western science and TEK often co-exist in an air of mutual suspicion but it does not need to be like that: wherever the two groups have collaborated in a spirit of mutual respect the results have often been very positive. Protected landscapes are an obvious place to start.

Protected Landscapes are a strong option for biodiversity conservation in human-influenced landscapes and seascapes. They often contain threatened or endemic species, and are critical areas for cultural sustenance. Recognized as Category V in IUCN's protected area categorization system, their existence is based on the interactions of people and nature over time. Many communities have long protected their own landscapes. The first officially designated protected landscapes were created to preserve cultural landscapes of scenic beauty. However, there is now also a growing interest in the nature conservation benefits of protected landscapes.

But do protected landscapes really protect wild biodiversity? The case studies collected here launch an investigation into wild biodiversity. They show that there is good if limited evidence that the approach can deliver effective biodiversity conservation. This publication is the third in a series on the Values of Protected Landscapes, which explores and documents the environmental, economic, social and cultural values that Category V protected areas provide. It is a project of the Protected Landscapes Specialist Group of IUCN's World Commission on Protected Areas.



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