

PARKS

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Developing capacity for a protected planet

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IUCN PROTECTED AREA DEFINITION, MANAGEMENT CATEGORIES AND GOVERNANCE TYPES

IUCN DEFINES A PROTECTED AREA AS:

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.

The definition is expanded by six management categories (one with a sub-division), summarized below.

- Ia Strict nature reserve:** Strictly protected for biodiversity and also possibly geological/ geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values.
- Ib Wilderness area:** Usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, protected and managed to preserve their natural condition.
- II National park:** Large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.
- III Natural monument or feature:** Areas set aside to protect a specific natural monument, which can be a landform, sea mount, marine cavern, geological feature such as a cave, or a living feature such as an ancient grove.
- IV Habitat/species management area:** Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category.
- V Protected landscape or seascape:** Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

VI Protected areas with sustainable use of natural resources: Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims.

The category should be based around the primary management objective(s), which should apply to at least three-quarters of the protected area – the 75 per cent rule.

The management categories are applied with a typology of governance types – a description of who holds authority and responsibility for the protected area.

IUCN defines four governance types.

Governance by government: Federal or national ministry/ agency in charge; sub-national ministry/agency in charge; government-delegated management (e.g. to NGO)

Shared governance: Collaborative management (various degrees of influence); joint management (pluralist management board; transboundary management (various levels across international borders)

Private governance: By individual owner; by non-profit organisations (NGOs, universities, cooperatives); by for-profit organisations (individuals or corporate)

Governance by indigenous peoples and local communities: Indigenous peoples' conserved areas and territories; community conserved areas – declared and run by local communities

For more information on the IUCN definition, categories and governance type see the 2008 *Guidelines for applying protected area management categories* which can be downloaded at: www.iucn.org/pa_categories

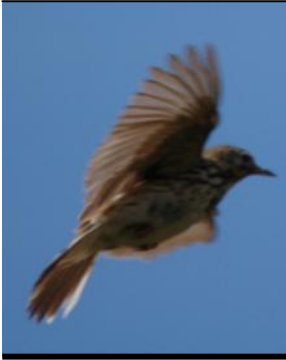
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Contribute to developing capacity for a Protected Planet at: www.protectedplanet.net/



PARKS: THE INTERNATIONAL JOURNAL OF PROTECTED AREAS AND CONSERVATION

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PARKS is published to strengthen international collaboration in protected area development and management by:

- exchanging information on practical management issues, especially learning from case studies of applied ideas;
- serving as a global forum for discussing new and emerging issues that relate to protected areas;
- promoting understanding of the values and benefits derived from protected areas to communities, visitors, business etc;
- ensuring that protected areas fulfill their primary role in nature conservation while addressing critical issues such as ecologically sustainable development, social justice and climate change adaptation and mitigation;
- changing and improving protected area support and behaviour through use of information provided in the journal; and
- promoting IUCN's work on protected areas.

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EDITORIAL: WILDLIFE CRIME POSES UNIQUE CHALLENGES TO PROTECTED AREAS

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ABSTRACT

Wildlife crime is the fifth largest international criminal activity worldwide. Wildlife and timber poaching is becoming increasingly organised, increasingly global and more ruthless. Protected areas are suffering most acutely from this crime wave. They frequently contain the richest biodiversity and many species valued by poachers are now virtually or completely confined to protected areas. Managers, rangers and their families are intimidated, attacked and killed. Local communities suffer threats, disturbance and loss of natural resources from community reserves. Protected areas are further exposed in many countries by weak judicial processes that fail to prosecute wildlife traders even if they are caught. These developments signal the need for long-term changes in management in protected areas containing species sought by wildlife traders; more emphasis on patrolling and enforcement along with efforts to address corruption, strengthen the judiciary and improve enforcement along the rest of the trade chain. Many of these changes are unwelcome in institutions that have spent decades developing softer approaches to management. Addressing wildlife crime without losing the benefits of more transparent, consultative and participatory approaches is a challenge that requires concerted efforts by all those affected.

KEYWORDS: wildlife crime, timber poaching, enforcement, protected areas

Much of the world's protected areas network is being deliberately targeted by increasingly violent and ruthless criminal syndicates, who move their operations around the world stripping out the most valuable species for sale on the international market. Unless governments, protected area managers, law enforcement agencies, the judicial sector and communities can improve their success at addressing these problems, protected areas will fail to deliver effective conservation for a proportion of the world's most iconic species. As protected areas are in many cases the most significant remaining habitat for these species, failure means consigning them to extinction in the wild. Addressing wildlife crime at the intensity it currently exists will require a fundamental realignment in the way in which protected areas do business, as well as a significant increase in law enforcement effort to tackle the rest of the trade chain and strategically designed efforts to reduce demand.

Crucially, the pervasive corruption which currently permeates nearly every stage of the law enforcement process in many regions must be combated for the

system to function with effectiveness and political credibility (Huijbregts et al., 2013).

Over the last two decades, wildlife crime has developed into a multi-billion dollar industry; by some estimates now the fifth largest international criminal activity after narcotics, counterfeiting, and illicit trafficking of humans and oil. (Haken, 2011). As with narcotics, wildlife crime has become increasingly well organised and violent, posing a new level of threat to those responsible for managing and protecting wildlife. Problems are escalating fast, in terms of both the scale of poaching and the audacity with which poachers take high value, heavily protected species. Mass killings of hundreds of elephants in individual protected areas have now occurred in several African countries (Haken, 2011). A sudden surge in poaching effort in some areas in the last few years has caught authorities off guard. It is estimated that up to 30,000 elephants are killed in Africa each year and rhino poaching in South Africa has increased from 13 in 2007 to 668 in 2012, rolling back years of conservation effort. In many parts of the world poachers have extirpated



Seized poachers weapons, Gabon @ WWF-Canon / James Morgan

species from large parts of their former range. The loss of the last population of a unique sub-species of Javan rhinoceros from Cat Tien National Park in Vietnam, was due to poaching (Brook et al., 2012). For several species whose body parts are particularly valuable to the wildlife trade, criminal activity is now a greater threat than habitat loss.

Analysts still only have an approximate idea of the scale of the problem. The legal trade in wildlife was estimated to be US\$21 billion a year in 2005 (Rosen and Smith, 2010). Estimates of the parallel illegal trade vary from US\$5-20 billion (Wyler & Sheikh, 2008), with the high value products including tiger parts, caviar, elephant ivory, rhinoceros horn and some exotic birds and reptiles. Poaching has been a controversial issue ever since people started claiming natural resources as personal property. The poacher has often been a

romantic figure in popular culture and folklore: someone relieving the rich and powerful of resources they had expropriated by force, often in turn suppressed by ruthless force of law (Thompson, 1976). There is an extent to which this attitude remains today; local communities taking game from protected areas set up on their traditional lands meet with considerable sympathy (Lewis, 1996). Similarly, both inside and outside protected areas local bushmeat hunting has been closely correlated with shortages of other foods or of money (e.g., Brashares et al., 2004, Nasi et al., 2008). Addressing these problems is challenging but is ultimately as much about negotiation and overall levels of development and wellbeing than it is to do with heavy-handed enforcement.

THE PROFESSIONALIZATION OF WILDLIFE CRIME

What is happening now is both of a different type and a different order of magnitude. Subsistence poaching is being overtaken by commercial theft of valuable wildlife products: resources for the exotic pet trade; freshwater and marine fish; and ivory and rhino horn to supply the huge markets in Asia, particularly China, Thailand and Vietnam.

Criminal syndicates involved in wildlife trafficking are increasingly well organised, with significant networks of international connections that enable them to gather and transport large quantities of illegal wildlife products across continents. Poaching gangs are better equipped, heavily armed, technologically savvy and prepared to move quickly between countries to exploit legal loopholes, areas of weak enforcement or changing demand. The amount of money involved has made the trade increasingly sophisticated, more violent and more susceptible to corruption, including of professionals within the system (such as veterinarian involvement in illegal rhino horn trade in South Africa). Illegal wildlife products are also used by rebel movements, such as the Sudan People's Liberation Army and the Janjaweed militia (WWF/Dalberg, 2012), and the Maoists in Nepal (Baral & Heinen, 2006), to fund their activities. Governments are often either complicit (Smith & Walpole, 2005) or unable to control the trade, which is seen as less serious than other criminal activities (e.g., Shepherd and Nijman, 2008): Corruption and abuse of power can be apparent throughout the system, for example even if poachers are apprehended they often never reach court. A recent survey of governments found mounting concern about the implications for security, sustainable development, natural resources and, due to the unregulated movement of animal parts, global health (WWF/Dalberg, 2012).



Illegally poached elephant ivory waits to be burned © WWF-Canon / James Morgan

Protected areas are, in many countries, the major, and sometimes the only, remaining habitat for species of conservation concern that are targeted for the illegal trade. They are therefore the focus of a large proportion of the illegal wildlife trade (e.g., Yi Ming et al., 2000); and in many countries protected areas are subject to highly criminalised poaching. Protected area agencies, primarily established and run by wildlife experts and insufficiently equipped or completely unarmed government park rangers, are now expected to respond to heavily armed criminal gangs; something akin to expecting social workers to deal with cross border drug smuggling cartels. Protected area rangers are killed every year in attempts to control poaching and there are increasing reports of intimidation against family members. Managers and rangers frequently feel unsupported by police and judiciary, and even their own hierarchies who may be complicit in the trade, and have little incentive to undertake dangerous patrolling missions.

IMPLICATIONS FOR PROTECTED AREA MANAGEMENT

For the last few decades or more, the emphasis of protected area management has increasingly been focused on softer approaches, building on negotiation, participation and consensus and consciously moving away from the rather militarised and top-down management approach of the past. Many donors have been reluctant to support law enforcement activities,

which were seen as symptomatic of an old-fashioned, colonial attitude to wildlife conservation. But management by consensus only works where there is a broad agreement on values and aims, and where they system is closed to outsiders and free of violations to the agreements. The rising criminality associated with wildlife trading, mainly driven by wealthy individuals, jeopardises a consensus approach to management. It also threatens indigenous and community conserved areas as much as it does state-run reserves; many coastal communities are finding their traditional fishing reserves under threat from mobile, offshore fleets and fishing collectives are mounting armed patrols to protect their resources.

Uncomfortable though it may be, many protected area agencies responsible for species valued by the wildlife trade need to elevate enforcement much higher up their list of management priorities. There is good evidence that poaching levels are closely correlated with enforcement (e.g., Hilborne et al., 2006 reporting on Serengeti in Tanzania) and that effective enforcement can indeed help stem the tide of poaching.

For enforcement to match the current level of threat, there is a need to shift protected area management further towards performance based accountability. It is critical that all protected areas implement Adaptive Tactical Patrolling techniques, including strong Law Enforcement Monitoring systems. The creation of



The Anti Poaching patrol team in Kui Buri National Park, set up by the Thai government in response to the recent escalation of Tiger and elephant poaching by organised wildlife crime syndicates, Thailand. Over 1,000 rangers worldwide have lost their lives protecting wildlife and natural places in the last 10 years. © WWF-Canon / James Morgan

protected area agencies that have legal and financial independence from central government can also help drive effectiveness. Enforcement strategies need to be location-specific, such as recognising the need for heavier patrolling activities in densely forested areas than in open plains (Jachmann, 2008). Bi- or multi-lateral government agreements can provide critical frameworks for transboundary law enforcement where protected areas cross one or more national boundaries.

Informant networks around protected area territories are also an essential tool for effective law enforcement, ensuring patrolling effort is well targeted and that poachers can be apprehended before animals are lost. All intelligence gathered from informant networks or arrested suspects should feed into national and regional intelligence systems to help articulate links to trafficking syndicates.

Agencies addressing wildlife crime also need to match the criminals in terms of technological sophistication and new tools are becoming available all the time, such as Unmanned Aerial Vehicles to facilitate patrolling, DNA profiling to track origin of traded animals (Baker et al., 2007; Wasser et al., 2007); use of satellite imagery to track ships involved in illegal fishing; and electronic coding of logs to track legal shipments. On a more

fundamental level, efforts to target the criminal syndicates at the heart of the trade would be greatly facilitated by methodologies used to combat other serious crimes such as drug and arms trafficking. These include controlled deliveries, covert investigation techniques, intelligence gathering, forensics and crime scene investigation, confiscation of assets, appropriate sentencing and extradition (ICCWC, 2012).

INTERNATIONAL RESPONSES

There are signs that the global community is waking up to the scale of the threat facing wildlife and to the wider implications for human society. Formation of the International Consortium for Combating Wildlife Trade, between CITES, the Convention on International Trade on Endangered Species of Wild Flora and Fauna, INTERPOL, The World Bank, the UN Office on Drugs and Crime and the World Customs Organisation, marks a new determination to bring the full array of enforcement measures against wildlife crime (UNODC, 2012), and there is increasing engagement of non-environmental fora such as the UN Convention Against Transnational Organised Crime and the Commission on Crime Prevention and Criminal Justice. After decades of inaction, governments are starting to be held accountable for wildlife crime - the last CITES Conference of the

Parties put several countries 'on notice' due to illegal ivory or rhino horn trade problems, with specific action required to avoid CITES compliance measures, which include sanctions. Most critically, high level politicians are increasingly acknowledging that wildlife crime is a serious crime, as outlined by the statements and commitments made by heads of state in international fora such as the Asia Pacific Economic Cooperation, the Rio+20 Outcome Document, and the UN General Assembly, although this political commitment still needs to be comprehensively translated into action.

On a more practical level, penalties for criminals convicted of wildlife trafficking are beginning to improve: in April 2013 Japan increased the maximum penalty for wildlife trafficking from one to five years and there is a growing (yet still small) number of highly significant prosecutions, such as the 40 year jail sentence given in South Africa late last year to a convicted Thai national kingpin in a rhino horn poaching racket. On-ground responses to these crimes have increased significantly in some areas – several African countries have launched elite military responses to large scale poaching threats, the latest in Cameroon involving 600 elite troops. So far the unique role of protected areas has received less attention. We need urgent steps to bring protected area agencies more centrally into strategic discussions about controlling trade; without their support – and without greater support for them in turn – these efforts are likely to be wasted.

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REFERENCES

Baker C.S., J.C. Cooke, S. Lavery, M.L. Dalebout, Y.U. Ma, N. Funahashi, C. Carraher and R.L. Brownell Jr. (2007). Estimating the number of whales entering trade using DNA profiling and capture–recapture analysis of market products. *Molecular Ecology* 16(13):2617–26., doi:10.1111/j.1365-294X.2007.03317.x.

Baral, N. and J.T. Heinen. (2006). The Maoist people's war and conservation in Nepal. *Politics and the Life Sciences* 24 (1-2): 1-11.

Brashares, J.S., P. Arcese, M.K. Sam, P.B. Coppolillo, A.R.E. Sinclair and A. Balmford. (2004). Bushmeat Hunting, Wildlife Declines, and Fish Supply in West Africa. *Science* 306: 1180-1183

Brook, S.M., P. van Coeverden de Groot, C. Scott, P. Boag, B. Long, R.E. Ley, G. Reischer, A.C. Williams, S.P. Mahood, Tran Minh Hien, G. Polet, N. Cox and Bach Thanh Hai. (2012). Integrated and novel survey methods for rhinoceros populations confirm the extinction of *Rhinoceros sondaicus annamiticus* from Vietnam. *Biological Conservation* 155: 59-67

Haken, J. (2011). *Transnational Crime In The Developing World*. Washington, DC, USA: Global Financial Integrity

Hilborn, R., P. Arcese, M. Borner, J. Hando, G. Hopcraft, M. Loibooki, S. Mduma and A.R.E. Sinclair. (2006). Effective Enforcement in a Conservation Area *Science* 314: 1266.

Huijbregts B., Bour P., Drori O., Elkan P., Feistner A., Froment J.M., Greer D., Gotanegre A., Douglas Hamilton I., Honing N., Ilambu O., Mathot L., Nzooch Z., Ononino A., Péliissier C., Scholte P., Roulet P.A., De Wachter P. (2013). *The ivory traffic crisis and wildlife management in Central Africa*. Technical paper, March 2013

International Consortium on Combatting Wildlife Crime (ICCWC). (2012). *Wildlife and Forest Crime Analytic Toolkit*. Vienna, Austria: UN Office on Drugs and Crime

Jachmann, H. (2008). Illegal wildlife use and protected area management in Ghana. *Biological Conservation* 141: 1906-1918

Lewis, C. (ed.) (1996). *Managing Conflicts in Protected Areas*. Gland, Switzerland: IUCN

Nasi, R., D. Brown, D. Wilkie, E. Bennett, C. Tutin, G. van Tol and T. Christophersen. (2008). *Conservation and use of wildlife-based resources: the bushmeat crisis*. Secretariat of the Convention on Biological Diversity, Montreal, and Technical Series no. Bogor, Indonesia: 33Center for International Forestry Research (CIFOR)

Rosen, G.E. and K.F. Smith. (2010). Summarising the evidence on the internationalisation of illegal wildlife. *EcoHealth* 7: 24-32.

Shepherd, C.R. and V. Nijman. (2008). The trade in bear parts from Myanmar: an illustration of the ineffectiveness of enforcement of international wildlife trade regulations. *Biodiversity Conservation* 17: 35-42

Smith, R.J. and M.J. Walpole. 2005. Should conservationists pay more attention to corruption?. *Oryx* 39 (3): 251-256.

Thompson, E.P. 1976. *Whigs and Hunters: The origins of the Black Act*. Pantheon

UNODC (United Nations Office on Drugs and Crime). (2012). *Wildlife and Forest Crime Analytic Toolkit*. New York, USA: United Nations

Wasser, S.K., C. Mailand, R. Booth, B. Mutayoba, E. Kisamo, B. Clark and M. Stephens. (2007). Using DNA to track the origin of the largest ivory seizure since the 1989 trade ban. *Proceedings of the National Academy of Sciences* 104 (10): 4228-4233.

Wyler, L.S. and P.A. Sheikh. (2008). *International illegal trade in wildlife: threats and US policy*. Washington DC, USA: Congressional Research Service

Yi-Ming, L., G. Zenxiang, L. Xinhai, W. Sung and J. Niemela. (2000). Illegal wildlife trade in the Himalayan region of China. *Biodiversity and Conservation* 9: 901-918

WWF/Dalberg. (2012). *Fighting illicit wildlife trafficking: A consultation with governments*. Gland, Switzerland: WWF International

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RESUMEN

Los delitos contra la vida silvestre son la quinta actividad delictiva internacional más grande del mundo. La caza furtiva y la explotación maderera ilegal son actividades cada vez más organizadas, más globales y más despiadadas. Las áreas protegidas están sufriendo de forma más aguda los embates de esta ola delictiva. Con frecuencia contienen la biodiversidad más rica y muchas especies apreciadas por los cazadores furtivos están ahora práctica o totalmente confinadas a las áreas protegidas. Los administradores y los guarda parques y sus familias son intimidados, atacados y asesinados. Las comunidades locales sufren amenazas y alteraciones y la pérdida de los recursos naturales de las reservas comunitarias. Las áreas protegidas se ven más expuestas en muchos países por la debilidad de los procesos judiciales que no logran enjuiciar a los comerciantes de vida silvestre, incluso si son atrapados. Estos hechos señalan la necesidad de cambios a largo plazo en la gestión de las áreas protegidas que contienen especies buscadas por los comerciantes de vida silvestre, incluyendo más énfasis en el patrullaje y la aplicación de la ley, junto con la creación de capacidades tendientes a asegurar el apoyo eficaz de la comunidad judicial en general. Muchos de estos cambios no son bienvenidos en las instituciones que han pasado décadas desarrollando enfoques de gestión más blandos. El abordaje de los delitos contra la vida silvestre sin perder los beneficios de enfoques más transparentes, consultivos y participativos es un reto que precisa de los esfuerzos concertados de todos los afectados.

RÉSUMÉ

La criminalité contre les espèces sauvages est la cinquième activité criminelle internationale dans le monde. Le braconnage d'espèces sauvages ainsi que le trafic de bois illégal deviennent de plus en plus organisés, mondiaux et sans pitié. Les aires protégées souffrent davantage de cette vague criminelle. Elles abritent en effet souvent la plus riche diversité biologique et accueillent de nombreuses espèces valorisées par les braconniers, aujourd'hui pratiquement – voire complètement – confinées aux aires protégées. Les gestionnaires d'aires protégées, les gardes et leurs familles sont intimidés, attaqués, et même assassinés. Les communautés locales sont menacées, perturbées et dépossédées des ressources naturelles de leurs réserves communautaires. Les aires protégées sont davantage exposées dans les nombreux pays où la justice défaillante ne condamne pas les trafiquants d'espèces sauvages, même lorsque ceux-ci sont arrêtés. Il est donc essentiel de changer à long-terme la gestion des aires protégées accueillant des espèces particulièrement recherchées par les trafiquants ; de mettre davantage l'accent sur les patrouilles et l'application de la loi ; et de renforcer les capacités pour fournir un soutien efficace à la communauté judiciaire dans son ensemble. Cependant, beaucoup de ces changements ne sont pas les bienvenus dans des institutions qui adoptent depuis des décennies des approches de gestion plus souples. Lutter contre la criminalité liée aux espèces sauvages sans perdre les avantages des approches transparentes, consultatives et participatives mises en place est donc un défi qui demande, pour être relevé, des efforts concertés de toutes les parties prenantes.



PROGRESS TOWARDS THE CBD PROTECTED AREA MANAGEMENT EFFECTIVENESS TARGETS

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ABSTRACT

The management effectiveness of protected areas is a critically important consideration for their conservation success. Over 40 different protected area management effectiveness (PAME) data collection tools have been developed to systematically assess protected area management effectiveness. Many of these assessments have recently been collated into the Global IUCN Protected Area Management Effectiveness (PAME) database. We use the PAME database together with and the World Database on Protected Areas (WDPA) to assess current progress towards the Convention on Biological Diversity's (CBD) 2010 and 2015 targets for PAME, which call for at least 30 per cent and 60 per cent of the total area of protected areas to have been assessed in terms of management effectiveness, respectively. We show that globally 29 per cent of the area protected has been assessed and 23 per cent of countries have reached the 60 per cent target. In addition 46 per cent of countries have reached the 30 per cent target. However, analytical results show that there are biases in the type of protected area assessed; protected areas with larger areas, and protected areas designated as National Parks (IUCN category II) are much more likely to have conducted a PAME assessment. In addition there is a paucity of PAME assessments from Europe and North America, where assessments of protected area management may already be integrated into protected area planning and monitoring systems, creating a challenge for reporting to the CBD. We further discuss the potential and limitations of PAME assessments as tools for tracking and evaluating protected area management, and the need for further assessment tools to address the 'equity' elements of Target 11 of the CBD.

KEYWORDS: protected area management effectiveness, CBD, WDPA, PoWPA, assessment

INTRODUCTION

Protected areas have long been regarded as an important tool for biodiversity conservation (e.g. WCED, 1987), and are used as indicators of progress in the protection of biological diversity by a number of international agreements, including the Convention on Biological Diversity (CBD). The CBD Aichi Biodiversity Targets, agreed on by Parties to the Convention in October 2010, include the following target for protected areas: (www.cbd.int/sp/targets/):

*By 2020, at least 17 per cent of terrestrial and inland water, and 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through **effectively and equitably managed**, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes'. Target 11, CBD (emphasis added).*

This new Aichi target was developed from the earlier CBD Target 1.1 (set in 2003), which called for: *'at least 10 per cent of each of the world's ecological regions [to be] effectively conserved'*. Target 1.1, Decision VII/30, CBD

Analyses of progress towards Target 1.1 have to date tended to measure protected area coverage (Chape et al., 2005, Coad et al., 2008, Spalding et al., 2008, Coad et al., 2009a, Coad et al., 2009b, Jenkins and Joppa, 2009) and ecological representativeness (Rodrigues et al., 2004, Spalding et al., 2007, Schmitt et al., 2009, Herbert et al., 2010) facilitated by the availability of open-access global datasets on protected area locations (e.g. The World Database on Protected Areas – WDPA) and global frameworks of ecological regions and key areas for biodiversity (Olson et al., 2001, Eken et al., 2004). In terms of global protected area coverage, Parties have made significant progress towards achieving Target 1.1 for terrestrial biodiversity: over 50 per cent of terrestrial ecoregions have 10 per cent or more of their area within protected areas, although marine ecosystems are still severely under-represented (Spalding et al., 2008, Coad et al., 2009b).

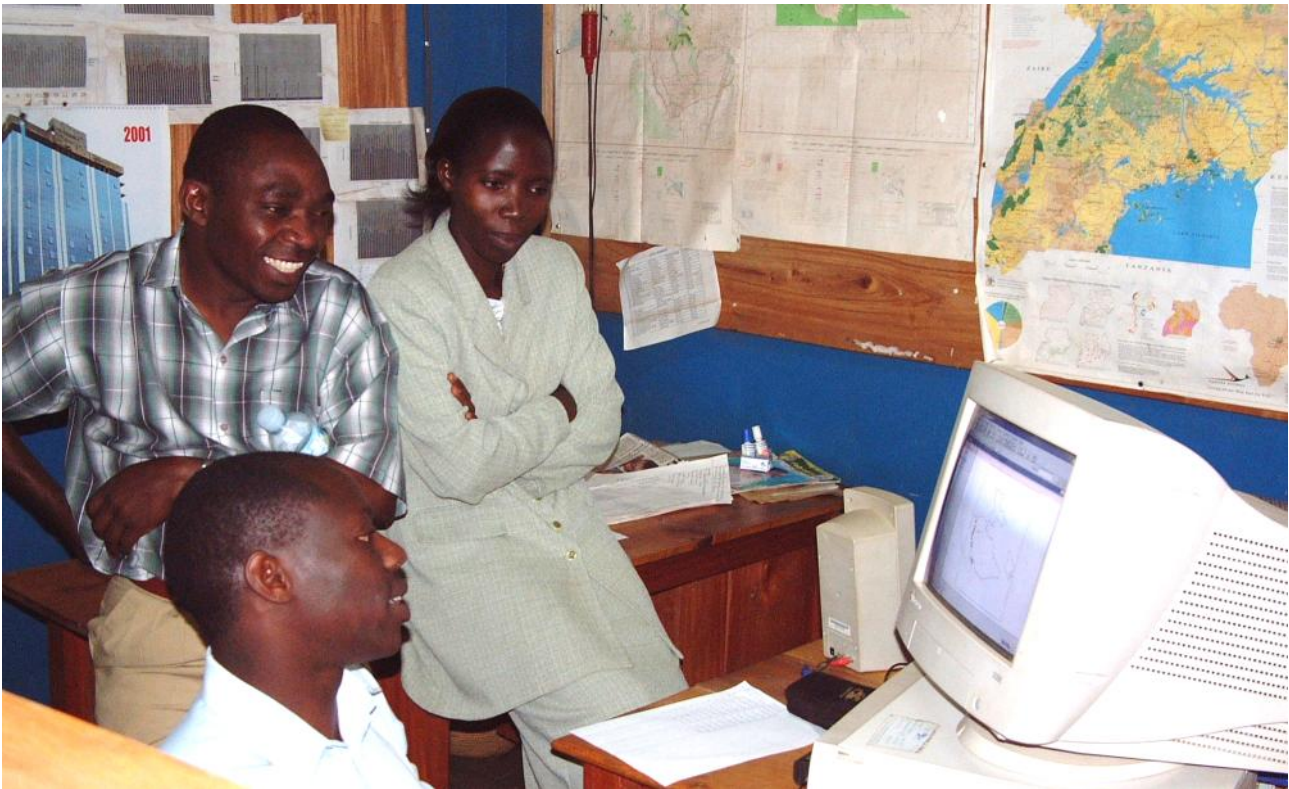
However, protected area coverage alone is not a sufficient indicator for meeting global biodiversity targets. There has been a growing concern amongst protected area managers and conservation scientists that many protected areas around the world are not achieving the conservation objectives for which they were established, because of a lack of effective management (Hockings et al., 2004b, Dudley & Stolton, 2009). In response to this concern, in 2004 the CBD established the Programme of Work on Protected Areas (PoWPA) and set a preliminary global target for 30 per cent of the world's protected areas to have assessed the effectiveness of their management by 2010 (Goal 4.2, CBD PoWPA) (see Coad et al., 2009). This targeted was updated at the CBD's COP 10, when addition to introducing the call for 'effective and equitable' management of protected areas in Target 11, the CBD Aichi targets expanded the mandate for management effectiveness assessment. Inviting *"...Parties to...expand and institutionalize management effectiveness assessments to work towards **assessing 60 per cent of the total area of protected areas by 2015** using various national and regional tools and report the results into the global database on management effectiveness..."* CBD Aichi Targets, COP 10 Decision X/31, 19a (emphasis added).

Undertaking an assessment of management effectiveness allows conservation agencies to understand better their strengths and weaknesses and to adapt and improve

their management regime. In some cases assessments are undertaken in response to donor requirements associated with project support for a protected area or as part of an NGO sponsored assessment and improvement project (Hockings et al., 2004a, Leverington et al., 2010b). Assessments are also undertaken in response to central government requirements to monitor and report on protected area management (e.g. NSW Audit Office, 2004, Auditor General of Queensland, 2010). In 2000, the IUCN World Commission on Protected Areas (WCPA) developed an overarching framework to guide assessment of management effectiveness that has been widely used around the world (Hockings et al., 2000, Hockings et al., 2006). According to this framework, the evaluation of management effectiveness can be carried out for a variety of reasons, including providing better management in a changing environment, effective resource allocation, improved accountability and transparency, community involvement, and promotion of protected area values.

The WCPA framework was developed to provide overall guidance for the evaluation of management, the selection of appropriate indicators and the analysis and application of assessment results. It has been used to develop over 40 different protected area management effectiveness (PAME) data collection tools to systematically assess protected area management effectiveness at the individual protected area level and at a national system level (Leverington et al., 2010a; also see www.wdpa.org/me).

A global study into management effectiveness evaluation was launched in late 2005 and completed in 2010 (Leverington et al., 2008, Leverington et al., 2010a, Nolte et al., 2010). The aim of the study was to obtain a global picture of protected area effectiveness and to track CBD targets and reporting needs on behalf of the international conservation community. To achieve this aim, all existing PAME assessments were collated into a single database. The resulting database has since been updated as part of a collaborative research effort between the University of Queensland and the University of Oxford, with inputs from various other NGO, government and intergovernmental partners¹. The database contains PAME assessments from 1991 to 2012. There are likely to be recent assessments that have not yet been located and added to the PAME database, despite the authors' best efforts. However, we believe that as a result of the high level of outreach to protected area managers, donors, NGOs, government and intergovernmental partners and the wider conservation community during the Global Study, which has been



Gathering data for a management effectiveness assessment in Bwindi Impenetrable National Park and World Heritage Site in Uganda © Marc Hockings

followed with regular updates from partners such as IUCN, The World Wide Fund for Nature (WWF) and the Global Environment Facility (GEF), the majority of assessments up to 2010 are now contained in the database.

In this paper we use the updated IUCN PAME database, together with the UNEP WCMC / IUCN WDPA (IUCN & UNEP, 2012), to conduct a spatial analysis of national and global progress towards the 'effectiveness' element of Aichi Target 11 and the PoWPA. We ask specifically whether countries have achieved the CBD 60 per cent Aichi target for management effectiveness assessments of nationally designated protected areas. We then explore the protected area characteristics that significantly predict whether a protected area has been evaluated. We discuss the results in terms of the future work required to measure progress toward the CBD Aichi Target for 17 per cent of the world's protected areas to be effectively and equitably managed.

METHODS

• Data preparation

All spatial analyses were carried out using the ESRI ArcGIS 10.1 programme (ESRI, 2012). We used the Mollweide Equal Area projection for all analyses. Results are displayed in the Robinson projection.

• WDPA

We used the December 2012 version of the WDPA for analysis (IUCN & UNEP, 2012). The WDPA is provided as two separate GIS shapefiles: 'WDPA polygons' for protected areas where the boundary and shape of the protected area is known, and 'WDPA points' for protected areas where only the point location is known. Where sites only existed in the WDPA as a point location, we used the 'buffer' tool in ArcGIS to create a circular polygon of the same size as the given area of the protected area (as recorded in the WDPA), with the point location as its centroid. We then used the 'Merge' tool to add the buffered points to the existing WDPA polygon shapefile. We included protected areas with a designation status of 'adopted', 'designated', 'inscribed' and 'not reported', and excluded 'proposed' protected areas. All reserves with international designations (World Heritage, Ramsar and Man and Biosphere) were removed leaving only nationally designated reserves, as most international designations either duplicate national reserves or may not meet the requirements for full protected area status (selection of nationally designated areas has also been applied in previous analyses of protected area coverage: see Jenkins & Joppa, 2009, and Schmitt et al., 2009, among others). The final version of the WDPA for analysis contained 168,054 nationally designated protected areas, of which 12 per cent were

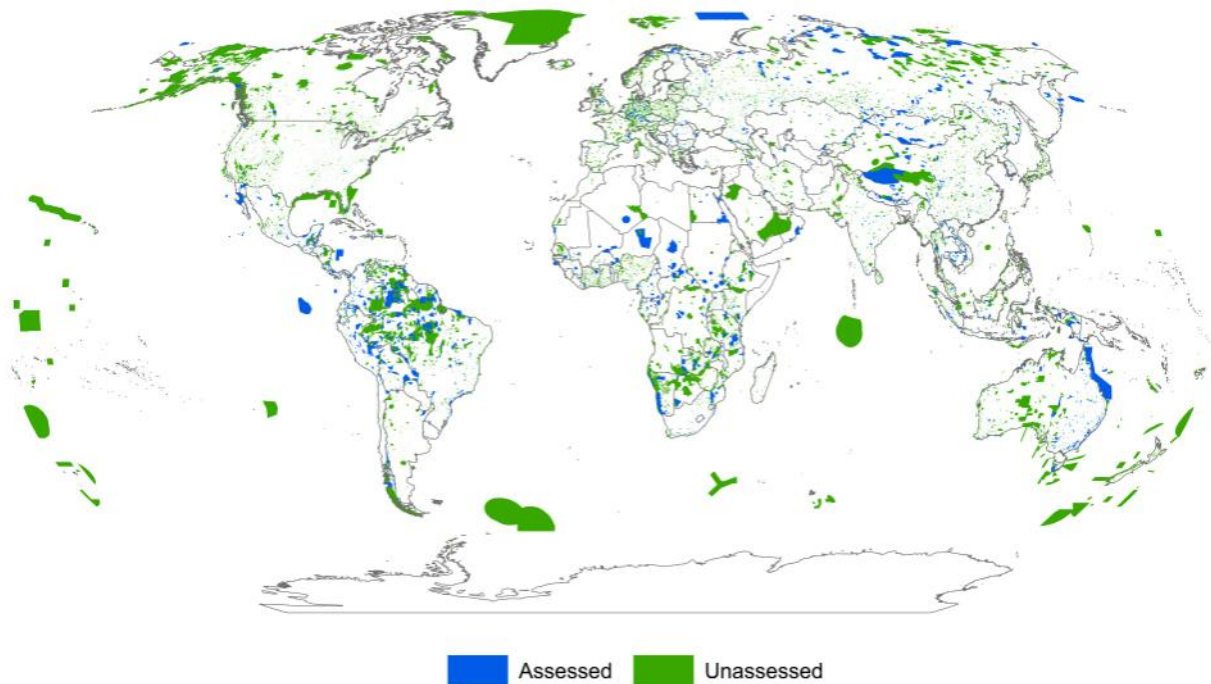


Figure 1: The location of protected areas that have conducted a PAME assessment. Marine and terrestrial nationally designated protected areas are included.

buffered points. Where detailed polygons in the 'WDPA polygon' shapefile exist, this results in large numbers of vertices in the shapefile, which can produce geoprocessing errors during analysis. To avoid these errors we used the ArcGIS 'Repair Geometry' tool to check and correct for any further geometry errors (ESRI, 2012).

- **PAME data**

Management effectiveness assessments have been systematically collated in the IUCN PAME database, which is maintained and hosted by the University of Queensland (UQ). Data held in the database includes protected area name, WDPA Unique Identifier (WDPA ID), year of assessment, methodologies, indicators and assessment tools used and, where available, assessment results. In this analysis we used all assessments entered into the IUCN PAME database up until 30th November 2012. The November 2012 version of the PAME database holds 10,501 assessments for 6,741 sites.

In the IUCN PAME database, for each PAME assessment we recorded the WDPA ID for the appropriate national protected area record in the WDPA. For those assessments where no WDPA ID existed we noted the area of the protected area in hectares, either from the original PAME assessment, or from a reputable government or NGO data source.

- **Calculating assessed area per country**

- **GIS overlay analyses (assessments with WDPA ID):**

We followed the analyses steps outlined by Bubb et al. (2008) for global protected area coverage analyses. We linked the WDPA shapefile with the list of assessed PAs, by WDPA ID, using the 'join' tool. From this, we then created a new shapefile of all assessed PAs. We used the 'dissolve' tool to dissolve all assessed protected area polygons within each country. We repeated this dissolve for the total WDPA. This resulted in two final shapefiles: one providing the total area of assessed nationally designated protected areas (for those with WDPA IDs) for each country, and a second providing the total area of all nationally designated protected areas for each country.

Assessments without WDPA ID: The area (km²) of assessed protected areas without a WDPA ID was summed for each country, using the area of the protected area provided in the IUCN PAME database. This area was then added to the total area of protected areas assessed for each country, and the total area of protected areas for each country. In total, 232 nations were assessed, using the International Organisation for Standardisation (ISO) 3166-1 A3 list to define nations. Dependent territories were added to their parent nations. We only included countries that had protected areas

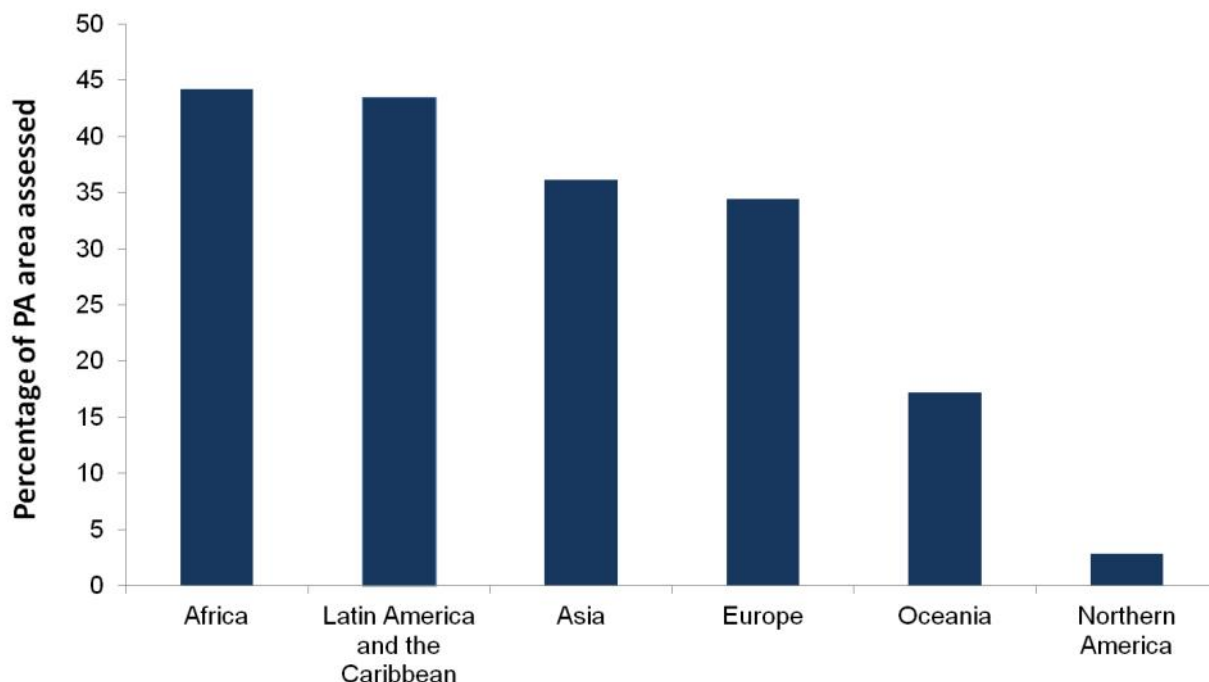


Figure 2: Regional progress towards the CBD 30 per cent and 60 per cent targets for PAME assessments. Progress is measured by the percentage of the total area of the nationally designated protected area network that has been assessed in each region.

recorded in the WDPA; Countries with no recorded protected areas were excluded from the analyses.

- **Calculating assessed area globally and per region**

Countries were grouped into regions according to the United Nations geoscheme. The area of assessed and unassessed protected areas for countries within each region was summed to find the percentage of assessed area for each region.

- **Identifying predictors of PAME assessment**

To identify which protected area characteristics significantly predict whether a PAME assessment had been carried out in a protected area, we used a generalized linear model (GLM) with a binomial error structure (i.e. multivariate logistic regression, Pinheiro & Bates, 2000). At the level of an individual protected area we were limited in our predictors to those with characteristics that have been routinely documented by the WDPA: area (in km²), IUCN management category and year of establishment (converted into 'age of protected area (years)' for the purposes of these analyses). We grouped IUCN categories (Dudley, 2008) into two factor levels category I – II and III – VI, to distinguish between protected areas which have been

predominantly established for strict biodiversity conservation, and those which allow for some level of sustainable use and/or human intervention. These groupings have previously been used in analyses of protected area coverage (see Scharlemann et al., 2010 and Joppa & Pfaff, 2011 for examples). We included UN region and UN Human Development Index (HDI) as regional and country-level predictors.

All statistical analyses were carried out using the R statistical package (R Development Core Team, 2012). Surprisingly, given the heterogeneity of the regions analysed, the data were not overdispersed (dispersion parameter = 1) so no correction for this was necessary (Gelman & Hill, 2007).

RESULTS: GLOBAL, REGIONAL AND NATIONAL PROGRESS TOWARDS THE 60 PER CENT AICHI TARGET

Globally, 29 per cent of the area of nationally designated protected areas has been assessed for PAME. The location of assessed and unassessed protected areas is shown in Figure 1. Regionally, Africa has assessed the largest proportion by area (44 per cent). Latin America, Asia and Europe have also reached the 2010 CBD PoWPA target of 30 per cent assessed (Figure 2). Oceania has not yet met the 30 per cent target, with 17 per cent of

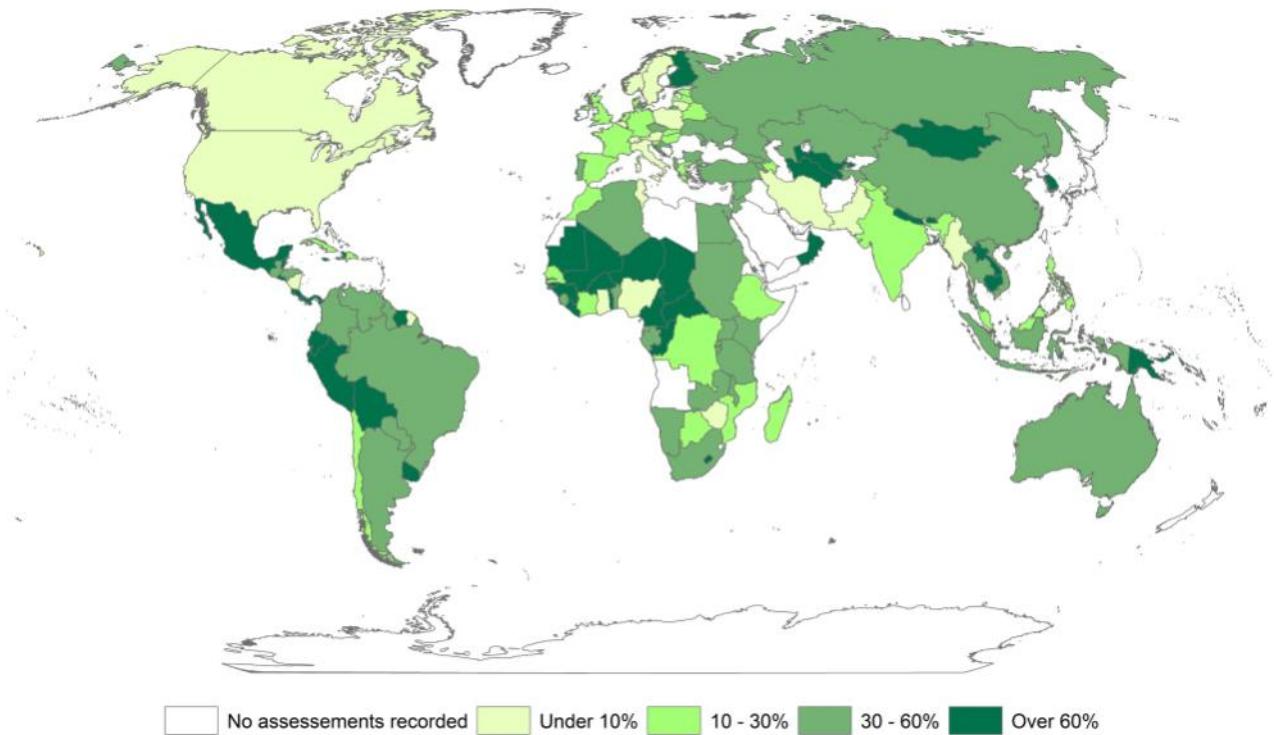


Figure 3: National progress towards the CBD 30 per cent and 60 per cent targets for PAME assessments. Progress is measured by the percentage of the total area of the nationally designated protected area network that has been assessed

the protected area assessed. Northern America has the least assessed area of all regions, with less than 3 per cent of its area assessed, according to PAME records currently held in the database.

Nationally, 46 per cent of the countries listed (90 countries in total) met the 2010 target of 30 per cent, with 23 per cent (45) already achieving the 60 per cent target of 2015 (Figures 3 and 4). However, for 52 countries (26 per cent) no assessments have been recorded in the PAME database.

PREDICTORS OF ASSESSMENT

Wald test statistics, which indicate the relative weights of the explanatory variables in the model, showed that the size of the protected area was the most significant predictor of whether an assessment had been carried out; followed by IUCN protected area management category (Table 1). Larger protected areas were significantly more likely to have conducted a PAME assessment (Figure 5 Table 1). Protected areas with an IUCN protected area management category of I - II were also significantly more likely to have been assessed than protected areas with another management category, even when controlling for area (Table 1). National Parks (category II) had the highest assessment rate, with 30 per cent of

all sites assessed (Figure 6). There was also a significant effect of protected area age (year of establishment) on the probability of assessment, with younger protected areas slightly less likely to have been assessed, although the effect was very small (Table 1). Protected areas in developing countries were more likely to be assessed than those in more developed countries, the frequency of assessment declining significantly with increasing HDI scores (Table 1). However, there were significant regional biases in the results in addition to the differences in terms of development between nations. In relation to African protected areas in general, Latin American, Caribbean and Oceanian protected areas were also more likely to have carried out a management assessment with Asian, European and, especially Northern American, protected areas were less likely.

DISCUSSION

In this paper we measured progress towards the CBD 2010 and 2015 PAME targets. The results of our analyses are encouraging, suggesting that for over 23 per cent of countries the 60 per cent target for 2015 has already been achieved, according to the PAME assessments currently held in the database. A much higher proportion (46 per cent) has achieved the 30 per cent target for 2010. In addition, we continue to receive data from a

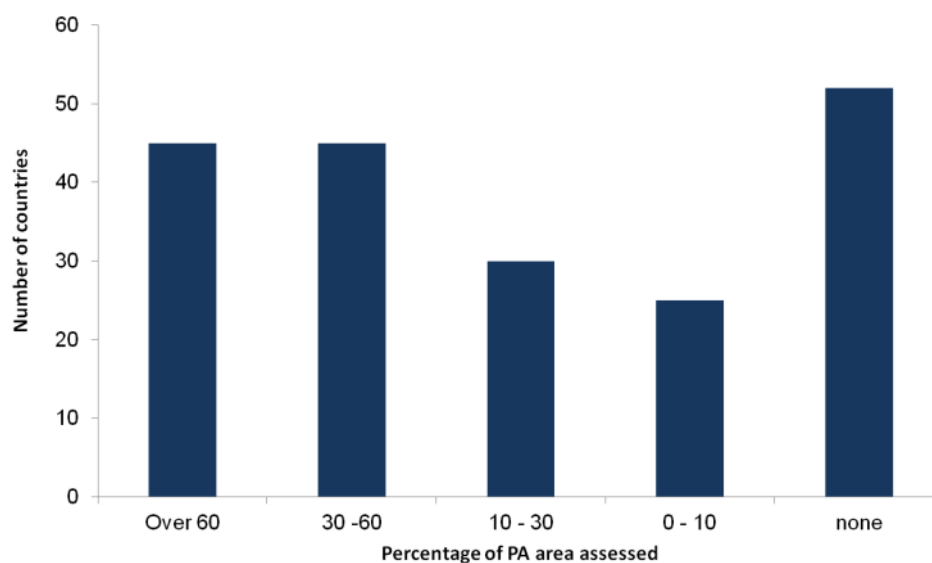


Figure 4: The number of countries reaching the CBD 30 per cent and 60 per cent targets for PAME assessments

number of sources, including regular updates from the GEF, and hence the number of assessments is now likely to be greater than that held in the November 2012 version of the PAME database.

However, progress towards the targets is not evenly spread across the globe. Africa has the highest percentage area assessed, with many countries in West

and Central Africa reaching the 60 per cent target. This is to a large extent due to the strong efforts of IUCN in that region through the PAPACO project² (Leverington et al., 2010b), which has collated and conducted evaluations as part of a targeted programme. Latin America and Asia have also assessed a large proportion of their total protected areas by area. Additionally, protected areas were more likely to be assessed if they were from

Table 1: Parameter estimates of a Generalized Linear Model (GLM) with binomial error structure, showing the significant predictors of whether an individual protected area has conducted a management effectiveness assessment

Predictor Variables (minimal model)	Estimate	S.E.	z	p
Intercept	-2.42	0.19	-12.82	<0.001
Ln (protected area in km ²)	0.96	0.02	48.62	<0.001
Protected area IUCN Category I - II	1.62	0.04	38.55	<0.001
Protected area age (years)	0.01	0.00	10.65	<0.001
Country Human Development Index	-2.35	0.30	-7.87	<0.001
Region:				
Asia	-0.82	0.11	-7.61	<0.001
Europe	-1.48	0.14	-10.68	<0.001
Latin America and the Caribbean	0.77	0.12	6.57	<0.001
Northern America	-3.64	0.25	-14.43	<0.001
Oceania	1.04	0.15	6.77	<0.001

Notes: N = 168,054, of which 4,922 protected areas (with WDPA ID) had a management effectiveness assessment. Reference level for UN Region is Africa, and for IUCN category is III – VI. Note that all these predictors were highly significant in the full model (p-values very close to zero), therefore no model selection step was required (Pinheiro & Bates, 2000), z values are Wald test scores showing the degree of association between the predictor and the probability of having had a management assessment (= square roots of χ^2 statistics).

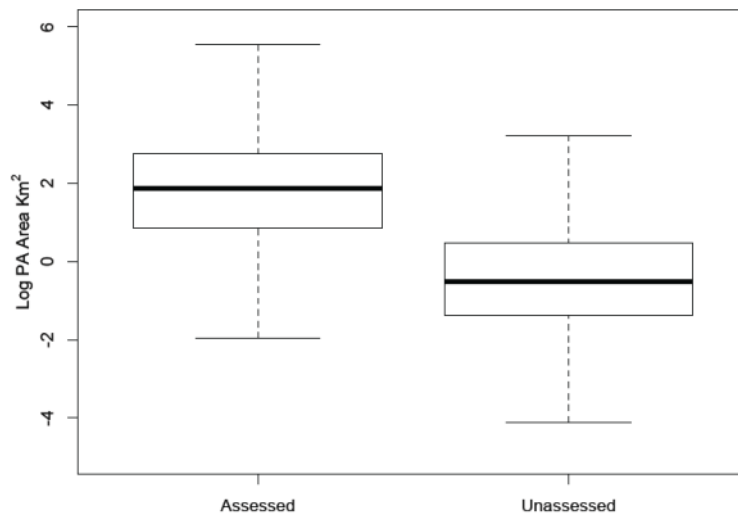


Figure 5: Boxplot showing the median area (and IQ range) of assessed and unassessed protected areas. Median area of assessed protected areas = 74.7 km², median area of unassessed protected areas = 0.30 km²

countries with a lower HDI score. The role of many large donor organizations, which predominantly work in developing countries, in carrying out PAME assessments (Belokurov and Besancon, 2009) could partly explain this geographic bias in reported assessments. For example, all protected area targeting projects funded by the GEF since 2004 have been required to complete the Management Effectiveness Tracking Tool (METT) (Stolton et al., 2007) at least three times for each targeted protected area. As the single largest source of finance for biodiversity and ecosystem management globally, the GEF makes a significant impact in achieving PAME targets through this reporting requirement in partner developing and in-transition countries; more than 300 protected areas in approximately 100 countries around the world are currently required to regularly complete METTs in line with the GEF reporting requirement.

Our results also show that only few assessments on PAME have been undertaken for protected areas in North America and Western Europe, despite a dedicated effort, particularly for Europe (Nolte et al., 2010) to bring together all PAME information. This may not imply that these countries do not evaluate the effectiveness of their protected area networks; they may already have systematic assessments of effectiveness as part of their internal protected area monitoring systems, independent from the IUCN or donor networks. Even where these data exist in North America and Europe, they may not be available through IUCN or UNEP WCMC networks and this creates a challenge for a seamless reporting to the

CBD via these intergovernmental organizations. For example, at a national level, Canada undertakes assessments through their State of the Parks systems and, where available, these assessments are included in the PAME database.

These analyses did not consider the different organizations undertaking PAME assessments, but this topic warrants further investigation. Although many PAME assessments may be carried out on a protected area-by-protected area basis, in some countries assessments have been integrated into regional and national management of protected area systems (for example, NSW DEC, 2005). The case of Australia, which as a country has achieved the 30 per cent target (Figure 1), clearly shows a regional difference in assessments, with eastern Australia accounting for the majority of Australian assessments (of which the Great Barrier Reef assessment accounts for a significant area). In Victoria, New South Wales and Queensland, PAME assessments have been adopted as a planning tool for state protected area management and are conducted every few years.

As well as a geographical bias, we also found a bias in the type of protected area being assessed. National Parks were much more likely to have been assessed (30 per cent of protected areas assessed) than those with another IUCN management category (1 – 7 per cent of protected areas assessed). Protected areas with a larger area were also more likely to have been assessed. This bias towards larger protected areas and National Parks is not surprising; National Parks could be described as the

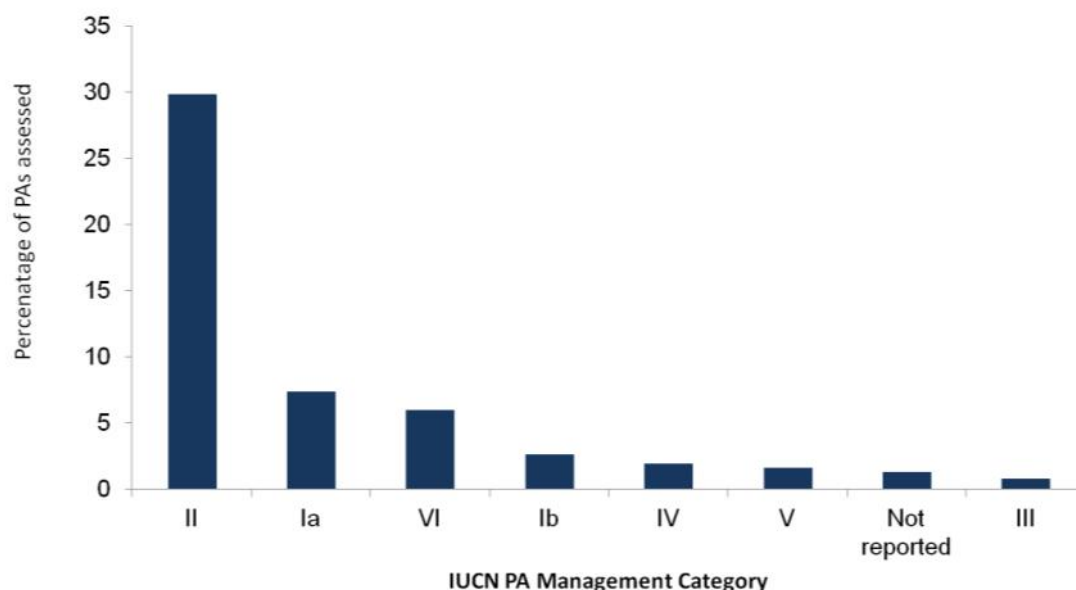


Figure 6: The percentage of protected areas that have undertaken a PAME assessment, by IUCN management category

‘charismatic mega fauna’ of protected areas. They are often designated for their high biodiversity value or spectacular landscapes, but also for their recreation and/or spiritual value, and are therefore likely to attract more funding and attention (and more likely to have monitoring and assessment structures in place, or have been given funding which requires a PAME assessment to be completed) than smaller areas with less emphasis on visitation and tourism. Older protected areas were also slightly more likely to have been assessed. This effect is possibly driven by the low rate of assessment in very recently designated protected areas, in which protected area management is more likely to be in the preliminary stages and management effectiveness assessments may not yet be a priority, and/or the time lag between an assessment being completed and its entry into the PAME database.

Target 11 of the CBD’s Aichi targets calls for ‘effectively managed’ protected areas and protected area networks to be conserved. PAME evaluations, although not designed as a tool for collecting scientific data, may provide the first global-scale sample of data on protected area providing data for over 6,700 protected areas on core management inputs, context, process, outputs and outcomes. However, most PAME assessments were not primarily designed to track CBD target progress, but rather as a tool to help protected area managers start the process of adaptive management at a site and system level. Most of the assessments are completed by protected area managers, and this may introduce reporting biases. In addition, as these analyses show, the

current sample of assessed protected areas is strongly biased towards large protected areas and National Parks. Some or all of these limitations in the data can be overcome; however, they must be considered when using PAME assessments to track progress towards international biodiversity targets.

The PAME database, and the kind of information it contains, is valuable, but not in itself sufficient, for tracking CBD Target 11. To address the “equity” element of the Target 11, there is an urgent need for more detailed and systematic assessment of the social and governance aspects of protected area management. IUCN and others are currently working to improve both the social indicators of management effectiveness and to create additional tools for the social assessment of protected areas (IUCN TILCEPA, 2010). Information on biodiversity outcomes is captured, in part, in management effectiveness assessments but will be better informed by the work of the IUCN WCPA-SSC Task Force on Biodiversity Outcomes of Protected Areas 3. With these initiatives currently in the design stages, the time is ripe for a discussion within the wider conservation community as to how we evaluate protected area management at local, regional and global levels, what we are hoping to achieve with these evaluations, and which tools might help us best achieve our aims.

NOTES

¹ Some records in the dataset were provided on the basis that they were only used for global analyses and access to site data is restricted. For information on the database, contact Marc Hockings at m.hockings@uq.edu.au

² For more information see: <http://cms.iucn.org/fr/papaco/>

³ For more information see: http://www.iucn.org/about/work/programmes/gpap_home/gpap_biodiversity/gpap_wcpabiodiv/gpap_pabiodiv/

REFERENCES

- Auditor General of Queensland. (2010). Sustainable management of national parks and protected areas: A performance audit. *Report to Parliament No 9 for 2010*. Brisbane, Australia: Auditor General of Queensland
- Belokurov, A. and C. Besancon. (2009). New resources for assessing the effectiveness of management in protected areas. *Oryx* 43:14 - 14.
- Bubb, P., L. Fish, and V. Kapos. (2008). *Coverage of protected areas. Guidance for national and regional use*. Cambridge, UK: UNEP-WCMC
- Chape, S., J. Harrison, M. Spalding, and I. Lysenko. (2005). Measuring the extent and effectiveness of protected areas as an indicator for meeting global biodiversity targets. *Philosophical Transactions of the Royal Society B-Biological Sciences* 360:443-455.
- Coad, L., N. D. Burgess, B. Bomhard, and C. Besancon. (2009a). *Progress Towards the Convention on Biological Diversity's 2010 and 2012 Targets for Protected Area Coverage*. Cambridge, UK: UNEP-WCMC
- Coad, L., N. D. Burgess, L. Fish, C. Ravilious, C. Corrigan, H. Pavese, A. Granziera, and C. Besancon. (2008). Progress towards the Convention on Biological Diversity terrestrial 2010 and marine 2012 targets for protected area coverage. *PARKS 17*. Gland, Switzerland: IUCN
- Coad, L., N. D. Burgess, C. Loucks, L. Fish, J. P. W. Scharlemann, L. Duarte, and C. Besancon. (2009b). *The ecological representativeness of the global protected areas estate in 2009: progress towards the CBD 2010 target*. Cambridge, UK: UNEP-WCMC
- Dudley, N. (ed.) (2008). *Guidelines for Applying Protected Area Management Categories*. Gland, Switzerland: IUCN.
- Dudley, N. and S. Stolton (eds). (2009). *Protected area management effectiveness*: METT. NORAD.
- Eken, G., L. Bennun, T. M. Brooks, W. Darwall, L. D. C. Fishpool, M. Foster, D. Knox, P. Langhammer, P. Matiku, E. Radford, P. Salaman, W. Sechrest, M. L. Smith, S. Spector, and A. Tordoff. (2004). Key biodiversity areas as site conservation targets. *Bioscience* 54:1110-1118.
- ESRI. (2012). ArcGIS Desktop. Release 10.1. Environmental Systems Research Institute, Redlands, CA.
- Gelman, A. and J. Hill. (2007). *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge, UK: Cambridge University Press
- Herbert, M. E., P. B. McIntyre, P. J. Doran, J. D. Allan, and R. Abell. (2010). Terrestrial Reserve Networks Do Not Adequately Represent Aquatic Ecosystems. *Conservation Biology* 24:1002-1011.
- Hockings, M., J. Ervin, and G. Vincent. (2004a). Assessing the management of protected areas: the work of the World Parks Congress before and after Durban. *Journal of International Wildlife Law and Policy* 7:31 - 42.
- Hockings, M., S. Stolton, and N. Dudley. (2000). *Evaluating Effectiveness: A framework for assessing management of protected areas*. Gland, Switzerland: IUCN.
- Hockings, M., S. Stolton, and N. Dudley. (2004b). Management Effectiveness - assessing management of protected areas. *Journal of Environmental Policy and Planning* 6: 157 - 174.
- Hockings, M., S. Stolton, F. Leverington, N. Dudley, and J. Courrau. (2006). *Evaluating Effectiveness: A framework for assessing management effectiveness of protected areas*. Second edition. Gland, Switzerland: IUCN.
- IUCN and UNEP. (2012). The World Database on Protected Areas (WDPA). Cambridge, UK: UNEP-WCMC. <http://www.protectedplanet.net>.
- IUCN TILCEPA. (2010). Joint PAEL-TILCEPA workshop on Protected Areas Management Evaluation & Social Assessment of Protected Areas. Gland, Switzerland: IUCN.
- Jenkins, C. N. and L. Joppa. (2009). Expansion of the global terrestrial protected area system. *Biological Conservation* 142:2166-2174.
- Joppa, L. N. and A. Pfaff. 2011. Global protected area impacts. *Proceedings of the Royal Society B-Biological Sciences* 278:1633-1638.
- Leverington, F., K. Costa, J. Courrau, H. Pavese, C. Nolte, M. Marr, L. Coad, N. D. Burgess, B. Bomhard, and M. Hockings. (2010a). *Management effectiveness evaluation in protected areas: a global study*. Second edition. St. Lucia, Queensland, Australia: University of Queensland, IUCN- WCPA, TNC, WWF
- Leverington, F., K. Costa, H. Pavese, A. Lisle, and M. Hockings. (2010b). A global analysis of protected area management effectiveness. *Environmental Management* 46:685 - 698.
- Leverington, F., M. Hockings, and K. Costa. (2008). *Management effectiveness evaluation in protected areas - a global study*. Brisbane, Australia: University of Queensland
- Nolte, C., F. Leverington, A. Kettner, M. Marr, G. Neilsen, B. Bomhard, S. Stolton, S. Stoll-Kleemann, and M. Hockings. (2010). *Protected area management effectiveness assessments in Europe. A review of application, methods and results*. Bonn, Germany: Federal Ministry of the Environment, Nature Conservation and Nuclear Safety
- NSW Audit Office. (2004). *Performance audit: managing natural and cultural heritage in parks and reserves: National Parks and wildlife service*. Sydney, Australia: The Audit Office of New South Wales
- NSW DEC. (2005). *State of the Parks 2004*. Sydney, Australia: NSW Department of Environment, Conservation (NSW DEC)
- Olson, D. M., E. Dinerstein, E. D. Wikramanayake, N. D. Burgess, G. V. N. Powell, E. C. Underwood, J. A. D'Amico, I. Itoua, H. E. Strand, J. C. Morrison, C. J. Loucks, T. F. Allnutt, T. H. Ricketts, Y. Kura, J. F. Lamoreux, W. W. Wettengel, P. Hedao, and K. R. Kassem. (2001). Terrestrial ecoregions of the worlds: A new map of life on Earth. *Bioscience* 51:933-938.
- Pinheiro, L. and D. Bates. (2000). *Mixed-effects models in S and S-Plus*. Springer Verlag, New York, USA.
- R Development Core Team. (2012). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing
- Rodrigues, A. S. L., S. J. Andelman, M. I. Bakarr, L. Boitani, T. M. Brooks, R. M. Cowling, L. D. C. Fishpool, G. A. B. da Fonseca, K. J. Gaston, M. Hoffmann, J. S. Long, P. A. Marquet, J. D. Pilgrim, R. L. Pressey, J. Schipper, W.

- Sechrest, S. N. Stuart, L. G. Underhill, R. W. Waller, M. E. J. Watts, and X. Yan. (2004). Effectiveness of the global protected area network in representing species diversity. *Nature* 428:640-643.
- Scharlemann, J. P. W., V. Kapos, A. Campbell, I. Lysenko, N. D. Burgess, M. C. Hansen, H. K. Gibbs, B. Dickson, and L. Miles. (2010). Securing tropical forest carbon: the contribution of protected areas to REDD. *Oryx* 44:352 - 357.
- Schmitt, C. B., N. D. Burgess, L. Coad, A. Belokurov, C. Besancon, L. Boisrobert, A. Campbell, L. Fish, D. Gliddon, K. Humphries V. Kapos, C. Loucks, I. Lysenko, L. Miles, C. Mills, S. Minnemeyer, T. Pistorius, C. Ravilious, M. Steining, and G. Winkel. (2009). Global analysis of the protection status of the world's forests. *Biological Conservation* 142:2122-2130.
- Spalding, M. D., L. Fish, and L. J. Wood. (2008). Toward representative protection of the world's coasts and oceans-progress, gaps, and opportunities. *Conservation Letters* 1:217-226.
- Spalding, M. D., H. E. Fox, B. S. Halpern, M. A. McManus, J. Molnar, G. R. Allen, N. Davidson, Z. A. Jorge, A. L. Lombana, S. A. Lourie, K. D. Martin, E. McManus, J. Molnar, C. A. Recchia, and J. Robertson. (2007). Marine ecoregions of the world: A bioregionalization of coastal and shelf areas. *Bioscience* 57:573-583.
- Stolton, S., Hockings, M., Dudley, N., MacKinnon, K., Whitten, T. and F. Leverington. (2007). *Reporting progress in Protected areas. A site level Management Effectiveness Tracking tool: second edition*. Gland, Switzerland: World Bank/WWF Forest Alliance and WWF. <http://www.wdpa.org/ME/PDF/METT.pdf>
- WCED. (1987). *Report of the World Commission on Environment and Development: Our Common Future*. Oxford, UK: UN World Commission on Environment and Development (WCED)

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RESUMEN

La eficacia de la gestión de áreas protegidas es una consideración de importancia crítica para el éxito de los esfuerzos de conservación. Se han desarrollado más de 40 instrumentos de recolección de datos relacionados con la eficacia de la gestión de áreas protegidas (PAME) para la evaluación sistemática de la eficacia de la gestión de áreas protegidas. Muchas de estas evaluaciones han sido recogidas recientemente en la base de datos mundial sobre la Efectividad del Manejo de las Áreas Protegidas de la UICN (PAME). Utilizamos la base de datos de PAME junto con la Base de Datos Mundial de Áreas Protegidas (WDPA) para evaluar el progreso actual hacia las metas sobre PAME para 2010 y 2015 del Convenio sobre la Diversidad Biológica (CDB), que requieren que al menos el 30 y el 60 por ciento, respectivamente, de la superficie total de áreas protegidas haya sido evaluada en términos de efectividad de la gestión. Señalamos que a nivel mundial el 29 por ciento de las áreas protegidas han sido evaluadas y el 23 por ciento de los países han alcanzado la meta del 60 por ciento. Además, el 46 por ciento de los países han alcanzado la meta del 30 por ciento. Sin embargo, los resultados analíticos reflejan la existencia de sesgos en torno al tipo de áreas protegidas evaluadas; las áreas protegidas con áreas más grandes y las áreas protegidas designadas como Parques Nacionales (Categoría II de la UICN) tienen mayor probabilidad de haber realizado una evaluación de PAME. Por otra parte, hay pocas evaluaciones de PAME de Europa y América del Norte, donde las evaluaciones sobre la gestión de áreas protegidas pueden estar ya integradas en los sistemas de planificación y monitoreo de áreas protegidas, lo que dificulta el suministro de información al CDB. También analizamos con detenimiento las posibilidades y limitaciones de las evaluaciones de PAME como instrumentos para el seguimiento y la evaluación de la gestión de áreas protegidas, y la necesidad de nuevos instrumentos de evaluación para abordar los aspectos relativos a la "equidad" de la meta 11 del CDB.

RÉSUMÉ

Pour garantir le succès de la conservation des aires protégées, il est extrêmement important de prendre en compte l'efficacité de leur gestion. Plus de 40 outils différents de collecte de données sur l'efficacité de la gestion des aires protégées ont été élaborés pour évaluer de façon systématique cette dernière. Un grand nombre de ces évaluations ont récemment été réunies dans la base de données mondiale de l'UICN sur l'efficacité de la gestion des aires protégées (PAME). Nous avons utilisé la base de données PAME ainsi que la Base de Données Mondiale sur les Aires Protégées (WDPA) pour évaluer les progrès réalisés quant aux objectifs de la Convention sur la diversité biologique pour 2010 et 2015 sur l'efficacité de la gestion des aires protégées. Selon ces objectifs, au moins 30 et 60 pour cent respectivement de la superficie totale des aires protégées doivent être évalués en termes d'efficacité de leur gestion. Nous démontrons ainsi que, à l'échelle mondiale, 29 pour cent des aires protégées ont été évaluées, et 23 pour cent des pays ont atteint l'objectif de 60 pour cent. En outre, 46 pour cent des pays ont atteint l'objectif de 30 pour cent. Cependant, les résultats analytiques montrent certaines limites – notamment dans le type d'aire protégée évaluée. Les aires protégées les plus vastes, ainsi que les aires protégées classées Parc National (catégorie II de l'UICN) sont beaucoup plus susceptibles d'avoir mené une évaluation PAME. En outre, on observe un déficit d'évaluations PAME provenant d'Europe et d'Amérique du nord, ce qui s'explique probablement par le fait que les évaluations sur la gestion des aires protégées sont déjà intégrées dans des systèmes de planification et de suivi des aires protégées – et il est donc plus compliqué de demander à ces acteurs de faire état de la situation auprès de la Convention sur la diversité biologique. Enfin, nous examinons le potentiel et les limites des évaluations PAME en tant qu'outils de suivi et d'évaluation des aires protégées, et étudions l'importance de mettre en place d'autres outils d'évaluation pour aborder les éléments liés à l'équité mentionnés dans l'Objectif 11 de la Convention sur la diversité biologique.



ARE GOVERNANCE AND MANAGEMENT EFFECTIVE WITHIN PROTECTED AREAS OF THE KANCHENJUNGA LANDSCAPE (BHUTAN, INDIA AND NEPAL)?

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ABSTRACT

An assessment was undertaken of the governance and related management effectiveness of four protected areas of the Kanchenjunga landscape shared by Bhutan, India and Nepal, using a simple site level tracking tool. The study was further supported by focus group discussion, a survey of key informants and site visits. The management assessment revealed that protected areas are consistently weak in inputs such as number of staff, equipment, financial provision and infrastructure. The results indicate that management improvements are needed. Khangchendzonga biosphere reserve and Singhalila National Park in India scored 41.98 per cent and 32.44 per cent respectively. Slightly higher, Kanchenjunga Conservation Area of Nepal and Toorsa Strict Nature Reserve of Bhutan scored 67.59 per cent and 58.02 per cent respectively. Weak institutional capacity, depredation by wildlife, livestock grazing and illegal harvesting of resources were identified as threats. Limited participation of local people in decision making and protected area management were seen as major challenges. The findings support the recommendation that efforts should be made to move from a protectionist approach to a community-based conservation approach for conservation and sustainable use of biological resources in the landscape.

KEYWORDS: management effectiveness, Kanchenjunga , Bhutan, India, Nepal, tracking tool, Singhalila, Toorsa, focus group discussion

INTRODUCTION

There are now some 160,000 protected areas listed on the World Database of Protected Areas, covering nearly 13 per cent of the world's terrestrial surface areas. Many of these are embedded in comprehensive national and regional networks of connected protected areas and corridors (Bertzky et al., 2012). This connectivity has been established by promoting, through participatory approaches, sustainable forest management and other conservation efforts along protected area boundaries (Bruner et al., 2001) and developing biological corridors to link habitats and ecosystems (Boyle et al., 2010). Despite these efforts it is not easy to answer the question of how effectively parks are being managed in the context of growing human pressure. Governance and management are as important to the planning and operation of protected areas as biodiversity conservation.

The Kanchenjunga Landscape (KL) which encompasses the southern stretch of landscape surrounding Mount Kangchenjunga (8,586 metres) spreads over diverse ecological zones in eastern Nepal, Darjeeling and Sikkim

in India and western Bhutan (Figure 1 overleaf). Protected areas are established in the landscape for protection of globally threatened species, ecosystem restoration, recreation and to provide ecosystem services to the communities. They are managed in a variety of ways including by the government, co-managed, private management by local NGOs and community conserved areas (Kothari, 1999), under different rules and regulations. Spread over three countries, issues, challenges and governance vary based on each country's own context. However, these areas face similar conservation threats, many of which are transboundary in nature such as park-people conflict, wildlife poaching, illicit trade of species and their products and unregulated tourism. Until recently there had been no assessment of how well these protected areas were managed or whether they have achieved the goals and objectives set at their establishment.

The evaluation of the management effectiveness of protected areas is one critical tool to ensure protected areas are managed for biodiversity conservation,

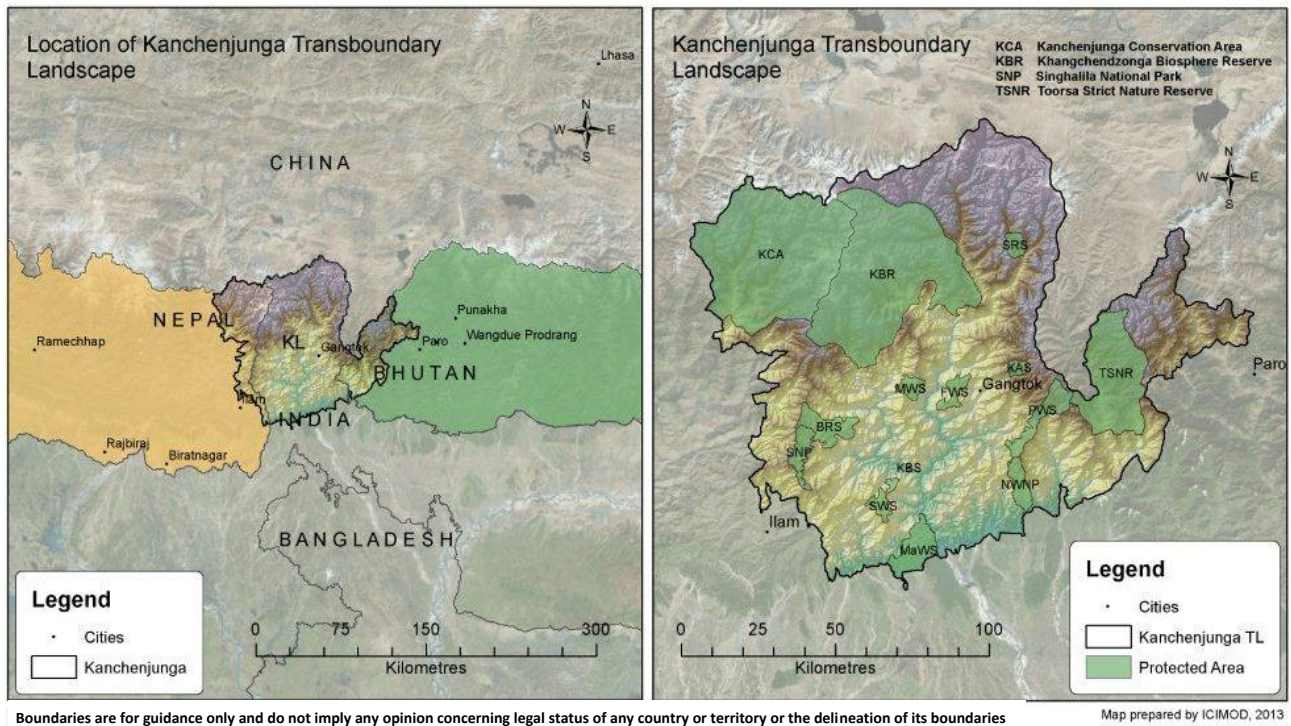


Figure 1. Kanchenjunga Landscape showing protected areas and corridors

maintenance of vital ecosystem services, and provision of socio-economic benefits (BIP, 2011). Although the protected areas in KL are separated, the transboundary movement of bio cultural resources and sharing of environmental services has kept the landscape intact and alive. The landscape approach, and assessment of the effectiveness of management across the landscape, provides opportunities to learn from best practices to address conservation, ecological integrity and sustainable use of biological resources issues at a broader level defined by ecosystems rather than by political boundaries. Well managed protected areas harbouring participatory and equitable governance mechanisms yield significant benefits far beyond their boundaries, which can be translated into cumulative advantages across a national economy and contribute to poverty reduction and sustainable development including achievement of the Millennium Development Goals (Leverington et al, 2010). Considering these issues in particular, the assessment reported here intended to (i) assess the management effectiveness, (ii) assess governance status and its effectiveness, and (iii) identify threats, strengths, and weakness of current management and governance of the protected areas of the transboundary KL.

STUDY AREA

KL is part of Hindukush Himalayan region (Chettri et al., 2008) shared by Nepal, Bhutan and India and is a part of the Himalayan Biodiversity Hotspot (Mittermeier et al.,

2005; WWF-US, 2005). The landscape has 14 protected areas covering 6,037.96 km² representing 40.9 per cent of the total area (Table 1). The landscape provides habitat for more than 100 mammal species, 550 birds and 600 butterflies (Chettri et al., 2008). Some of them are globally threatened species (Rana, 2008). Two-thirds of the protected areas in KL are IUCN category IV (Habitat/Species Management area) (Sharma, 2010). Other protected areas fall under category Ia (Strict Nature Reserve), II (National Park) and VI (Protected Area with Sustainable use of Natural resources). The management responsibility for most of the protected areas in the landscape rests with the government although a few areas are co-managed. The landscape supports over 1.5 million people (Sharma, 2008). Agriculture and animal rearing are the dominant occupation, and there is a high dependency on biological resources for subsistence livelihoods.

For this study, four protected areas in India, Nepal and Bhutan were selected:

1. Toorsa Strict Nature Reserve, Bhutan (IUCN category Ia)
2. Singhalila National Park, Darjeeling, India (IUCN category II)
3. Khangchendzonga Biosphere Reserve, Sikkim, India (IUCN category V and UNESCO Biosphere Reserve)
4. Kanchenjunga Conservation Area, Nepal (IUCN category VI)

Table 1: Protected areas of the Kanchenjunga Landscape

Country	Name of the protected area	IUCN category	Area km ²
1. Nepal	Kangchenjunga Conservation Area	VI	2,035
2. India (Sikkim)	Khangchendzonga Biosphere Reserve	II	2,620
3. India (Sikkim)	Barsey Rhododendron Sanctuary	IV	104
4. India (Sikkim)	Fambong Lho Wildlife Sanctuary	IV	51.76
5. India (Sikkim)	Kyongnosla Alpine Sanctuary	IV	31
6. India (Sikkim)	Maenam Wildlife Sanctuary	IV	35.34
7. India (Sikkim)	Singhba Rhododendron Sanctuary	IV	43
8. India (Sikkim)	Pangolakha Wildlife Sanctuary	IV	128
9. India (Sikkim)	Kitam Bird Sanctuary	IV	6
10. India (WBengal)	Singhalila National Park	II	79
11. India (WBengal)	Senchal Wildlife Sanctuary	IV	39
12. India (WBengal)	Mahananda Wildlife Sanctuary	IV	127
13. India (WBengal)	Neora Valley National Park	II	88
14. Bhutan	Toorsa Strict Nature Reserve	Ia	651
Total			6,037.96

Source: Adapted from Chettri et al. (2008) and GOS (2007)

These protected areas represent the majority, 89 per cent (over 5,385 km²), of the protected area system in KL. Each has a different management regime and unique biodiversity resources. The management responsibility of Toorsa Strict Nature Reserve and Singhalila National Park rest with the government, while Khangchendzonga Biosphere Reserve is managed by the government in collaboration with local communities. The Kanchenjunga Conservation area in Nepal is managed by a local NGO in collaboration with the local communities.

METHODS

The assessment, which focussed on governance and livelihood issues, was made up of six separate activities:

1. Literature review

The first step in the assessment was a thorough review of available literature including management plans, national and international journal articles, research papers, theses, and project proposals to assess major aspects of management and governance of protected areas.

2. Site level tracking tool

The second step was the application of a simple site level management effectiveness tracking tool (METT) in the protected areas. This tool was developed by WWF and World Bank and has been applied since 2003 (Stolton et al., 2007); adaptations of the tool have been used in India in 2006 and 2011 to assess management

effectiveness of tiger reserve (MoEF, 2011), and Nepali (2005) followed a similar approach for evaluating the protected areas of Nepal. The METT follows the structure of the World Commission on Protected Areas (WCPA) management effectiveness framework (Hockings et al., 2006); and considers the six elements of the management cycle (context, planning, inputs, process, outputs and outcomes) (Stolton et al., 2007). In this study, the tool was adapted for use in the KL. A set of 37 questions considering each of these elements was developed and administered through a questionnaire survey (Annex I). A four-point scale: 0 (no or negligible progress), 1 (slight progress), 2 (good) and 3 (very good) was assigned to the elements. The METT was completed by the protected area managers and other stakeholders (e.g. residents, farmers/cattle herders, EDC/FPC officials, NGO officials, protected area field staff, and local body representatives such as Panchayat or Gewak leaders) during the field visits and discussions (see below). The scores were then tabulated by the authors along with the participants.

3. Governance survey

In addition to the adapted METT, a governance survey of 27 questions was developed following protected area governance principles and United Nations principles of governance (Annex II). The survey was conducted with a mixed group of stakeholders including park staff, local people, herders, representatives of community-based organisations, NGOs and youth clubs. Representatives



Focus group discussion with local communities, park rangers and key informants © Durga P. Sharma

from local government body such as *Panchayat* or *Gewak* leaders (leaders from local level bodies) were also surveyed. Altogether 100 individuals from different locations of KL took part in the survey.

4. Reconnaissance survey

The fourth step of the assessment was to visit the four protected areas to gather initial information on management resources, the administration system and other values that could not be ascertained from the literature review. During these visits the METT was completed, focus group discussion held and key informants survey completed.

5. Key informants survey

During the reconnaissance survey, key informants were chosen for semi-structured and one-on-one interview. Besides management and governance issues, the range of topics focused on strengths, challenges and threats in the protected areas such as community involvement in decision-making, benefit sharing, perception of local people towards protected areas and behaviour of park staff towards the local people. The key informants included local community leaders (men and women), shop keepers, researchers working for community based organisations and park authorities.

6. Focus group discussion

Focus group discussions were held for each of the selected protected areas. Altogether 12 themes for management effectiveness (context, planning, inputs,

process, outputs and outcomes) and governance (do-no-harm, accountability, legitimacy and voice, equity, direction and performance) were discussed along with strengths, challenges and threats.

For the Kanchenjunga Conservation Area (KCA) in Nepal, a meeting was held in March 2010 under the chairmanship of the warden of the KCA. 10 government officials including past and current employees of the KCA took part in the discussion. Similarly for the Toorsa Strict Nature Reserve, the discussion was held in Haa village in April 2010 under the chairmanship of the *Gewak*. Two of the 12 participants were women and the discussion was facilitated by the local forest officer and Nature Conservation Division official. Four discussions were held in Khangchendzonga Biosphere Reserve in Sikkim in June 2010, with 56 targeted participants including panchayat leaders, NGO officials, reserve staff, local residents and the Khangchendzonga conservation committee staff. Finally, discussions were conducted in late June with the local villagers, local NGO staff, farmers/cattle herders and the conservation committee for the Singhalila National Park of Darjeeling, India.

RESULTS: EVALUATION OF MANAGEMENT EFFECTIVENESS

An overall rating (given as a percentage of the total score) was given to each protected area based on set evaluation parameters focussed primarily on protected area governance, community relations and livelihood issues (Table 2).

Table 2: Evaluation of Protected Areas of Kangchenjunga Landscape for Management Effectiveness

Protected Areas	Evaluation Parameters						
	Context	Planning	Inputs	Process	Outputs	Outcomes	Overall
	Rating and %						
Toorsa SNR, Bhutan	Excellent 76.19	Fair 38.10	Fair 38.89	Good 57.14	Good 66.67	Excellent 75.00	Good 57.40
Singalila NP, Darjeeling, India	Good 57.14	Fair 47.62	Fair 38.89	Fair 42.86	Fair 46.67	Good 58.33	Fair 48.15
Khangchendzonga BR, Sikkim, India	Good 61.91	Good 55.43	Fair 35.11	Fair 31.67	Fair 35.47	Fair 27.67	Fair 42.82
Kanchenjunga CA, Nepal	Excellent 80.95	Good 71.43	Fair 38.89	Good 66.67	Good 60.00	Good 66.67	Good 64.82
Average	Good 69.05	Good 53.15	Fair 37.95	Fair 49.59	Good 52.20	Good 56.92	Good 53.30

Rating criteria: Excellent: 75-100%, Good: 50-74.9%, Fair: 25-49.9%, and Poor: <25%

The adapted METT assessment resulted in Toorsa Strict Nature Reserve scoring 57.40 per cent, which can be regarded as good (management above 50 per cent was considered good). The rating was validated during the focus group discussion where local people showed positive attitudes towards the park and commitment to participating in conservation and management. Implementation of Integrated Conservation and Development Programmes (ICDPs) in which people's concerns are taken into consideration shows the government is committed to the conservation of the reserve's resources and livelihoods of people.

KCA Nepal, which is fully managed through participatory conservation approaches by local people, scored 64.82 per cent. From the questionnaire survey of protected area staff, it was found that local values (including ecological, cultural and spiritual) have been considered carefully in management. Local people expressed that their economic well being has improved since the establishment of conservation area.

Singhalila National Park of India, in which the government holds authority, responsibility and accountability for management, received a 'fair' rating of 48.15 per cent. Management in this case was dependent on policy and governance structures at state and national level. The informants reported that people's participation was inadequate, especially in the preparation of management plan and decisions related to providing access to resources in the park or its buffer zone. The local people further expressed that they are not consulted for on-going planning and management decisions.

The results of the assessment in the Khangchendzonga Biosphere Reserve found staff were committed to

protecting the reserve's important ecosystems. Local NGOs play a crucial role in promoting responsible tourism as well as bridging the gap in communication between local people and park authorities. However, the conventional management regime in which local people are excluded from management processes resulted in the management effectiveness score to be 42.82 per cent. The transhumance system¹ of animal rearing, which is an important part of landscape management, existed in the area for centuries but has been banned in the reserve and herders have not been compensated or provided with new income sources. This has created negative attitudes among local people, which were expressed during discussions and the informants' survey. People reported that the wildlife populations have been increasing, resulting in an increase in human-wildlife conflict including retaliatory killings. Furthermore, a comprehensive approach to settle such disputes has not been put in place.

The overall assessment shows that inputs in all the protected areas were weak with an inadequate number of staff, equipment and infrastructure, and poor financial provisions. The management system of the protected areas in India shows room for improvement, whilst the management systems in the protected areas of Bhutan and Nepal were in a satisfactory condition.

KEY MANAGEMENT ISSUES

Most of the protected area officials reported a lack of funds to meet the increasing responsibilities related to assessing and managing the protected areas and purchasing equipment. With increased eco-tourism, regular patrolling, vigilance and law enforcement are all important. For this the required trained manpower is not available in almost all the protected areas. All these

protected areas are in remote areas, and the assessment found office infrastructure was insufficient and the living conditions of workers inadequate. There was little motivation and staff expressed their frustration at conditions. The findings of this study was similar to those reported by Nepali et al. (2005) who found limited staff and office facilities were one of the limitations for effective management in Nepalese protected areas. Surveyed staffs also reported limited training opportunities which have made them less aware of changing realities of protected area management, especially in the areas of monitoring wildlife populations, changes in forest compositions and team building.

Except for KCA in Nepal and Toorsa Strict Nature Reserve in Bhutan, local participation during annual planning was limited and management plans were prepared without their consultation. Some locals in Singalila National Park reported they are even not aware of the park. Although NGOs play an important role in raising conservation awareness and in community development around the protected areas, it was found that there is limited coordination between the park administration and NGOs.

Serious human-wildlife conflict issues were recorded in Sikkim, Darjeeling (GOS, 2008) where locals complained about their limited access to forest resources and the depredation of domestic animals and crops by wildlife for which they receive little or no compensation. By contract, the livestock insurance plan in KCA Nepal is an innovative scheme in which local people have developed a finance mechanism through which they receive compensation for the depredation of livestock by wildlife without having to wait for the government. The Royal Government of Bhutan is also piloting a livestock insurance policy programme in Toorsa and its biological corridor to reduce human-wildlife conflicts by formulating a policy of compensation.

EVALUATION OF GOVERNANCE SYSTEM

The analysis of the governance survey shows that governance parameters in India scored below 50 per cent which reflects the predominance of the conventional approach to making protected area management decisions. In the Khangchendzonga Biosphere Reserve, which scored 41.98 per cent, communities have limited involvement in governance. People are excluded from management and have limited access to resources from the reserve or its buffer zone. Similarly, in Singhalila National Park, which scored 32.44 per cent (Table 3), people's participation in park management is almost

negligible, especially in the preparation of the management plan and decisions related to providing access to park resources.

With involvement of local people, conservation goals in India could be effectively achieved while providing maximum benefits from biodiversity conservation to the local communities at the same time. However legal frameworks make this difficult. The protected area authorities expressed their mandate to ensure effective implementation of the Wildlife Protection Act which prohibits settlements inside national park as well as access to resources within parks. The local communities in Sikkim and Darjeeling expressed their willingness to get involved in park management. However, many people are too scared to speak with park officials and have no avenue or voice to report wrong-doings or introduce innovative activities. This can be validated by the expression of one woman who said, *"I feel that they are dealing with wilderness and have guns with whom we feel scared even to greet"*. The governance structures of these Indian protected areas thus have ample room for improvement leading towards more participatory management. As local people expressed a willingness to participate in protected area management, their opinions should be considered in major decisions. A focus should also be placed on sharing benefits with local communities.

The KCA Nepal scored 67.59 per cent. Issues of equity and performance have been adequately addressed in its management approach in which the government acts as a facilitator for local communities to responsibly manage the protected area (DNPWC, 2000). Encouraging results from community-based conservation and development initiatives in KCA have increased local people's sense of ownership towards the conservation area. Local people are satisfied with its management and mechanisms for the distribution of benefits seem to be satisfactory. However, the accomplishments should be monitored and evaluated regularly in order to continue to manage the area sustainably.

Similarly, Toorsa Strict Nature Reserve scored 58.02 per cent showing a satisfactory governance structure. Local people in the reserve are confident about their continuous access to resources and are gradually realizing their roles in the management of reserve and taking decisions related to management, boundary delineation, choice of supporting activities in ICDP and periodic evaluations. However, it has taken time for protected area officials to understand their accountability towards the communities.

Table 3: Evaluation of Protected Areas of Kangchenjunga Landscape for Governance

Protected Areas	Do no harm	Legitimacy and voice	Equity	Direction	Performance	Accountability	Overall Rating
	Rating and %						
Toorsa SNR, Bhutan	Good 66.67	Good 60.00	Good 73.33	Good 66.67	Fair 33.33	Fair 33.33	Good 58.02
Singalila NP, Darjeeling, India	Fair 46.67	Fair 33.33	Fair 46.67	Fair 46.67	Fair 33.33	Fair 44.44	Fair 41.98
Khangchendzonga BR, Sikkim, India	Fair 26.53	Poor 24.40	Fair 46.67	Fair 42.13	Poor 22.17	Fair 29.56	Fair 32.44
Kanchenjunga CA, Nepal	Excellent 86.67	Good 73.33	Good 66.67	Good 73.33	Good 50.00	Good 55.56	Good 67.59
Average	Good 56.64	Fair 47.78	Good 58.34	Good 57.20	Fair 34.71	Fair 40.72	Good 50.01

Rating criteria: Excellent: 75-100%, Good: 50-74.9%, Fair: 25-49.9%, and Poor: <25%

Table 4: Threats to protected areas in the Kangchenjunga Landscape

Identified threats	KCA, Nepal	Sikkim PAs, India	Darjeeling PAs, India	Toorsa SNR, Bhutan
	Livestock grazing	✓	✓	✓
Poaching of wildlife	✓	✓	✓	
Illegal harvest of fuelwood and timber	✓		✓	
Illegal harvest of NTFPs	✓	✓	✓	✓
Diversion of rivers and streams, dam construction		✓	✓	
Settlement and forest encroachment	✓		✓	
Tourism		✓	✓	
Crop/livestock depredation by wildlife	✓	✓	✓	✓
Forest fires	✓	✓	✓	✓
Weak institutional capacity	✓	✓	✓	✓

THREATS

Threats were identified based on discussions with different focus groups; the most prominent threats were weak institutional capacity, depredation by wildlife, livestock grazing and illegal harvesting of resources (see table 4).

The results of the study show that many of the threats to protected areas are similar to those observed at the time of their designation. However, the results also showed that the severity of threat is not uniform across all the studied protected areas. For example in KCA, Nepal, hunting was a major problem before the conservation area was declared and handed over to the communities. This problem was greatly reduced along with the meaningful engagement of communities (WWF-Nepal, 2007). “With the communal harmony and unity

amongst local people, the conservation effort has received huge boost in the area” reported one park ranger. This clearly shows that when confidence and responsibility are placed in local communities, they are more compelled to protect biological resources and enhance ecosystem function. However overall protection mechanisms also need to be strengthened in KL to deter illegal hunting from the protected areas.

Illegal harvest of non-timber forest products, fuelwood and timber are prevalent in all the protected areas to varying degree. The issue remains unresolved due to a lack of policy intervention. There has been some attempt in Nepal at the policy level to promote the sustainable harvest of forest resources from forests (Sharma et al., 2004), but implementation has been far from satisfactory.



Blue sheep main prey species of snow leopard in KCA 2010 © KamalThapa

STRENGTHS AND WEAKNESS OF PROTECTED AREA MANAGEMENT

The strength of each protected area varied based on available funds, human resources and participation of community in park management. The strengths and challenges across all protected areas are summarised as follows:

- During the discussion and interview, the key informants and park authority representatives reported that the legal status and ownership of the protected area in each country is clear and defined. Protection in each country is substantially high and effective at protecting the ecosystems and species within their borders despite land use pressure along the borders. Similar results were reported by Bruner et al (2001) from the evaluation of 93 parks in 22 tropical countries.
- All the four parks have management plans and governments have set aside annual budgets with allocation for permanent staffs.
- Conservation Area User Committees (KCA Nepal) are active in conservation activities which have helped reduce the over harvesting of resources and wildlife poaching. They also provide economic benefits to communities through projects. In India Eco-development Committees are institutionalised, but

their impacts on the conservation and development are yet to be realised

- Efforts by NGOs have helped bridge the gap between protected area officials and local communities, and foster sustainable development in the KL.
- However, management planning processes seldom include local communities and management plans do not have adequate provisions to deal with local resource use and programmes for better livelihoods. Except for KCA in Nepal management structures are not designed to promote participatory modes of working.
- There is a general lack of field staff, inadequate provision of equipment and physical infrastructures, and limited capacity building training.
- Limited budgets mean that most available resources are spent on patrolling and supervisory activities and not on research, monitoring and evaluation.
- Eco-development committees in India are not fully functional and self-governing organizations and have limited legal rights.
- Human–wildlife conflicts in and around protected areas have increased and more comprehensive approaches to address this issue should be introduced, including schemes for community-based compensation.

STRENGTHS AND CHALLENGES OF PARK GOVERNANCE

- People are gradually realizing the value of protected areas and their role in management and are willing to engage in major decision making.
- Community based conservation and development initiative in KCA, Nepal have shown that local people can be trusted in protected areas management. In KCA, people's feeling of ownership of the protected areas is high, a situation which can be seen as an example for the rest of the KL.
- The 'preservation' mind set of authorities is gradually changing towards one of greater "inclusiveness".
- However, in some cases limited coordination and consultation between protected areas officials and local people is triggering park people conflicts.
- Governance structures that include local people are lacking, especially in Indian protected areas.
- Eco-development committees (EDCs) and Forest Protection Committees (FPCs) which are formed to help the park administration for the protection of forests in India are not considered partners in protected areas governance and management, but rather considered as separate entities.
- There is a lack of clear legally binding mechanisms of sharing the cost and benefits between EDCs, FPCs and protected areas.

DISCUSSION

The METT has been applied in more than 85 countries with some modifications in Asian countries (Leverington et al., 2010). The tool proved useful in assessing the management effectiveness of protected areas that are part of large, transboundary landscape with different national jurisdictions and legal frameworks. With the overall aim of improving protected area management in the KL, the application of the METT gave a clear view of the management status, threats, strengths and weakness of protected areas within the landscape. The tool was supported by the governance survey, field visits, focus group discussions and key informant's survey which gave a clear picture of management and governance structures.

Almost all the respondents reported that the ecosystem has been maintained or restored due to the presence of protected areas. This fact was obvious when viewing the other land uses along the protected area borders during the field trip. Where in place, participatory approaches to park management have increased support for the protected area but the ecological impacts of such

approaches, which include anthropogenic activities, have not been scientifically assessed or validated due to the lack of research and monitoring in the area. Sustainable harvesting and the removal of higher and lower plants and animals will have impacts and is a major issue to address in the future. Similarly, traditional land use practices such as pastoralism as a tool to managing the ecosystem have been abandoned; studies are required on the augmentation or reduction of biological resources as a result.

Strengths and challenges of management and governance revealed by the assessment provide future courses of action to be taken to improve management across the landscape. For example, weak institutional capacity was identified as a major challenge in all protected areas reflected inadequate staffing, equipment and infrastructure. This also reflects limited training opportunities for field based park staff, EDC and NGO officials, and other community workers. Inadequate funding and inadequate access to research-based information for protected area management were also noted. Other barriers inhibiting effective management include government policies and legal frameworks evolved from conventional models that still undermines the full participation of local communities. The process of integrating relevant actors in protected area management needs to be promoted.

It is still too early to say if the ICDP approach of management in Nepalese and Bhutanese protected areas has maintained the balance between conservation and development. Nevertheless, the findings of the study provide base-line information for future evaluation and to raise awareness among protected area and other stakeholders on the methodology applied in the study.

In addition the study outlines strengths and weakness of all protected areas, which will help the managers to improve management and accountability and to influence policy. The results suggest that protected area authorities should also be prepared to listen to their critics, be willing to adopt new ways of managing and governing protected areas, be motivated in understanding anthropological dynamics of the local community and be respectful to their traditional ways of conserving biological resources. There are progressive methods being applied within the landscape, for example biological corridor policies of Bhutan (Wangchuk, 2007) and Nepal. If successful methodologies are adapted and monitored, protected area management can be made more effective and governance can be greatly improved.

Finally, the study showed a clear need to increase support for protected areas to improve effectiveness against all threats. The findings suggest that protected areas should remain a central component of conservation strategies to maintain biodiversity and ecosystem functioning. Bringing local communities into protected area management and helping protected areas perform better will provide a significant contribution to long-term biodiversity conservation in the transboundary landscapes in the Himalayas.

NOTES

¹ Transhumance, a developed form of pastoralism, which describes the seasonal movement of people with their livestock between fixed summer and winter pastures, or the cyclic movement of people and livestock to maintain a balance between demand and supply of pasture.

ANNEX I: MANAGEMENT EFFECTIVENESS

QUESTIONNAIRE

Context

- 1.1: Legal status: Notification done? Protected area (PA) rules and regulations available?
- 1.2: Are there enough staff and equipment to enforce PA law?
- 1.3: Are there boundary disputes?
- 1.4: Are the demarcation posts/marks readily identifiable and known to people?
- 1.5: Level of acceptance or resentment towards the PA? (include in the answer what they had to forgo for the PA: hunting, fishing, collection of NTFP, firewood, timber, stones/boulders, etc.)
- 1.6: Were people displaced during the establishment of the PA? (Include in the answer any details provided)
- 1.7: Assess the current human footprint in the PA due to infrastructure and activities that include roads/irrigation canals, illegal harvest of resources, land encroachment, modification of forests, mining and pollution (entering or generated)?
- 1.8: If 1.7 is true, was there any provision of EIA for activities that have direct impacts on biodiversity. If EIA was undertaken, was the mitigation planned implemented?
[Only additional information, not for score purpose]

Planning

- 1.9: Is there a management plan and is it being implemented?
- 1.10: Does the plan clearly identify key threats?
- 1.11: Is there a plan to abate these threats?
- 1.12: What are the key species protected? Is the PA of the right size and shape to protect these species?
- 1.13: Does the PA represent a unique ecosystem and/or protect endangered species?
- 1.14: Do people understand the core values of the PA and do they believe in them?
- 1.15: Is there a rolling operational work plan and is it being implemented?

Inputs

- 1.16: Are staff and community leaders trained/oriented on a regular basis?
- 1.17: Are there enough staff members to manage the PA?
- 1.18: Is the natural resource actively managed?
- 1.19: Is equipment sufficient?

1.20: Is the current budget adequate to implement programmes?

1.21: If there is a funding shortfall, is there a plan to ensure the growth of income matches or exceeds the growth of expected costs of PA management?

Process

- 1.22: Is there a planned outreach programme linked to objectives and needs?
- 1.23: Is the role of indigenous people and local communities/marginalized people in the PA management synergetic, constructive?
- 1.24: Are there sufficient programmes to address the welfare needs of the local communities?
- 1.25: How is tourism in the PA perceived?
- 1.26: Do tour operators' activities contribute to PA management?
- 1.27: If fees are applied for entrance or other services, does a share return to the benefit of the communities and/or to the PA?
- 1.28: Are management activities actively monitored against performance?

Outputs

- 1.29: Do local people and/or indigenous/marginalized people actively support PA?
- 1.30: Is the PA seen as a source of providing economic benefits, employment or other opportunities for local people's wellbeing?
- 1.31: Is the PA seen as the provider of environmental services?
- 1.32: Are visitor facilities adequate for the demand?
- 1.33: Based on your interactions with visitors and tour operators, how do you rate visitor satisfaction?

Outcome

- 1.34: Is it the belief that the condition of important PA values (especially biodiversity and cultural values) is enhanced because of the presence of the PA?
- 1.35: How do people perceive the role of PA authorities?
- 1.36: If not happy, where they see the need to improve?
- 1.37: What is the best impact the PA has made in their community, in the neighborhood, and/or in livelihood in general?

ANNEX II: GOVERNANCE QUESTIONNAIRE

Do no harm

- 1.1: What was the role of local communities and indigenous/marginalized/influential people when the PA was notified?
- 1.2: Were people re-settled? If yes, how they have taken this move?
- 1.3: Is there anyway local communities feel humiliated due to PA?
- 1.4: What good happened to local people after PA was established?
- 1.5: Does PA legislation respect customary laws, age-old practices?

Legitimacy and Voice

- 1.6: Who makes major decision in PA management, especially when it comes to using PA resources?
- 1.7: Are people allowed to use the PA resources?
- 1.8: Is there discrimination of ethnic groups and social class, gender?
- 1.9: Are the PA management objectives, strategies, activities developed through collective agreements between different stakeholders?

1.10: Is there preference for jobs for local people? Is the procedure transparent?

Equity

1.11: Do all men and women have fair opportunity to improve or maintain their well-being within and outside the PA?

1.12: Are people allowed to live within the PA?

1.13: Is the law enforcement just?

1.14: Is there a fair and equitable system(s) of distribution of costs and benefits of conservation?

1.15: Is there a fair management practice of PA staff?

Direction

1.16: How sympathetic is PA management towards local people's concerns and innovative ideas?

1.17: Does the PA provide effective leadership by fostering and maintaining an inspiring and consistent vision for the PA in long-term management?

1.18: Does PA management make efforts to mobilize support for the vision and garner funds?

1.19: Are PA objectives clear to the stakeholders?

1.20: Provide best examples of partnership and/or taking initiatives.

Performance

1.21: Is the capacity of staff ensured to carry out roles and assume responsibilities?

1.22: How is the PA management structure rated? Robust, resilient, etc?

1.23: How does the PA management deals with the complaints and criticism?

1.24: Are people involved in the monitoring and evaluation as part of an adaptive management strategy?

Accountability

1.25: Is the PA management accountable to the public at large?

1.26: How are the media entertained for any investigative reporting?

1.27: Are PA officials rewarded for their exceptional work benefitting communities or punished for any wrongdoing that especially affects communities.

REFERENCES

- Bertzky, B., Corrigan, C., Kemsey, J. et al. (2012). *Protected Planet Report 2012: Tracking progress towards global targets for protected areas: Key protected area facts for decision makers*. Gland, Switzerland: IUCN and Cambridge, UK: UNEP WCMC
- Bruner, A. G., Gullison, R. E., Rice, R. E. and G. A. B. da Fonseca. (2001). Effectiveness of Parks in Protecting Tropical Biodiversity, *Science* 291, 5 January 2001
- Biodiversity Indicators Partnership (BIP). (2011). *Guidance for national biodiversity indicator development and use*. Cambridge, UK: UNEP WCMC
- Boyle, M., Ervin, J. and C. M. Hogan. (2010). Biological corridor. In: Ed. C. J. Cleveland., *Encyclopedia of Earth*. First published in the Encyclopedia of Earth May 20, 2010; Revised September 20, 2010; Retrieved March 9, 2013 http://www.eoearth.org/article/Biological_corridor?topic=58074.com
- Chettri, N., B. Shakya, R. Thapa, and E. Sharma. (2008). Status of a protected area system in the Hindu Kush-Himalayas: an analysis of PA coverage. *International Journal of Biodiversity Science and Management* 4: 164-178
- DNPWC. (2000). *Government Managed Conservation Area Management Regulations*. Kathmandu, Nepal: Department of National Parks and Wildlife Conservation (DNPWC)
- Government of Sikkim (GOS). (2008). *Management Plan of the Khangchendzonga National Park 2008-2018*. Gangtok, India: Wildlife Circle, Forests, Environment and Wildlife Management Department
- Hockings, M., Stolton, S., Leverington, F., Dudley, N., and J. Courrau. (2006). *Evaluating Effectiveness: A Framework for Assessing Management Effectiveness of Protected Areas*: Second edition. Gland, Switzerland: IUCN
- Kothari, A. (1999). Towards participatory conservation in India: National scenario and lessons from the field. Pages: 117-149. In: Oli, K.P. (ed.), *Collaborative Management of Protected Areas in the Asian Region*. Kathmandu, Nepal: IUCN
- Leverington, F., K. Costa, J. Courrau, H. Pavese, C. Nolte, M. Marr, L. Coad, N. D. Burgess, B. Bomhard, and M. Hockings. (2010). *Management effectiveness evaluation in protected areas: a global study*. Second edition. St. Lucia, Queensland, Australia: University of Queensland, IUCN-WCPA, TNC, WWF
- Mittermeier R. A., Gils P. R., Hoffman M., Pilgrim J., Brooks T., Mittermeier C.G., Lamoreaux J. and G. A. B. da Fonseca (eds.). (2005). *Hotspots Revisited. Earth's biologically Richest and Most Endangered Terrestrial Ecoregions*. USA: University of Chicago Press
- MoEF, Government of India. (2011). *Management Effectiveness Evaluation of 39 tiger reserves in India*. New Delhi, India: Government of India. www.projecttiger.nic.in/whtsnew/meetr_tiger_2011.pdf
- Nepali, S. C. (2005). *Rapid Assessment and Prioritization of Protected Area Management in Nepal*. Kathmandu, Nepal: WWF
- Rana, L. N. (2008). Biodiversity status in the potential conservation corridors of the Kanchenjunga Landscape: a distribution model of flagship and indicator species. In *Biodiversity conservation in the Kanchenjunga Landscape*. Kathmandu, Nepal: ICIMOD
- Sharma, U. R. (2010). Kangchenjunga landscape: opportunities for transboundary sharing of knowledge and skills. *Biodiversity Conservation Efforts in Nepal Newsletter, special issue for the 15th*. Kathmandu, Nepal: DNPWC
- Sharma, U. R., Malla, K. J. and R. Uprety. (2004). Conservation and management efforts of medicinal and aromatic plants in Nepal. *Banko Janakari* 14(2): 3-11
- Stolton, S., Hockings, M., Dudley, N., MacKinnon, K., Whitten, T. and F. Leverington. (2007). Reporting progress in Protected areas. A site level Management Effectiveness Tracking tool: second edition. Gland, Switzerland: World Bank/WWF Forest Alliance and WWF. <http://www.wdpa.org/ME/PDF/METT.pdf>
- Wangchuk, S. (2007). Maintaining ecological resilience by linking protected areas through biological corridors in Bhutan. *Tropical Ecology* 48(2): 176-187
- WWF-Nepal. (2007). Understanding the changes in Livelihood assets with Locals: A case study for Kanchenjunga Conservation Area Project, Nepal. *Sacred Himalayan Landscape in Nepal*. Series No.3.
- WWF-US, Asia Programme. (2005). *Ecosystem Profile. Eastern Himalaya Region*. Final report. Critical Ecosystem Partnership Fund. www.cepf.net/Documents/final.ehimalayas.ep.pdf. Accessed on 22nd Feb 2013, Washington DC, USA: WWF-US

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RESUMEN

Se hizo una evaluación sobre la gobernanza y la eficacia de la gestión en cuatro áreas protegidas del paisaje del monte Kanchenjunga compartido por Bután, India y Nepal, empleando una herramienta sencilla de seguimiento a nivel de sitio. El estudio se reforzó tanto con discusiones de grupos focales, como con un estudio de participantes clave y visitas de campo. La evaluación de la gestión reveló que las áreas protegidas son sistemáticamente débiles en lo referente a insumos como cantidad de personal y equipo, provisión financiera e infraestructura. Los resultados sugieren la necesidad de mejoras en materia de gestión. La Reserva de la Biosfera de Khangchendzonga y el Parque Nacional Singhalila en la India obtuvieron un 41,98 y 32,44 por ciento, respectivamente. El Área de Conservación Kanchenjunga de Nepal y la Reserva Natural Estricta Toorsa de Bután obtuvieron una calificación un poco más alta: 67,59 y 58,02 por ciento, respectivamente. La escasa capacidad institucional, la depredación de la vida silvestre, el pastoreo de ganado y la tala ilegal de los recursos fueron señalados como amenazas. Entre los principales problemas destacan la limitada participación de la población local en la toma de decisiones y en la gestión de las áreas protegidas. Los resultados apoyan la recomendación de que se deben hacer esfuerzos para pasar de un enfoque proteccionista a un enfoque de conservación basado en la comunidad para la conservación y el uso sostenible de los recursos biológicos en el paisaje.

RÉSUMÉ

Une évaluation a été menée sur la gouvernance et l'efficacité de la gestion de quatre aires protégées du paysage de Kanchenjunga, qui se partage entre le Bhoutan, l'Inde et le Népal, grâce à l'utilisation d'un outil de suivi très simple à l'échelle locale. L'étude s'est ensuite appuyée sur des discussions thématiques de groupes, une enquête auprès des principaux répondants et des visites sur le terrain. L'évaluation de la gestion a ainsi révélé que les aires protégées manquent systématiquement de personnel, d'équipement, de réserves financières et d'infrastructures. Des améliorations de la gestion sont donc nécessaires: la réserve de biosphère de Khangchendzonga et le Parc national de Singhalila en Inde ont ainsi des taux respectifs de 41,98% et 32,44%. La zone de conservation de Kanchenjunga au Népal et la Réserve naturelle intégrale Toorsa au Bhoutan ont des taux légèrement supérieurs, de 67,59% et 58,02% respectivement. Les principales menaces sont la faiblesse des capacités institutionnelles, la dégradation par la faune sauvage, le pâturage du bétail et la récolte illégale de ressources. Par ailleurs, la participation limitée des populations locales dans la prise de décision et la gestion des aires protégées est un défi de taille à relever. L'étude préconise donc de faire des efforts et d'abandonner l'approche protectionniste pour adopter une approche basée sur les communautés qui favorise la conservation, afin de conserver et d'utiliser de manière durable les ressources biologiques du paysage.



PROTECTED AREA MANAGEMENT AND LIVELIHOOD CONFLICTS IN GHANA: A CASE STUDY OF DIGYA NATIONAL PARK

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ABSTRACT

The Digya National Park in Ghana has been the scene of conflicts between local communities and wildlife managers ever since its establishment in 1971. The conflicts range from apprehension of local people by Wildlife Officials for entry into the park to collect non-timber forest products, to serious confrontation with poachers, arrests and evictions that occasionally result in deaths. Documented information on these conflicts, however, is scanty. This study examines the root causes of conflict in Digya National Park, with a view to recommending policy interventions that will help curtail the conflicts. Data for the study were derived from focused group discussions, direct interviews with stakeholders, on-site observations, as well as, from a management effectiveness evaluation exercise that involved administration of a pre-designed questionnaire to protected area managers and administrators. The results revealed that a major underlying source of conflict in the park was poverty in neighbouring communities. This, together with unresolved issues of compensation payment, animal raids on farmlands and exclusion of local communities in the management process, have fuelled illegal activities, mainly hunting and encroachment, leading to several conflict situations. Arrest of culprits and forced evictions by Wildlife Officials had not helped in curtailing illegal activities and conflicts. The study recommends linking wildlife management to community development to ensure that local economies and livelihoods of fringe communities are sustained while seeking to attain the objectives of wildlife conservation in order to minimize conflicts.

KEYWORDS: local communities, conflict, Digya National Park, Ghana, policy, stakeholders, assessment

INTRODUCTION

Protected areas constitute a major component of national and regional strategies to counter biodiversity loss. They are considered as *in situ* repositories of genetic wealth as well as relics of pristine landscapes that deeply touch the spiritual, cultural, aesthetic and relational dimensions of human existence (Chape et al., 2003; Putney, 2003). In recent times however two terminologies ‘paper parks’ and ‘island parks’ have become synonymous with many protected areas, depicting how most protected areas have failed to maintain their ecological character (Laurance, 2008). Invariably, humans are the main agents of park degradation and are responsible for the failure or abysmal performance of most protected areas.

Past conservation efforts viewed local people as destroyers of the forest, who must be ‘excluded’ in order to conserve biodiversity. This mindset led to the adoption

of the preservationist approach, otherwise referred to as ‘fences and fines’, ‘fences and guns’ and/or ‘colonial approach’, which promoted the establishment of protected areas with little or no regard for local people (King, 2009; Vig & Kraft, 2012). Research has shown that such a militaristic defence strategy only heightens conflict between park managers and local communities living within and around protected areas (Sharachandra et al., 2010). A different approach of protected area management, the utilitarian view, which respects the rights and existence of the local people emerged later to avert conflicts and to encourage mutual respect and benefit sharing between local people and protected areas management (Nelson & Hossack, 2003).

The two divergent approaches have influenced the philosophical underpinnings in protected area management and have so far dominated the nature

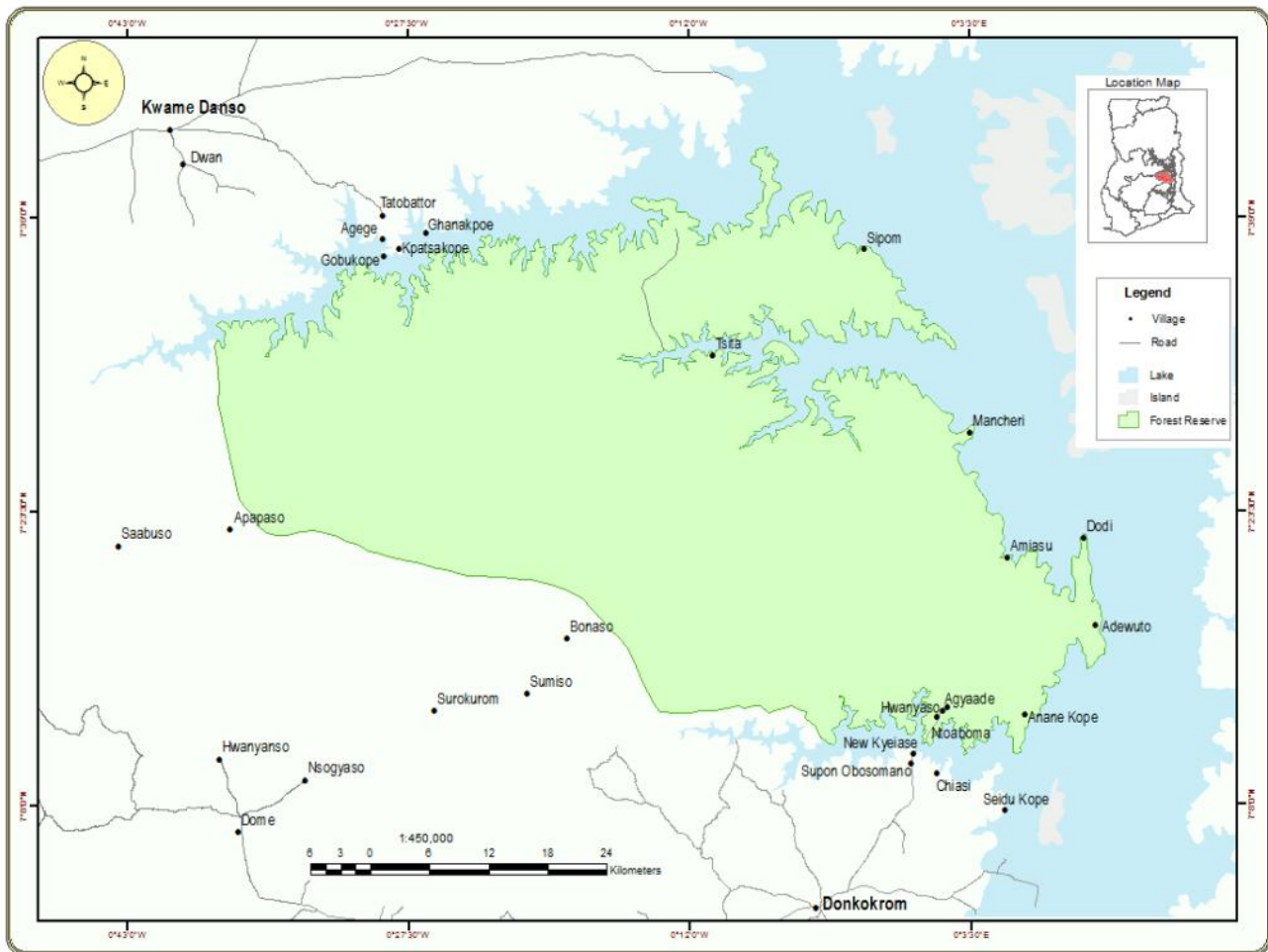


Figure 1. Map of Digya National Park in Ghana

conservation discourse in contemporary times. The preservationists believe in the intrinsic beauty and value of all things within ‘the one great unit of creation’, and hold the view that nature should be preserved for its own sake and that man should be able to live in harmony with nature without destroying it (Fox, 1981). The utilitarians, on the other hand, believe that wild nature is not to be preserved but actively managed through scientifically based interventions to improve and sustain yields (Pinchot, 1910). The preservationists adopted the ‘exclusive model’ in which human activities are excluded whereas advocates of the utilitarian view adopted the ‘inclusive model’, which sees the interests of local societies and sustainable management as central to protected area management (Borrini-Feyerabend, 2003).

Conflicts between protected area managers and fringe community members generally suggest that there are significant lapses in the strategies adopted by protected area officials in integrating local residents in the overall management framework. Conflict in this context refers to disagreements or disputes arising over access to, and control over natural resources, loss of livelihoods and

food insecurity (Mukherjee, 2009). Conflicts between protected area managers and local communities in Ghana arise out of the externally enforced exclusion of the communities from the protected area and the resources they had access to before the designation of the areas. The conflicts range from disagreements over illegal entry and development of settlements in the park, to major confrontations, arrests, prosecutions and even deaths (see Box 1). According to Stern (2008), conflicts arise as a result of struggles over access to resources or historical land disputes. Though other divergent views have been expressed to explain causes of the conflicts, the dominant view attributes conflict to the system of protected area governance (West & Brechin, 1991; Borrini-Feyerabend et al., 2004).

Earlier works on conflicts in nature conservation focused on the concept of ‘economic rationalization’ suggesting that fringe communities respond foremost to economic livelihood issues, and arguing that only strict regulations would prevent local residents from being a threat to park management (Brandon & Wells, 1992; Terborgh, 1999). An alternative solution to conflict is benefit-sharing (Brandon, 2002; McShane & Wells, 2004).

BOX 1. EXAMPLES OF CONFLICTS IN PROTECTED AREA MANAGEMENT IN GHANA

Conflict in between protected area officials and local communities living close to protected areas is a major issue in nature conservation. These conflicts involve disagreements and disputes over access to and control over resources and may lead to arrests and prosecution, and violent confrontation sometimes resulting in death.

In 2006, a border dispute in Kyabobo National Park resulted in the tragic death of two Wildlife Officials (Ghanaweb, 2006). Another incident occurred in Bui National Park in 2007, when a poacher lost his life for resisting arrest and attacking a Wildlife Official (Ayivor, 2007). Local communities attacked Wildlife Officials and burnt down one of their camp sites. Both incidents were resolved through the intervention of local chiefs and Wildlife Officials from the national headquarters.

In 1989, 2002 and 2006, three major eviction exercises were carried out in Digya to move mainly migrant communities and their families (squatters) who were allowed entry into portions of the park by local chiefs. These chiefs claimed that cash compensation for expropriation of their lands had been paid to wrongful claimants and, therefore, considered themselves as rightful owners of these portions of the park. The exercises mostly targeted squatters who often resisted eviction, thus, compelling Wildlife Officials to seek the support of the military to evict them. During the 2006 eviction exercise, nine people lost their lives through a boat accident that occurred while they were being ferried across Volta Lake. The eviction exercise of 2006 was abandoned due to public outcry and a court injunction (Myjoyonline, 2006, CHRE/CHRIPD, 2006).

Animal raids, particularly elephants and rodents, on farms adjacent to protected areas in Ghana have also been a source of disenchantment between fringe communities and Wildlife Officials. Farmers suffer economic losses but they risk prosecution if they are found to have killed animals raiding their farms. This situation creates antagonism between Wildlife Officials and local people leading to mistrust, hatred and sometimes violent confrontations.

Other schools of thought reflect a human-centred approach, focusing on: economic empowerment of residents (Pimbert & Pretty, 1995; Kothari et al., 1997; Borrini-Feyerabend, 2003); changing relationships between fringe communities and protected area managers (Hulme & Murphree, 2001; Barrow & Fabricius, 2002); and the complex links between biodiversity degradation and rural poverty (Wood et al., 2000; Hartman, 2002; Rachman, 2002; Adams et al., 2004). According to Gillingham & Lee (2003), local people who disproportionately bear the cost of protection and feel 'excluded' cannot be expected to provide the needed support if the costs of doing so outweigh the benefits they derive.

A number of national parks in Ghana have been scenes of conflicts between Wildlife Officials and local communities in recent times (box 1). However, there is a paucity of information on these conflicts in the literature in spite of the widespread media attention such conflicts normally receive, see for example Amnesty Press Release (2006a; 2006b), Myjoyonline.com (2006) and CHRE/CHRIPD (2006). This paper investigates conflicts between local communities and protected area managers using the Digya National Park as a case study, with a view to understanding the nature, causes and consequences of such conflicts. The ultimate goal is to

inform policy makers about possible interventions that could avert or minimize future conflicts.

MATERIALS AND METHODS

• Site description

The study focused on Digya National Park, one of the six national parks legally designated in Ghana. This park is situated on a peninsular off the central section of the western shore of Lake Volta (Figure 1). The park had an area of 65,000 ha when it was first established in 1909 during the British colonial era (Twumasi et al., 2005). The creation of the Volta Lake in 1965 resulted in expansion of the park to its present size of 347,830 ha, including the original location of some sixteen settlements. The reserve was legally gazetted as a national park in 1971 on the basis of its importance as wild animal habitat and also as part of the complex policy related management issues of the Volta basin. Digya is considered as very strategic in the stabilization of the shores of the Volta Lake. It is surrounded by a large human population made up of fishers and farmers, comprising indigenous communities as well as migrants who moved into the area with the creation of the Volta dam. Most of the people in the fringe communities live in houses constructed out of improvised local materials, notably switch for wall construction and thatch for roofing.



Mud/thatch houses are a common feature in the fringe communities of Digya National Park where poverty levels, according to national statistics, are relatively high © J. S. Ayivor

The park supports low populations of the African Elephant (*Loxodonta africana*), together with a number of ungulates including Hartebeests (*Alcelaphus buselaphus*), Roan Antelope (*Hippotragus equines*), Bushbuck (*Tragelaphus scriptus*), Bay Duiker (*Cephalophus dorsalis*), Bush Duiker (*Sylvicapra grimmia*), Red-flanked Duiker (*Cephalophus rufilatus*), Waterbuck (*Kobus ellipsiprymnus*) and Burron's Kob (*Kobus kob*). The African Buffalo (*Syncerus caffer*), Oribi (*Ourebia ourebi*) Bongo (*Tragelaphus euryceros*), Bush Pig (*Potamochoerus larvatus*) and Common Warthog (*Phacochoerus africanus*) are also known to occur in the park. Additionally, the park harbours aquatic species of conservation significance such as the Manatee (*Trichechus senegalensis*), Hippopotamus (*Hippopotamus amphibious*) and African Clawless Otter (*Aonyx capensis*) together with numerous fish species in the adjoining Lake Volta (Wildlife Department, 1995; EPA, 1996). At least six primate species including Olive Baboon (*Papio anubis*), Velvet Monkey (*Cercopithecus pygerythrus*), Mona Monkey (*Cercopithecus mona*), Lesser Spotnosed Monkey (*Cecopithecus nictitans*), the Western Pied Colobus (*Colobus polykomos*) and Patas Monkey (*Cercopithecus (Erythrocebus) patas*) are reported to occur in the park. Common carnivores are the Cusimanse (*Crossarchus obscurus*) and some mongoose species. The park is reported to be the historical home of two species that are presently locally extinct namely the Black Rhinoceros (*Diceros bicornis*) and the Wildebeest (*Connochaetes taurinus*)¹ (Twumasi et al., 2005).

Digya spans three political regions, and five administrative districts of Ghana: the Atebubu and Sene Districts in the Brong Ahafo Region, Afram Plains District in the Eastern Region, and Sekyere East and Sekyere West Districts in the Ashanti Region. The park has two main parts, the northern and southern sectors, and is managed by the Wildlife Division (WD) of Ghana Forestry Commission through the Atebubu office of the Division. There are 13 camp sites spread around the park. Camp sites are sub-stations established at strategic points within and along the boundaries of the park to ensure the day-to-day protection of the park. The Atebubu office is headed by a Park Manager who has oversight responsibility over all the 13 camp sites (Wildlife Department, 1995).

• **Methods**

Field work was carried out within selected communities bordering the park by a three-member research team, between August 2010 and March 2011. The field-based approach employed focused group discussions, direct interviews and on-site observations to extract qualitative data. Twelve focused group discussions were carried out in nine communities involving 139 individuals between the ages of 18 and 75. The discussants were made up of 27 per cent females and 73 per cent males. Female representation was low because most of the married women whose husbands participated said that they shared the same views about the subject matter as their husbands and therefore saw no need to participate. In order to increase female participation, separate female group discussions were organised. Seven separate



Participants at a focus group discussion in one of the fringe communities of Digya National Park © J. S. Ayivor

interviews were carried out also with two traditional chiefs and their elders and five WD officials. Communities surveyed were selected with the help of a base map and advice from Wildlife Officials on accessibility. Four of the communities located about 8 km apart on the average, were selected from the northern sector. In the southern sector where the landmass is more extensive, five communities located about 12 km apart, were selected to ensure a fair geographical representation. The Community Liaison Officer of the Wildlife Division, who already had a good rapport with the communities, led the research team into the communities, but as a result of existing tensions, the team considered it best that he was not present at the discussions. Participants comprised women and youth group leaders, representatives of the Collaborative Resource Management Area (CREMA), members of District Assembly Unit Committee, and other prominent and knowledgeable citizens of the communities. The discussions, which generated qualitative data mostly, focused on the nature, causes and effects of conflicts between communities and park managers; individual perceptions about the national park concept; community's relationship with Wildlife Division officials; and measures to curb future conflicts. On-site observations recorded the types of living structures, availability of utility services and road network. Housing condition was used as an indicator of poverty and lack of social infrastructure as a sign of community marginalization (also alluded to by the discussants). These indicators are supported by national and regional poverty indices (GSS, 2007). Housing structures and external housing conditions have been used as an

indicator for poverty, for example Simanowitz et al., (2000) used CASHPOR House Index (CHI) and Participatory Wealth Ranking (PWR) as means for identifying the very poor. Nearness of communities and farm units to the park was also recorded to give an indication of likelihood of conflicts between farmers and wild animals (see for example Parry & Campbell (1992) in Botswana, Hill (1997) in Uganda, and Gillingham & Lee (2003) in Tanzania).

Data for pressure and threats facing the park were derived from an evaluation of protected area management effectiveness, which employed the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) methodology (Ervin, 2003). This assessment covered eight protected areas in the Volta Basin of Ghana and was carried out from 16th to 17th April 2009, in a workshop setting held at the University of Ghana. Twenty-five participants comprising protected area managers and administrators from Wildlife Division Headquarters, and personnel from NGOs and academics participated in the workshop. The RAPPAM methodology is based on a pre-designed questionnaire covering six main assessments elements, of which the evaluation of pressure and threats constitute just a part of one of the elements. Based on the methodology, every activity which is a pressure or threat to the park has three main attributes namely: extent, impact and permanence. The extent could be localized, scattered, widespread or throughout. Impact could be mild, moderate, high or severe, whereas permanence, which refers to time scale, could be short-term, medium term, long-term and permanent. Each of the four elements describing the

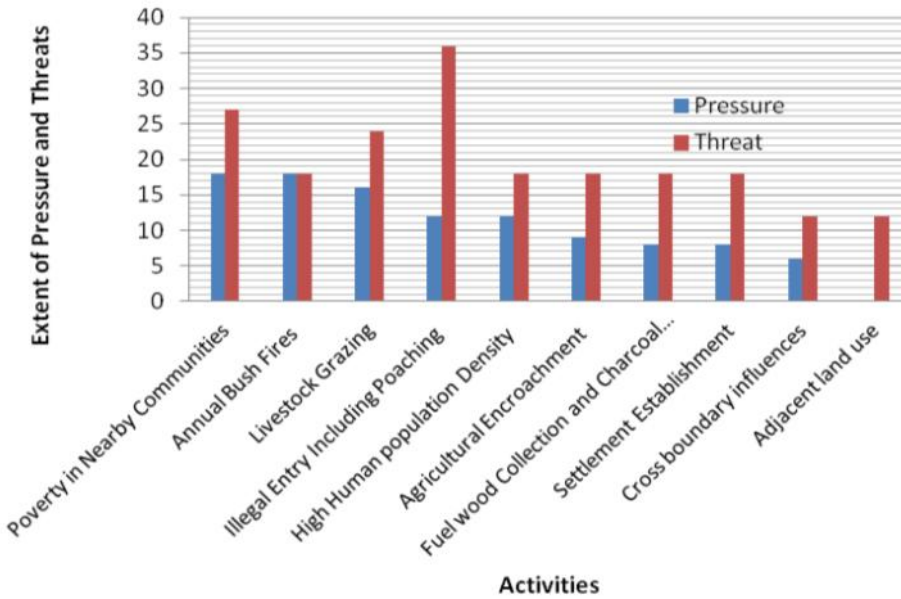


Figure 2. Pressures and threats Facing Digya National Park. Note: Numbers on Y axis represent the product of scores for all three attributes (i.e. extent, impact and permanence) on the scale of 1-64, based on the RAPPAM methodology.

nature of the attributes carries a score ranging from one to four. For each activity, the product of scores given by respondents for all three attributes gives the degree of pressure or threat that the activity poses. Each pressure or threat has a score of between 1 and 64, which is the product of the *extent* (scale 1 to 4: localized, scattered, widespread, throughout) the *impact* (scale 1 to 4: mild, moderate, high, severe) and the *permanence* (scale 1 to 4: short term, medium term, long term or permanent). It is therefore not a linear scale. A score from 1-3 is weak, 4-9 moderate, 12-24 high and 27-64 severe (figure 2).

Institutional data in relation to illegal activities in the park were obtained from unpublished official reports of the district and divisional offices of Wildlife Division responsible for Digya covering the period 2005-2009. This information was provided by Wildlife Officials. Secondary data were extracted from both published and unpublished sources such as Wildlife Division field records and annual reports. The quantitative data obtained from the RAPPAM assessment and institutional sources were entered into Microsoft Excel (2007) and were used to generate bar graphs to illustrate the distribution of elements that were measured (figure 3).

RESULTS AND DISCUSSIONS

• **Pressure and threats facing Digya**

Results from the evaluation of management effectiveness of Digya indicated that the park faced a lot of pressures and threats emanating from surrounding communities. Pressure in this context refers to processes, activities, or

events that have already had a detrimental impact on the integrity of the protected area. Threats, on the other hand, are potential processes, activities or events in which a detrimental impact is likely to occur or continue in the future (Ervin, 2003). In terms of pressure, poverty in nearby communities had the highest score, followed by annual bush fires and livestock grazing. Other factors or activities that exerted pressure on the park included illegal entry including poaching, high human population density, agricultural encroachment, charcoal production and settlement establishment (Figure 2).

A critical look at illegal activities and encroachment reveals that they are fundamentally linked to poverty and economic livelihood issues. Most of the houses were constructed using improvised local materials, notably mud/swish for wall construction and thatch for roofing, a common feature in poorer rural communities in Ghana.

The participants at the management effectiveness evaluation workshop based their assessment of poverty in fringe communities on a regional poverty index (GSS, 2008). While the poverty index in Ghana has decreased from 52 per cent in 1991/92 to 28 per cent in 2005/06 (GSS, 2008), incidence of poverty in rural savannah areas, which include the northern parts of Brong Ahafo Region where Digya National Park is located, had remained pervasive according to earlier studies (Coulombe & McKay, 2004).

Of the threats facing the park, the one that scored highest was illegal entry, including poaching, followed by poverty in nearby communities and livestock grazing. Other

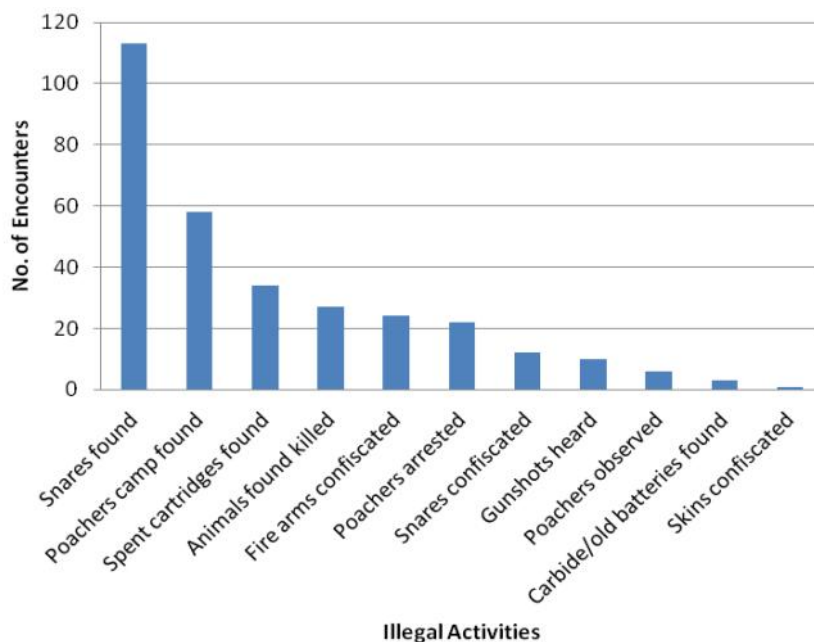


Figure 3. Illegal activities encountered in Digya National Park in 2009

threats in order of severity were annual bush fires, high human population density, agricultural encroachment, charcoal production and settlement establishment (Figure 2). It was clear from the findings that poverty in nearby communities and human population pressure were the main underlying causes of the threats facing Digya. On population growth, available figures of selected fringe communities from Ghana Statistical Service have shown that in Nsogyaso, Hwanyaso and Kpatsakope, for instance, the population increased from 75 to 1,121; 185 to 750; and 82 to 295, respectively, between 1970 and 2000 (GSS, 2005).

While some of the threats and pressures such as agricultural encroachment are direct illegal activities, others such as poverty in nearby communities and high population density may not be direct, but may aggravate illegal activities. Protected area officials are required to enforce a set of regulations which prohibit local people from engaging in illegal activities but more often, the prohibitions are flouted and result in conflict.

- #### Prohibited activities carried out by Local People

Figure 3 shows a frequency chart of illegal activities encountered within the park based on records of field monitoring and law enforcement by officials of the park in 2009. The activities include snaring of animals, establishment of camps by poachers within the park, littering of spent cartridges from gun shots and animals found killed, bushmeat confiscated and poachers arrested, among others.

Park monitoring records in Digya, from 2005 to 2009 as illustrated in Figure 4, show that although a large number of illegal activities were encountered annually, only a few culprits were arrested. In 2005, there were a total of 360 illegal activities compared to 21 arrests; in 2006, the numbers were 345 and 23; 280 and 18 in 2007; 358 and 23 in 2008; while 2009 recorded 310 illegal activities and 22 arrests. The small number of arrests suggest that Digya lacks the requisite law enforcement capacity to prevent illegal activities in the park. In 2006 for instance, the park had only 0.016 effective patrol staff per km² and an operational budget of UD\$2.5/km² compared to 0.198 patrol staff and UD\$58/km² operational budget for Shai Hills Resource Reserve in the coastal savannah region of Ghana (Jachmann, 2008). The ideal cost of effectively managing a protected area is estimated at US\$250/km² (James et al., 2001). The lower number of poachers arrested in 2007 could be the result of the backlash from both local and international media following a forced eviction exercise, and boat disaster (see box 1) in 2006 (Ayivor, 2007). This might have forced Wildlife Officials to exercise some restraint. It is worthwhile to note that though the arrests recorded may be considered as successful law enforcement efforts, continuous arrests and prosecutions of local people only aggravate conflict (Stern, 2008), which negates the principles of the 'inclusive concept' (Borrini-Feyerabend, 2003).

- #### Other causes of conflict

Reports from the field discussion indicate that the damming of the Volta at Akosombo in 1964 and its

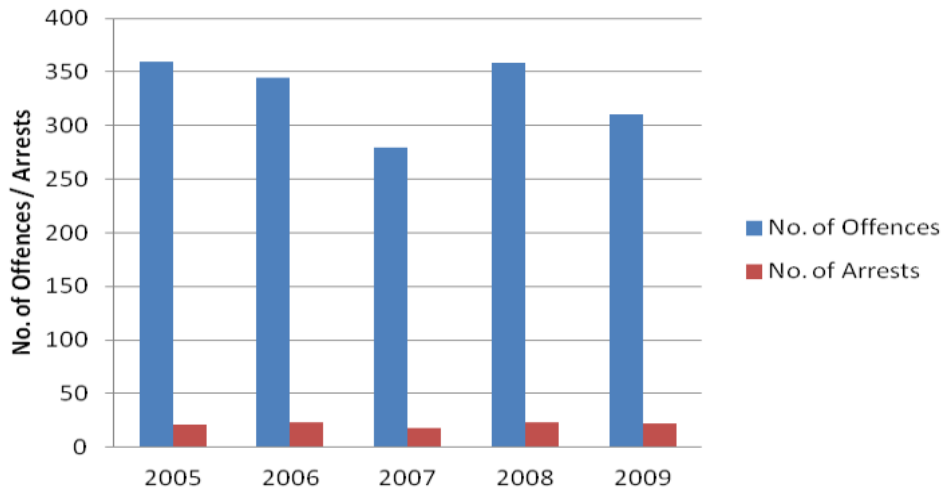


Figure 4: Illegal activities encountered in Digya National Park Compared to number of arrests from 2005-2009

aftermath resulted in the influx of three categories of migrants: (i) those displaced by inundation of the Volta Lake and resettled in four communities within the vicinity of the southern sector of the park; (ii) fisher folks from lower Volta area who were affected by downstream hydrological changes as a result of damming; and (iii) famers and petty traders who were attracted generally by the new economic opportunities provided by the dam. These migrants, together with indigenes who were displaced after the establishment of the park, live in over 200 communities within the vicinity of the park.

For those who had to be relocated, the issue of compensation had been a major source of conflict. According to the Ghana legal system, persons displaced as a result of government acquisition/expropriation of land are entitled to cash compensation from the government for both loss of property, including crops, paid to individuals, and land expropriation (paid mainly to the chiefs). Some local residents claimed that compensation due them was paid to undeserved claimants. They have vowed, therefore, to continue to annex the portions of the park belonging to them until they received their compensation. This confirms the observation by Kiss (1990) that local people are not motivated to conserve wildlife resources if they have not been compensated for the sacrifices they had made. As Muller & Albers (2001) noted, ecologically valuable lands are also economically valuable and so in the absence of development interventions that would provide the residents with alternative means of livelihood, illegal activities, which aggravate conflict, would continue. The poor handling of resettlement arrangement was another source of conflict according to local residents.

Apart from the fact that no housing was provided to those who had to be moved, some of those affected claimed they have been detached from their traditional roots. A number of communities in the southern sector of the park were living within the park in a location that was part of the Ashanti Region. After the demarcation of the park between 1974 and 1976, they were relocated to Kwahu lands in the Eastern Region. Presently, these communities consider themselves as half Ashantis and half Kwahus. These are ethical issues bordering on human rights and respect for local people, which according to Beltran (2000) have to be properly handled to avoid conflict.

Human-wildlife conflict was another source of disaffection among local residents. Studies have shown that when fringe communities of protected areas are forced to absorb the costs of living with wildlife, local support for conservation may be seriously undermined (Brandon et al., 1998; Ogra & Badola, 2008). Elephant raids were common in communities within the southern sector, where damage to crops was reported to be extensive. Though actual data on elephant raids were scanty, every cocoa farmer who was at the focus group discussion in the southern sector reported being a victim at one time or the other. Additionally, rodents, ungulates, primates and birds were reported to destroy crops within all the fringe communities. When farmers kill these animals pests, they are arrested and are sometimes openly paraded and humiliated before being prosecuted, thus, deepening conflict. As Naughton et al., (1999), noted, human-wildlife conflicts remain a major obstacle to community support for conservation. This requires the establishment of another form of compensation system



Two poachers arrested by Wildlife Guards with their carcasses awaiting prosecution © W D Kyabobo

that pays for part or all of the losses suffered by local farmers from wild animal activities in particular elephant raids, which often means the loss of the entire crop of the farmer for the year.

Another issue of concern that tends to reduce local support for protected area management is the high handedness by Wildlife Officials. Some respondents at the focus group discussions narrated the ordeal they went through including physical assaults and imposition of fines when they were arrested for protected area offences. As Stern (2008) noted, when potential collaborators who should help achieve a common goal are criminalized for offenses that border on livelihood, the chances are that they will not cooperate. In Digya, protected area officials were determined to clamp down on offenders, by advocating for the imposition of a more deterrent punishment on culprits. Unfortunately, stiffer punishment will not engender the win-win-win solutions advocated by Meffe et al., (2002) but would only deepen conflict.

During field discussions, all the participants in eight out of the 12 groups were emphatic that protected area

establishment did not bring any tangible benefits to them. A 42 year old woman reported: *"I derive no benefit from the park but instead crop losses. When I get to my farm and encounter an elephant feeding on my crops, I can only create noise to drive it away; if that fails, I just look on helplessly as my farm is destroyed. Often, I get so devastated and have no option but to weep all the way back home"*.

The only tangible benefit according to them was bushmeat hunting, which, in itself, is an illegal activity. Respondents from four out of the 12 groups indicated that they disliked the establishment of the park in their neighbourhood because it has reduced their land size, exposed their farm produce to raids by wildlife, denied them access to bushmeat and restricted their access to traditional economic activities such as harvesting of non-timber forest products. Their apprehension was rooted in the fact that poverty within the fringe communities had worsened as a result of the protected area establishment, whilst they were paying an additional price of high handedness and arrest for encroachment. Though all the participants shared similar sentiments regarding livelihood challenges resulting from the establishment of

the park, five of the groups indicated that they liked the park establishment concept, while three groups were indifferent. Groups which had accepted the concept indicated that periodic outreach programmes organized by Wildlife Officials had sensitized them to support nature conservation.

The fisher folks along the lakeshores of the park also claimed that the protected sections of the lake were more productive in terms of fish size and abundance. This confirms Roberts et al., (2001) assertion that prohibiting fishing in reserves lead to increase in biomass, abundance and average size of fishes. According to the fisher folks, whenever they encroached into these areas and were caught, apart from being manhandled by 'gun wielding' Wildlife Officials, their fishing gears were also destroyed, which put a lot of economic burden on them. Clearly, this situation only deepens the animosity between local people and the officials.

EXISTENCE OF SQUATTER SETTLEMENTS AND FORCED EVICTION

The establishment of illegal settlements inside Digya National Park has been another major source of conflict between the settlers and Wildlife Officials. The squatter settlements emerged after the creation of the Volta Lake, which provided fishing and farming opportunities. It was reported that in 1971, when the park was gazetted, the settlers were notified to vacate the area. Most of them did not comply with the eviction order because there were no resettlement arrangements in place. Whilst compensation was paid by government to some of the chiefs who owned the lands, the settlers who were directly affected were left out and were expected to return to their original lands. In 1989, the Wildlife Division embarked on an eviction exercise with the backing of the military government that was in power. According to resident victims, the exercise was rather highhanded and traumatic. Below is a quote from a 55 year old man at one village about the ordeal they went through: *"We were served an eviction notice without us being told where to go. Two weeks after the notice, we were forcefully evicted and were not allowed even to salvage our belongings, including food crops and livestock. Wildlife Officials were highhanded on us and there was no one to speak for us. We had to move at night to the opposite bank of the Sene River with our children without any protection against the harsh environment. We had to pitch tents using improvised local materials as temporary houses. It took the goodwill of the paramount chief of Dwan, to give us this land to resettle ourselves. We had to start life all over again"*.

Unfortunately the action was *ad hoc* as the Wildlife Division lacked the capacity in terms of staff and logistics to enforce the eviction order. Communities along the Sene River arm of the park complied because of the proximity of the Tato Bator wildlife camp site, which enabled effective monitoring. On the other hand, about twelve communities at the Digya River arm of the park returned to the park after the exercise because of lack of monitoring. The main challenge according to Wildlife Officials was the high financial cost of accessing the Digya River arm which was possible only by means of a high powered motor boat over the Volta Lake.

Another eviction order was announced in 2002, with the support of the local political heads. The plan was not implemented due to budgetary constraints. However, in 2006, there was yet another eviction exercise, which resulted in ten of the evacuees losing their lives through a boat disaster. The settlers were allegedly overloaded in a boat by private operators, apparently, to escape the wrath of the task force that was set up to enforce the eviction order. This attracted a lot of public outcry and condemnation and had to be discontinued as a result of a court injunction by human rights activists. From the research team's interactions with community members, it could be inferred that the squatter settlements had the backing of some traditional leaders who claimed ownership of those portions of the park where the squatters were and collected rent from them.

CONCLUSION

The study identified two main sources of conflict in Digya National Park. The first relates to residents of fringe communities acting individually or as groups to carry out illegal activities for economic survival, which exerted pressure on the park and posed threats on its survival. The authors concluded that poverty, population growth and livelihood issues were the root causes of most of the pressures and threats identified. The second source of conflict involved squatter communities living inside the park. This group had experienced at least three major eviction exercises, but would always return once the exercise was over.

There was no evidence of attempts to mainstream local community participation in the management of Digya, or systematically address their needs and expectations. Under these circumstances, it is likely that the illegal activities within the protected areas will continue, leading to arrests and prosecutions, which in turn will fuel the antagonism and lack of cooperation from the local people. Instead of Wildlife Officials seeing local



Children in fringe communities of Digya National Park look into the future with optimism in spite of poor living conditions
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communities as allies in the management of the park, what pertains is distrust on both sides.

An important way forward to resolve some of these issues would be to link community development to wildlife management. This includes the promotion of self-sustaining economies in these remote areas including alternative livelihoods such as bee keeping, local handicraft production and small livestock raising. Enhancing income generating opportunities and quality of life for human populations in proximity to protected areas will contribute to the attainment of the objectives of wildlife conservation in the park.

Dialogue with local communities affected by nature conservation is also vital in curtailing conflicts. Alongside provision of alternative livelihood enhancement opportunities, Wildlife Officials need to have the capacity to embark on regular outreach programmes to dialogue with community members and to listen to their concerns. Regular dialogue will help to promote mutual trust, reduce acrimony and curtail conflict situations. This will require the assignment of Community Liaison Officers to each wildlife protected area.

Payment of compensation to groups and individuals who were seriously disadvantaged as a result of protected area establishment would be vital also in reducing conflicts. It would be necessary first to develop pricing and compensation mechanisms that take into account the value of ecosystem services as well as the lost livelihood services and separates the issues of indigenes and migrants. The compensation system would not be limited only to lands expropriated for protected area

establishment and property lost, but also to consistent damages caused by wildlife to farm crops.

Opportunity costs for conservation should not be the burden of only the communities living close to the protected area, but should be a national as well as an international concern. Programmes aimed at supporting those whose livelihoods were directly affected by protected area establishment, therefore, have to be the collective responsibility of local, regional and national administrative institutions backed by international financial mechanisms. The concept of empowering communities around protected areas (Community Resource Management Area –CREMA) recently adopted by the Wildlife Division of the Ghana Forestry Commission, has a lot of potential to minimize conflicts with surrounding communities and to encourage collaboration. The CREMA concept seeks to build the capacity of, and provide incentives for, local communities to sustainably manage and conserve natural resources.

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NOTES

¹ All the species names are based on Kingdon's nomenclature (Kingdon, 1997)

REFERENCES

- Adams, W. M., Aveling, R., Brockington, D., Dickson, B., Elliott, J., Hutton, J., Roe, D., Vira, B. and Wolmer, W. (2004). Biodiversity conservation and the eradication of poverty. *Science*, 306, p 1146-1149.
- Amnesty International, (2006a). Africa: Forced evictions reach crisis levels. 10th April, 2006 Press Release. <http://news.amnesty.org/index/ENGAFR010092006>.
- Amnesty International, (2006b). Ghana: Forced evictions in the Digya national park area must stop Public Statement AI Index: AFR 28/001/2006 (Public) News Service No: 098 19 April 2006.
- Ayivor J. S. (2007). *An Exploration of Policy Implementation in Protected Watershed Areas: Case Study of Digya National Park in the Volta Lake Margins in Ghana*: Master Thesis Presented to the College of Arts and Sciences. Athens, USA: Ohio University
- Barrow, E., and Fabricius, C. (2002). Do rural people really benefit from protected areas - rhetoric or reality? *PARKS* 12(2), 67-79.
- Beltrán, J. (2000). *Indigenous and traditional peoples and protected areas: Principles, guidelines and case studies*. Gland and Cardiff: World Commission on Protected Areas and Cardiff University
- Borrini-Feyerabend, G. (2003). Governance of protected areas: Innovations in the air. *Policy Matters* 12(3):92-101.
- Borrini-Feyerabend, G., Kothari, A. and Oviedo, G. (2004). *Indigenous and local communities and protected areas: Towards equity and enhanced conservation*. Gland, Switzerland and Cambridge, UK: IUCN
- Brandon, K. and Wells, M. (1992). Planning for people and parks. *World Dev.* 20:357-370.
- Brandon, K.; Redford, K. H. and Sanderson, S. E. (ed). (1998). *Parks in peril. People, politics and protected areas*. Washington, D.C: Island Press.
- Brandon, K. (2002). Putting the right parks in the right places. In Terborgh, J. van Schaik, C. Davenport, L. and Making M. (eds.). *Strategies for protecting tropical nature*, Rao, Washington, DC: Island Press. 443-467.
- Centre for Housing Rights & Evictions, Commonwealth Human Rights Initiative and Peoples Dialogue (CHRE/ CHRIPD), (2006). Forced eviction of settlers from the Digya National Park. Statement of facts and recommendations . April 19 2006. http://www.humanrightsinitiative.org/new/2006/media_release_forced_evictions_in_ghana.pdf.
- Chape, S., Blyth, S., Fish, L. and Spalding, M. (Compilers). (2003). *2003 United Nations List of Protected Areas*. Gland, Switzerland and Cambridge, UK: IUCN, UNEP-WCMC
- Coulombe, H. and McKay A. (2004). *Selective poverty reduction in a slow growth environment: Ghana in the 1990s*. Paper presented at ISSER-Cornell International Conference on "Ghana at the Half Century", Accra, July 2004.
- Environmental Protection Agency (EPA), (1996). *Environmental Protection Agency at a Glance*. Accra, Ghana: EPA
- Ervin, J. (2003). *WWF Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology*. Gland, Switzerland: WWF
- Fox, S. (1981). *The American Conservation Movement: John Muir and his legacy*. Madison, USA: University of Wisconsin Press.
- Ghanaweb, (2006). Assailants of Kyabobo Park Guards would face justice-DC assures. Regional News of 2006-07-12. Hohoe, Ghana.
- Ghana Statistical Service (GSS), (2005). *Population and housing census of Ghana*. Accra, Ghana: GSS
- Ghana Statistical Service (GSS), (2007). *Pattern and trends of poverty in Ghana: 1991-2006*. Accra, Ghana: GSS
- Ghana Statistical Service (GSS), (2008). *Ghana Living Standard Survey Report of the Fifth Round*. Accra, Ghana: GSS
- Gillingham, S. and Lee, P. C. (2003). People and protected areas: a study of local perceptions of wildlife crop-damage conflict in an area bordering the Selous Game Reserve, Tanzania. *Oryx* 37:3, pp 316-325.
- Hartman, B. (2002). Degradation narratives. Over-simplifying the link between population, poverty and the environment. *Newsletter of the international human dimensions programme on global environmental change: IHDP Update*, April, 2002.
- Hill, C. M. (1997) Crop-raiding by wild vertebrates: the farmer's perspective in an agricultural community in western Uganda. *International Journal of Pest Management* 43, 77-84.
- Hulme, D. and Murphree, M. (eds.) (2001). *African wildlife and livelihoods: The promise and performance of community conservation*. Oxford: James Currey.
- Jachmann, H., (2008). Monitoring law-enforcement in nine protected areas in Ghana. *Biological Conservation* 141, p 89-99.
- James, A., Gaston, K. J. and Balmford, A. (2001). Can we afford to conserve biodiversity? *BioScience* 51: 43-52.
- Kendon, J. (1997). *The Kingdon field guide to African mammals*. London: A&C Black Publishers Ltd.
- King, B. (2009). Conservation geographies in Sub-Saharan Africa: The politics of national parks, community conservation and peace parks. *Geography Compass*. 3, pp. 1-14.
- Kiss, A., (1990). *Living with wildlife: Wildlife resource management with local participation in Africa*. Technical Paper, 130. Washington DC: World Bank
- Kothari, A., Vania, F., Das, P., Christopher, K. and Jha. S. (1997). *Building bridges for conservation: Towards joint management of protected areas in India*. New Delhi, India: Indian Institute of Public Administration.
- Laurance, W. F. (2008). Theory meets reality: How habitat fragmentation research has transcended island biogeography theory. *Biological Conservation* 141: 1731-1744.
- McShane, T. and Wells, M. (eds). (2004). *Getting biodiversity projects to work: Towards more effective conservation and development*. Biology and Resource Management Series. New York: Columbia University Press.
- Meffe, G., Nielsen, L., Knight, R. and Schenborn, D. (2002). *Ecosystem management: Adaptive, community-based conservation*. Washington, D.C.: Island Press.
- Mukherjee, A. (2009). Conflict and coexistence in a national park. *Economic and Political Weekly*. Xliv:23. p 52-59.
- Muller J, and Albers, H. J. (2001). Enforcement, payments, and development projects near protected areas: how the market setting determines what works where. *Resource and Energy Economics* 26. p 185-204.
- Myjoyonline.com, (2006). Volta Lake disaster survivors appeal for food aid. <http://www.myjoyonline.com/news>.
- Naughton, L., Rose, R. and Treves, A. (1999). The social dimensions of human-elephant conflict in Africa: a

- literature review and case studies from Uganda and Cameroon, *A Report to the African Elephant Specialist Group, Human-Elephant Conflict Task Force*, Gland, Switzerland: IUCN
- Nelson J. and Hossack, L. (eds.). (2003). *From principle to practice: Indigenous peoples and protected areas in Africa*. Moreton-in-Marsh, UK: Forest Peoples Programme
- Ogra, M. and Badola, R. (2008). Compensating human-wildlife conflict in protected area communities: Ground-level perspectives from Uttarakhand, India. *Hum Ecol*, 36:5
- Parry, D. & Campbell, B. (1992) Attitudes of rural communities to animal wildlife and its utilization in Chobe Enclave and Mababe Depression, Botswana. *Environmental Conservation*, 19, p 245–252.
- Pimbert, M. and Pretty, J. N. (1995). Parks, people and professionals: Putting “participation” into protected area management. *UNRISD Discussion Paper No. 57*. Geneva, Switzerland: United Nations Research Institute for Social Development.
- Pinchot, G. (1910). *The fight for conservation*. New York: Doubleday, Page & Company.
- Putney, A. (2003). Introduction: Perspective on the values of protected areas. In: Harmon, D. and A. Putney (Eds). *The full value of parks: From economics to the intangible*. Lanham, MD, USA: Rowman and Littlefield Publishers.
- Rachman, A. A. (2002). Poverty and environment linkages: An emerging concern needs greater attention and focused action. *Newsletter of the international human dimensions programme on global environmental change: IHDP update*, April, 2002.
- Roberts, C. M., Bohnsack, J. A., Gell, F., Hawkins, J. P. and Goodridge, R. (2001). Effects of marine reserves on adjacent fisheries. *Science*. 294, p 1920-1923.
- Sharachandra L., Wilshusen, L., Brockington, D., Seidler, R. and Bawa, K. (2010). Beyond exclusion: alternative approaches to biodiversity conservation in the developing tropics. *Current Opinion in Environmental Sustainability* 2:1-7.
- Simanowitz, A., Nkuna, B. and Kasim, S. (2000). *Overcoming the obstacles of identifying the poorest families*. Washington, DC: Microcredit Summit Campaign
- Stern, M. J. (2008). The power of trust: Toward a theory of local opposition to neighboring protected areas. *Society & Natural Resources: An International Journal*, 21:10, p 859-875.
- Terborgh, J. (1999). *Requiem for nature*. Washington, DC: Island Press.
- Twumasi, Y.A., Coleman, T. L. and Manu, A. (2005). Biodiversity management using remotely sensed data and GIS technologies: the case of Digya National Park, Ghana. *In Proceedings of the 31st International Symposium on Remote Sensing of Environment*. June 20-21. Saint Petersburg, Russia Federation.
- Vig, N. J., Kraft, M. E. (2012). *Environmental Policy. New direction for the twenty-first century (8th ed.)* Washington DC: CQ Press
- West, P. C. and Brechin, S. R. (Eds.) (1991). *Resident peoples and national parks*. University of Tucson, USA: Arizona Press
- Wildlife Department, (1995). *Digya National Park Management Plan*. Accra, Ghana: Wildlife Division.
- Wildlife Division, (2007). *Bui National Park Annual Report 2007*. Accra, Ghana: Wildlife Division.
- Wood, A., Stedman-Edwards, P., and Mang, J. (eds.). (2000). *The root causes of biodiversity loss*. London: Earthscan Publications Ltd.

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RESUMEN

El Parque Nacional Digya de Ghana ha sido escenario de conflictos entre las comunidades locales y los administradores de la fauna silvestre desde su creación en 1971. Los conflictos que van desde la detención de los pobladores locales por las autoridades de vida silvestre por ingresar al parque para la recolección de productos forestales no maderables, hasta confrontaciones serias con cazadores furtivos, arrestos y desalojos que a veces resultan en muertes. Sin embargo, la información documentada sobre estos conflictos es escasa. Este estudio examina las causas fundamentales de los conflictos en el Parque Nacional Digya, con vistas a recomendar intervenciones normativas que ayuden a reducir los conflictos. La información para el estudio se obtuvo a través de discusiones con grupos focales, entrevistas con los interesados directos, observaciones sobre el terreno, además de un ejercicio de evaluación de la eficacia de la gestión que implicó la administración de un cuestionario pre diseñado para administradores de áreas protegidas. Los resultados revelaron que una de las causas fundamentales de los conflictos en el parque era la situación de pobreza que agobiaba a las comunidades vecinas. Esto, sumado a las cuestiones pendientes en lo referente al pago de indemnizaciones, las incursiones de animales en las tierras agrícolas y la exclusión de las comunidades locales del proceso de gestión, han impulsado actividades ilegales, principalmente la caza y la invasión, que han resultado en frecuentes situaciones de conflicto. La detención de los culpables y los desalojos forzosos por parte de las autoridades de vida silvestre no había ayudado a reducir las actividades ilegales y los conflictos. El estudio recomienda vincular la gestión de la vida silvestre al desarrollo comunitario para garantizar que se mantengan las economías locales y los medios de subsistencia de las comunidades marginales al tiempo que se procura alcanzar los objetivos de conservación de la vida silvestre para reducir los conflictos.

RÉSUMÉ

Le Parc national de Digya au Ghana est le théâtre de conflits entre communautés locales et gestionnaires de la vie sauvage depuis sa création en 1971. Les conflits vont de l'appréhension des responsables de la vie sauvage envers les habitants locaux, qu'ils soupçonnent de vouloir entrer dans le parc pour récolter des produits forestiers non ligneux, à de graves confrontations avec les braconniers, avec des arrestations et des expulsions se soldant parfois par la mort d'hommes. Néanmoins, une information sérieuse sur ces conflits fait défaut. Cette étude examine les origines du conflit dans le Parc national de Digya, dans l'optique de recommander des interventions politiques qui puissent y mettre un terme. Les données utilisées pour l'étude sont tirées de débats menés avec des groupes ciblés, d'entretiens directs avec les parties prenantes, d'observations sur le terrain ainsi que d'un exercice d'évaluation d'efficacité de la part des gestionnaires, où les gestionnaires et administrateurs d'aires protégées devaient répondre à un questionnaire pré-rempli. Les résultats ont ainsi révélé que la pauvreté des communautés voisines est une des sources principales de conflits dans le parc. Cette pauvreté, associée à des questions non résolues de paiements compensatoires, de raids des animaux sur les fermes et d'exclusion des communautés locales dans le processus de gestion, a nourri les activités illégales, notamment la chasse et l'empiètement de propriétés, aboutissant à plusieurs situations conflictuelles. Cependant, les arrestations des coupables et les expulsions forcées par les gardes de la vie sauvage n'ont pas permis de réduire les activités illégales et les conflits. L'étude recommande donc d'établir un lien entre la gestion de la vie sauvage et le développement communautaire afin de préserver les économies locales et les moyens de subsistance des communautés avoisinantes, tout en cherchant à atteindre les objectifs de la conservation de la vie sauvage, ce qui minimiserait les conflits.



TIGERS IN THE TRANSBOUNDARY MANAS CONSERVATION COMPLEX: CONSERVATION IMPLICATIONS ACROSS BORDERS

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ABSTRACT

Tiger *Panthera tigris*, is used as a flagship or umbrella species in conserving wildlife and wild areas in many parts of Asia. We used remotely triggered camera traps and capture-recapture framework within Manas National Park in India and Royal Manas National Park in Bhutan to estimate the abundance and density of tigers in the Transboundary Manas Conservation Complex (TMCC). A total of 102 camera traps pairs were used in three ranges to cover more than 400 km² area. We captured 87 photographs of 14 individually identified tigers (eight males and six females), during the 5,955 camera-trap night survey period. The population estimated was 15 (\pm SE 2.64) individuals with a 95 per cent confidence interval range of 15 to 29. Tiger density estimates using $\frac{1}{2}$ MMDM (Mean Maximum Distance Moved) and using MLSECR (Maximum Likelihood Spatially Explicit Capture Recapture) analysis was 1.9 (\pm SE 0.36) and 0.75 (\pm SE 0.21) individuals/100 km² respectively. TMCC is an important landscape, crucial for the future of tigers, and effective management of biodiversity should extend beyond the borders of protected areas and across political boundaries.

KEYWORDS: *Panthera tigris*, Manas, India, Bhutan, camera traps, abundance, density

INTRODUCTION

Knowledge of what species is present, their relative abundance and distribution within an area is essential for effective conservation management (Sheng et al., 2010). Well-designed monitoring programmes can obtain such information and provide robust scientific data to wildlife managers on the long-term population or biodiversity trends (Pereira & Cooper, 2006; Marsh & Trenham, 2008). In the absence of species abundance information, conservation management decisions are often based on educated guesses, which may result in erroneous decisions that can be counterproductive for conservation (Blake & Hedges, 2004).

In the Indian subcontinent, conservation of the Royal Bengal Tiger (*Panthera tigris tigris*) is at a crucial stage. The extirpation of tigers from tiger reserves has led to the growing realization that this subspecies is declining rapidly where they were thought to be thriving (Wright, 2010). It was found that due to massive forest destruction in India, as well as poaching of tigers and the loss of their prey base, much of the tiger populations disappeared in the last decade. In Bhutan, the tiger can be found from sub-tropical jungles near the Indian plains to above tree line on the Tibetan border (Dorji & Santiapillai, 1989). The Royal Government of Bhutan (RGoB) is committed to conserving this species and has



Deploying camera traps in Manas National Park, India © WWF India

set aside more than 51 per cent of the country's total geographic area as protected areas in the form of National Parks and Biological Corridors. Global initiatives to conserve tigers by international organizations and NGOs have helped in raising awareness of the precarious state of this species. However, despite huge financial investment and effort from these agencies and nations, tiger numbers continue to dwindle in most of the tiger range countries.

Global and regional level initiatives will need to be anchored to on the ground actions at the local level. Conservation actions and initiatives at the local level are crucial to realize the global mission of preventing extinction of tigers in the wild. It is with this objective that we initiated a tiger monitoring study in the Royal Manas National Park (RMNP) in Bhutan and the Manas National Park (MNP) in India as the core area of the Transboundary Manas Conservation Complex (TMCC) (Borah et al., 2012). The complex is an important tiger conservation unit stretching across India and Bhutan. It is also supposed to be the only landscape in South East Asia sustaining the occurrence of tigers living close to the timberline and predated upon mountain ungulates (Wikramanayake et al., 1998). Tigers in this complex are known to traverse between the political boundaries since the whole complex is a contiguous stretch of habitat conducive for its survival.

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STUDY AREA

TMCC straddles the Indo-Bhutanese border from the Ripu Reserve Forest in India in the west, to Bhutan's Khaling Wildlife Sanctuary in the east, to Jigme Singye Wangchuk National Park in Bhutan to the north. Thus, the TMCC encompasses the whole of India's Manas Tiger Reserve and the group of protected areas in southern Bhutan. The area is home to one of the richest diversity of wildlife and vegetation in the region.

The TMCC is located at the junction of Indo-Gangetic and Indo-Malayan realms and is a key conservation area in the *Jigme Dorji-Manas-Bumdeling* conservation landscape in the eastern Himalayan eco-region (Wikramanayake et al., 2001). It is also an identified Tiger Conservation Landscape (#37 *Northern Forest Complex – Namdapha - Royal Manas*, Sanderson et al., 2006). Habitats range from tropical grasslands at 40 to 150 m through subtropical forest at 300 m to warm broad-leaved forest above 1000 m reaching up to 2000 m. The Manas River flows through RMNP and MNP with both parks functioning as important watershed areas.

The complex is home to endemic and globally threatened species like Golden langur (*Trachypithecus geei*), Pygmy hog (*Porcula salvania*) and the endangered Bengal florican (*Houbaropsis bengalensis*) as well as of Royal

Bengal tiger, Clouded leopard (*Neofelis nebulosa*), Leopard (*P. pardus*), Asian elephant (*Elephas maximus*), Asiatic water buffalo (*Bubalis bubalis*), Gaur (*Bos gaurus*), Greater one-horned rhinoceros (*Rhinoceros unicornis*) and White bellied heron (*Ardea insignis*). The landscape is noted for its spectacular scenery with a variety of habitat types that support a diverse fauna with nearly 30 threatened mammals and about 35 threatened birds.

MATERIALS AND METHODS

We used remotely triggered camera-traps and a capture-recapture framework to estimate the population size of tigers. Photographic capture-recapture sampling is a reliable technique for estimating the abundances of tigers and other secretive animal species that can be identified individually from their natural markings (Karanth & Nichols, 1998; O'Brien et al., 2003; Karanth et al., 2004; Chauhan et al., 2005; Jhala et al., 2008, 2011; Sharma et al., 2009). The camera-trapping programme was designed primarily to determine the abundance and density of tigers in TMCC, but also provided extensive data on the occurrence of co-predator's and prey species. Using these data our intention was to establish baseline information that would facilitate the conservation of tigers and several other species in TMCC as a single conservation unit.

The camera-trapping study across the trans-boundary area was conducted within Bansbari and Bhuyanpara Ranges of MNP in India and the Manas Range of RMNP, comprising a minimum convex polygon (MCP) area of 436 km². Camera-traps were put in 102 locations across the three ranges within TMCC from November 2010 to February 2011. A pair of camera traps was put in each 4 to 6 km² grid cell size, with the distance between each camera varying from a minimum of 1.75 km to maximum of 3.15 km. The camera-traps were deployed in the best possible locations within each grid to ensure coverage of the entire sampling area, avoiding gaps large enough so as to satisfy the assumption that no animal had a zero probability of being photographed. The survey was, therefore, designed to cover the study area homogeneously to maximize the chance of photographing all animals present in the area (Karanth & Nichols, 1998). We kept all the cameras operational for 24 hours a day for 64 days, except in cases of malfunction or damage caused by elephants. Each day (24 h) was therefore defined as a sampling occasion (Otis et al., 1978). Our duration of camera-trapping for 64 days was adequate for assuming demographic closure (Otis et al., 1978) of the study population, as previous studies on large cats has suggested trapping periods of 2-3 months



Camera trap © WWF India

as sufficiently short to assume that no population change occurs during the study (Karanth, 1995; Karanth & Nichols, 1998; Silver et al., 2004). In MNP, all camera units were mounted on trees, on poles or in steel cages made specifically for the cameras. The cameras were placed 3-4 m apart on either side of a path or trail, with the sensor set at 20-40 cm from the ground. In RMNP, the cameras were placed 6-7 m away from each other at a height of 45 cm from the ground and positioned in such a way that two cameras were not in the same line of view to avoid the flash of one disturbing pictures on the other camera. Efforts were made to place two cameras at each location, but sometime in RMNP, certain camera stations could accommodate only one camera. In such cases, we placed the other camera few metres away from the location (10-15 m), forward or backwards, along the same trail.

In addition to monitoring tigers, this exercise was also meant to record biodiversity, particularly the fauna of TMCC, so we set the sensitivity of camera to 'high' for maximizing capture of wildlife in the area. To deter and avoid damage from elephants in RMNP, we placed fresh elephant dung on our cameras and camouflaged them to blend with surrounding environment. The cameras were checked on a daily basis by a team of researchers at MNP and monitored twice a month where ever possible in RMNP (some of the cameras traps could only be monitored once a month due to logistical constraints). Although the same camera locations were maintained throughout the study duration, we shifted the cameras 100-200 m from the original location whenever a sign of



Researchers recording data © WWF India

trap shyness was observed. We identified the photo captured individual tigers by its stripe pattern. Every photo-captured tiger was given a unique identification number (e.g. TM1M, TM2F etc) after carefully examining the position and shape of stripes on the flanks, limbs, forequarters and sometimes even tail (Schaller, 1967; Karanth, 1995; Franklin et al., 1999).

DATA ANALYSIS

• Abundance estimation

We developed individual capture histories for tigers in a standard 'X-matrix format' (Otis et al., 1978; Nichols, 1992). These were analyzed using models developed for closed populations in the programme CAPTURE (Rexstad & Burnham, 1991). An issue with the use of standard closed population models to estimate abundance is the assumption of demographic and geographic closure within the study period. In the majority of population studies on large, long-lived mammals, such as tigers, the sampling period is generally adequately short that the assumption of demographic closure (i.e. no births or deaths within the sample population) is logical. However, violation of the assumption of geographic closure (i.e. no animals move in or out of the study area during sampling) is much more likely. We assumed that the sampled population was demographically closed, as tigers are long-lived animals (Otis et al., 1978; Karanth, 1995) and our sampling period was relatively short. We formally tested population closure using open Pradel models implemented in the programme MARK. In Pradel

models, we compared Akaike Information Criteria corrected for small sample size (AICc) scores between a model in which recruitment and survival were constrained to zero and to one, respectively (representing population closure), and an open model in which these parameters were estimated based on observed data. The parameters, recruitment and survival, correspond to immigration and fidelity, assuming a population is demographically closed (Boulanger & McLellan, 2001; Harihar et al., 2009; Borah et al., *in press*). Jackknife estimator (Otis et al., 1978) has been used successfully in earlier photographic capture studies (Karanth, 1995; Karanth & Nichols, 1998; Karanth et al., 2004; Maffei et al., 2004; Simcharoen et al., 2007; Wang & Macdonald, 2009) to estimate capture probabilities and population size. However, it has been seen that the Jack-knife heterogeneity model appears less robust than other models when data are sparse or capture probabilities low and strongly heterogeneous (Boulanger et al., 2002, Harmsen et al., 2010, Gray & Prum, 2011). Based on the capture recapture history generated from our study, we generated parameter estimates under the M_b model which turned out to be the best-fit model for the present study in the programme CAPTURE.

• Density estimation

We estimated tiger densities (per 100 km²) by dividing the population size (N) by the effective sampled area, based on our abundance estimates. The effective sample area was computed following the approach developed by Wilson & Anderson (1985), using the half of the mean

maximum distance moved (HMMDM) method, in which a buffer of HMMDM for all individuals captured at more than one camera-trap location is added to the trapping grid polygon (Karanth & Nichols, 1998). We also obtained density estimates using full maximum likelihood spatially explicit capture recapture (MLSECR) in the programme DENSITY (DENSITY 4.4, www.otago.ac.nz/density), which did not rely upon closed population estimates from CAPTURE. The buffer width around the trapping grid was set at 10 km and we assumed a half-normal spatial capture probability function and a Poisson distribution of home-range centres for estimating density.

RESULTS

We photo captured 14 individually identified tigers comprising of eight males and six females, during the 5,955 camera-trap night survey period (see Annex). Four out of the 14 tiger identified were found to be using both the areas in MNP and RMNP. Capture frequencies varied from one to five for the individuals. In MARK, the open Pradel model estimated survivorship (θ) at 0.98 (\pm SE 0.008) and recruitment (f) at 0.02 (\pm SE 0.008) for the tiger population. The constrained Pradel model, in which θ was set at 1.0 and f at 0.0 (the closed model), was better supported (Δ AICc 771.93) than the open model (Δ AICc 856.5). Therefore, we found it reasonable to consider the population closure for tigers to justify analysis within a closed capture recapture framework.

• Abundance

The overall model selection test ranked M_b (behavioural response to capture) as the best model (Criteria rated 1) in CAPTURE. Tests for the affect of a behavioural response ($X^2 = 15.77$, $df=1$, $P=0.00007$) supported the suitability of the model in CAPTURE. The probability of detecting an individual on at least one sampling occasion (Average p -hat) was 0.03, while the estimated probability of recapture (average c -hat) was 0.12. The population estimate using M_b with the zippin estimator was 15 (\pm SE 2.64) individuals with a 95 per cent confidence interval range of 15 to 29.

• Density

The maximum distance moved (MDM) by recaptured individuals between photo captures was between 2.1 km and 30.7 km (mean 8.4; \pm SE 2.9). Based on HMMDM, the total sampling area was estimated to be 789.20 km² (\pm SE 50.98). Tiger density estimates based on estimate from model M_b in CAPTURE was 1.9 (\pm SE 0.36) individuals/100 km². Tiger density based on MLSECR analysis in DENSITY, was estimated at 0.75 (\pm SE 0.21) individuals/100 km².

DISCUSSION

• Future monitoring and management

The study produced the first abundance and density estimate for tigers from TMCC within India and Bhutan using capture recapture framework (Table 1). We estimated tiger density based on conventional approaches. The camera trapping study yielded 87 pictures of tigers comprising of 14 individuals in a total trapping effort of 5,955 trap night out of possible 6,592 trap nights. The four common tigers in TMCC were found to be sharing territory with each other. Based on the photo captured data the tigers were avoiding the southern boundary of MNP and the concentration was high towards the centre of TMCC indicating presence of good prey and the least disturb area. Further studies annually would provide more data on the movement patterns of these tigers. We recommend joint exercises, in form of monitoring as well as patrolling, to be carried out in TMCC to generate meaningful information for management purpose. Such joint exercises would also help in promoting the conservation initiatives in the landscape.

• Diversity of mammals and relationship with tigers

Apart from tigers, other carnivore species photographed included Leopard (including melanistic leopard), Clouded Leopard, Golden Cat (*Pardofelis temminckii*), Marbled Cat (*Pardofelis marmorata*), Leopard Cat (*Prionailurus bengalensis*), Jungle Cat (*Felis chaus*), Dhole (*Cuon alpinus*), Himalayan Black Bear (*Ursus thibetanus*), Sloth Bear (*Melursus ursinus*), Jackal (*Canis aureus*) and Civets. Herbivore prey species photo captured included Gaur, Wild pig (*Sus scrofa*), Sambar (*Rusa unicorn*), Barking Deer (*Muntiacus muntjak*), Goral (*Naemorhedus goral*), Serow (*Capricornis thar*), Asian Elephant and Porcupines. Such wide variety of mammal species in the landscape could be attributed to the varied geographical topography as well as the different vegetation type present in the landscape.

This could be the only landscape in the world with eight species of cats (felids) co-existing in the same area. The eight species being: Tiger, Leopard, Clouded Leopard, Marbled Cat, Golden Cat, Leopard Cat, Jungle Cat and Fishing Cat. All of them, except the fishing cat, were photo captured in the camera traps. The fishing cat, however, was sighted directly by one of our co-author in MNP, confirming its presence. Other important carnivores like dhole, sloth bear and black bear also share the same habitat with these cats making this landscape unique.

Table 1: Summary of camera trapping to estimate abundance and density of tigers from Trans-boundary Manas Conservation Complex

Total number of camera traps	102
Sampling occasion	64 days
Sampling effort (number of traps x sampling occasions)	5,955
Camera trap polygon area	436.37 km ²
Estimated buffer width (1/2 MMDM)	4.2 km
Effective sampled area	789.20 (±50.98)
Number of individual tigers captured	14
Estimated numbers of tigers in the sample area using model Mb	15 (95% CI: 15-29)
Estimated tiger density in sampled area using ½ MMDM	1.9 (±0.36) tigers/ 100 km ²
Estimated tiger density using MLSECR	0.75 (±0.21) tigers/ 100 km ²

We were able to determine the abundance and density estimates for leopards and clouded leopards from MNP. We photo captured 27 individually identified leopards comprising of 11 males and 13 females (three unidentified) and 16 individually identified clouded leopards comprising of four males and five females (seven unidentified), during the same survey period. The abundance estimate using M_h Jack-knife and Pledger model M_h was 47 (±SE 11.3) and 35.6 (±SE 5.5) respectively for leopards and 21 (±SE 6.6) and 25.03 (±SE 6.8) for clouded leopards. Density estimates using MLSECR was 3.4 (±SE 0.82) and 4.73 (±SE 1.43) individuals/100 km² for leopards and clouded leopards respectively (Borah et al., 2013 *in press*). We intend to determine the estimates of these species across TMCC soon.

Based on the higher abundance and density estimates for leopard and clouded leopard compared to tigers, we assume that there may be sympatric competition for food and space in predator guilds. It would be interesting to understand the intra-guild competition among these top predators and see how restricted habitat use and dietary overlap influence the abundance and distribution of tigers and other carnivores in TMCC and we would recommend such studies in future.

- **Monitoring method**

Photographic capture-recapture sampling is a reliable technique for estimating the abundances of tigers and other secretive animal species that can be identified individually from their natural markings. The present study further supports earlier studies (Karanth & Nichols, 1998; O'Brien et al., 2003; Karanth et al., 2004; Chauhan et al., 2005; Jhala et al., 2008, 2011; Sharma et al., 2009) on tigers using capture recapture framework. There was enough evidence for population closure assumption from the open Pradel models in MARK where recruitment and survival corresponding to

immigration and fidelity was estimated. The overall model selection test ranked M_b (behavioural response to capture) as the best model in CAPTURE. Model M_b allows the animal to exhibit a behavioural response to capture and the model deals with the failure of the assumption that the initial capture does not affect subsequent capture probabilities. Based on our data we assume that the individual tigers in the TMCC may be exhibiting behavioural response. The probability of detecting an individual on at least one sampling occasion (Average \hat{p}) was 0.03, and comparable to that recorded for the studies undertaken in rainforest areas in South East Asian countries, Malaysia (Kawanishi, 2002), Sumatra (O'Brien et al., 2003) and other sites (Karanth et al., 2004). The current study at TMCC in an effectively sampled area of 789.20 km² (±SE 50.98) revealed a population estimate (\hat{N}) of 15 tigers with a standard error ($SE \hat{N}$) of 2.64, while the estimated density (\hat{D} ($SE \hat{D}$)) was 1.9 (0.36) tigers/ 100 km² (based on ½ MMDM) and 0.75 (0.21) tigers/100 km² (based on MLSECR).

Estimating densities from abundance estimates from closed population capture recapture models is largely based on observed animal movements (Borchers & Efford, 2008; Karanth & Nichols, 2010). The best approach of Maximum Likelihood is to use the spatial capture histories of camera traps in a likelihood-based density estimation framework (Borchers & Efford, 2008; Efford et al., 2009). Since the spatial likelihood approach does not depend on adding a buffer to the trapping polygon for estimating effective trapping area, the resultant estimates are least biased by trap layout and density (Efford, 2004). We, therefore at present, recommend park managers to utilize the densities estimated by MLSECR approach, in order to assess conservation intervention effectiveness for efficient management decisions. However, MLSECR remains inhibited by different assumptions relating to spatial use



Monitoring team on patrol in Royal Manas National Park, Bhutan © Royal Manas National Park, Bhutan

and animal distributions (Efford, 2004) in spite of latest developments for intrinsically estimating density. For studies on monitoring large carnivores, these assumptions need to be taken into account based on the ecology of study species as well as the features of study area (Gray & Prum, 2011).

CONSERVATION IMPLICATIONS

For monitoring the success of conservation activities in various areas, baseline data on abundance and density estimates are crucial for various species of concern. Our estimates provide evidence that tigers in TMCC are effectively using the landscape along India and Bhutan. Further research studies in TMCC are of immediate need and would facilitate better understanding of all the major carnivore assemblages including that of tigers. Further, annual abundance and density estimation of tigers in TMCC will help monitor changes in populations and trends of these large carnivore population dynamics. The present study has also established a baseline for initiating a long-term monitoring programme for tigers and co-predators in TMCC. Whatever monitoring interventions are planned and implemented in future, it will be important to monitor the consequences for tigers and associated animal's abundance, and our study presents the baseline for such future comparison. Our results show that the TMCC is an extremely rich and

productive ecosystem. Future studies should also address connectivity issues between landscapes in addition to continuation of long term monitoring of tiger populations and other associated species.

TMCC is vital for regional and global conservation of tigers in the wild. The region forms an indispensable corridor for the Terai-Arc Tiger Conservation Landscape between Terai regions (of Nepal and India) with landscapes in North eastern India, Myanmar and South East Asia. The future plan should evolve a lasting commitment by the two national governments of India and Bhutan for wildlife conservation and monitoring. Beside tiger and prey monitoring, immediate activities should include local-level exchanges and the formalisation of exchanges at a higher level. Future programmes should also concentrate on developing specific field of skills and practical training, to report poaching and illegal trade of species. These initial steps will inspire confidence to build partnerships and commitment to a long-term process of collaboration. Finally, efforts need to be made to develop a sustainable funding mechanism to ensure transboundary monitoring and co-operation between both the governments. In general terms, a strategy that consolidates and then expands the present achievements can be followed to strengthen the transboundary conservation initiatives.

ANNEX I

Identified tiger individuals from Transboundary Manas Conservation Complex

TM1M



TM2F



TM3F



TM4M



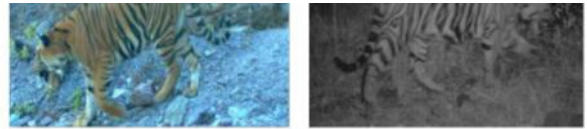
TM5M



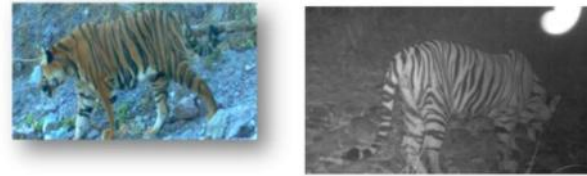
TM6F



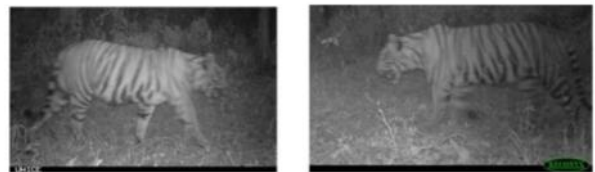
TM7M



TM8M



TM9M



TM10F



TM11F



TM12F



TM13M



TM14M



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Note: The camera trapping in MNP was conducted as a part of All India Tiger Estimation exercise of Government of India, in collaboration with the National Tiger Conservation Authority (NTCA), Wildlife Institute of India (WII) and Assam Forest Department, and



Panthera tigris tigris © National Geographic Stock / Michael Nichols / WWF

involved conservation organizations World Wide Fund for Nature (WWF) - India, Ashoka Trust for Research in Ecology and Environment (ATREE) and Aaranyak as partners, while in RMNP it was carried out for monitoring the tiger population by the Department of Forest and Park Services, RGoB, in collaboration with the Ugyen Wangchuk Institute for Conservation and Environment (UWICE) and the Bhutan Foundation. Supporting information on the study is available on request.

REFERENCES

- Blake, S. and Hedges, S. (2004). Sinking the flagship: the case of the forest elephants in Asia and Africa. *Conservation Biology*, 18, 1191–1202.
- Borah J., Wangchuk D., Swargowari A., Wangchuk T., Sharma T., Das D., Rabha N., Basumatari A., Kakati N., Ahmed M. F., Sharma A., Sarmah A., Dutta D. K., Lahkar B., Dorji T., Brahma P. K. Ramchiary L., Tempa T., Wangdi Y., Nedup T., Wangdi T., Tharchen L., Dhendup P., Bhobora C. R., Pandav B. and Vattakaven J. (2012). *Tigers in Indo-Bhutan Transboundary Manas Conservation Complex*. 2012. Technical report. New Delhi, India: MNP, RMNP, WWF-India, Aaranyak, ATREE, UWICE and Bhutan Foundation
- Borah, J., Sharma, T., Das, D., Rabha, N., Kakati, N., Basumatari, A., Ahmed, M.F. and Vattakaven, J. (in press). Evaluating abundance and density estimates for leopard and clouded leopard in Manas National Park, India: Conservation implication for rare carnivores. *Oryx: in press*.
- Borchers, D.L., and Efford, M.G. (2008). Spatially explicit maximum likelihood methods for capture–recapture studies. *Biometrics*, 64:377–385.
- Boulanger, J., and McLellan, B. (2001). Closure violation in DNA-based mark–recapture estimation of grizzly bear populations. *Canadian Journal of Zoology*, 79: 642–651.
- Boulanger, J., White, G.C., McLellan, B.N., Woods, J., Proctor, M. and Himmer, S. (2002). A meta-analysis of grizzly bear DNA mark-recapture projects in British Columbia, Canada. *Ursus* 13:137–152.
- Chauhan, D.S., Harihar, A., Goyal, S.P., Qureshi, Q., Lal, P. and Mathur, V.B. (2005). *Estimating leopard population using camera traps in Sariska Tiger Reserve*. Dehra Dun, India: Wildlife Institute of India, p. 23.
- Dorji, D. P. and Santiapillai, C. (1989). The Status, Distribution and Conservation of the Tiger *Panthera Tigris* in Bhutan. *Biological Conservation*, 48: p 311–319.
- Efford, M. (2004). Density estimation in live-trapping studies. *Oikos*, 106: 598–610.
- Efford, M. G., Dawson, D. K. and Borchers, D. L. (2009). Population density estimated from locations of individuals on a passive detector array. *Ecology*, 90: p 2676–2682.
- Franklin, N., Bastoni, Sriyanto, Siswomartono, D., Manansang, J. and Tilson, R. (1999). Using tiger stripes to identify individual tigers. In Seidensticker, J., Christie, S. & Jackson, P. (Eds). *Riding the Tiger: Tiger Conservation in Human Dominated Landscapes*: p 138–139. Cambridge, UK: Cambridge University Press
- Gray, T.E., and Prum, S. (2011). Leopard Density in Post-Conflict Landscape, Cambodia: Evidence from Spatially Explicit Capture-Recapture. *The Journal of Wildlife Management*, 9999: p 1–7

- Harihar, A., Pandav, B. and Goyal, S.P. (2009). Density of leopards (*Panthera pardus*) in the Chilla Range of Rajaji National Park, Uttarakhand, India. *Mammalia*, 73: 68-71.
- Harmsen, B. J., R. J. Foster and Doncaster, C. P. (2011). Heterogeneous capture-rates in low density populations and consequences for capture-recapture analysis of camera-trap data. *Population Ecology* 53:1, p 253-259.
- IUCN (2005). Benefits Beyond Boundaries. *Proceedings of the Vth IUCN World Parks Congress*. Gland, Switzerland and Cambridge, UK: IUCN
- IUCN (2010). *IUCN Red List of Threatened Species*. Version 2010.2. <www.iucnredlist.org>.
- Jhala, Y.V., Gopal, R. and Qureshi, Q. (2008). *Status of tigers, co-predators and prey in India*. New Delhi, India and Dehra Dun, India: National Tiger Conservation Authority, Govt. of India and Wildlife Institute of India
- Jhala Y. V., Qureshi Q., Gopal R. and Sinha P. R. (2011). *Status of tigers, co-predators and prey in India*. TR 2011/003 pp-302. New Delhi, India and Dehra Dun, India: National Tiger Conservation Authority, Govt. of India and Wildlife Institute of India
- Karanth, K. U. (1995). Estimating tiger (*Panthera tigris*) populations from camera trapping data using capture-recapture models. *Biological Conservation* 71: p 333-338.
- Karanth, K. U. and Nichols, J. D. (1998). Estimation of tiger densities in India using photographic captures and recaptures. *Ecology*, 79: p 2852-2862.
- Karanth, K. U. and Nichols, J. D. (2002). *Monitoring tigers and their prey: a manual for researchers, managers and conservationists in tropical Asia*. Bangalore, India: Centre for Wildlife Studies
- Karanth, K. U., Nichols, J. D., Kumar, N. S., Link, W. A. and Hines, J. E. (2004). Tigers and their prey: Predicting carnivore densities from prey abundance. *Proceedings of the National Academy of Sciences of the United States of America*, 101: 4854-4858.
- Karanth, K. U. and Nichols, J. D. (2010). Non-invasive survey methods for assessing tiger populations. in R. Tilson and P. Nyhus, (Eds). *Tigers of the world: the science, politics and conservation of Panthera tigris*. Second edition. New York, USA: Elsevier, P 461-481
- Kawanishi, K. (2002). Population status of tigers (*Panthera pardus*) in a primary rainforest of peninsular Malaysia. Ph. D thesis. Florida, USA: University of Florida p 126.
- Maffei, L., Cuellar, E. E. and Noss, A. (2004). One thousand jaguars (*Panthera onca*) in Bolivia's Chaco? Camera trapping in the Kaa-Iya National Park. *Journal of Zoological Society* 262: p 295-304.
- Marsh, D. M. and Trenham, P. C. (2008). Current trends in plant and animal population monitoring. *Conservation Biology* 22: p 647-655.
- Nichols, J. D. (1992). Capture-recapture models: using marked animals to study population dynamics. *Bioscience* 42: p 94-102.
- O'Brien, T., Kinnaird, M. and Wibisono, H. (2003). Crouching tigers, hidden prey: Sumatran tiger and prey populations in a tropical forest landscape. *Animal Conservation* 6: p 131-139.
- Otis, D. L., Burnham, K. P., White, G. C. and Anderson, D. R. (1978). Statistical inference from capture data on closed animal populations. *Wildlife Monographs* 62: p 1-135.
- Pereira, H. M. and Cooper, H. D. (2006). Towards the global monitoring of biodiversity change. *Trends in Ecology and Evolution* 21: p 123-129.
- Rexstad, E. and Burnham, K.P. (1991). *User's guide for interactive program CAPTURE*. Fort Collins: Colorado State University, USA. <<http://www.mbr-pwrc.usgs.gov/software.html>>.
- Sanderson, E., Forrest, J., Loucks, C., Ginsberg, J., Dinerstein, E., Seidensticker, J., Leimgruber, P., Songer, M., Heydlauff, A., O'Brien, T., Bryja, G., Klenzendorf, S. and Wikramanayake, E. (2006). *Setting Priorities for the Conservation and Recovery of Wild Tigers: 2005-2015*. The Technical Assessment. New York, USA and Washington, D.C, USA: WCS, Smithsonian and NFWF-STF and WWF
- Schaller, G. B. (1967). *The deer and the tiger*. Chicago, Illinois, USA: University of Chicago Press
- Sharma, R. K., Jhala, Y. V., Qureshi, Q., Vattakaven, J., Gopal, R. and Nayak, K. (2009). Evaluating capture-recapture population and density estimation of tigers in a population with known parameters. *Animal Conservation* 13: p 94-103.
- Sheng, L., Dajun, W., Xiaodong, G., William, J. and McShea, W. J. (2010). Beyond pandas, the need for a standardized monitoring protocol for large mammals in Chinese nature reserves. *Biodiversity Conservation* 19: p 3195-3206.
- Silver, S. C., Ostro, L. E. T., Marsh, L. K., Maffei, L., Noss, A. J., Kelly, M. J., Wallace, R. B., Gomez, H. and Ayala, G. (2004). The use of camera traps for estimating jaguar (*Panthera onca*) abundance and density using capture/recapture analysis. *Oryx* 38: p 1-7.
- Simcharoen, S., Pattanvibool, A., Karanth, K. U., Nichols, J. D. and Sambar Kumar, N. (2007). How many tigers *Panthera tigris* are there in Huai Kha Khaeng Wildlife Sanctuary, Thailand? An estimate using photographic capture-recapture sampling. *Oryx* 41: p 447-453.
- Stanley, T. R., and Burnham, K. P. (1999). A closure test for time-specific capture-recapture data. *Environmental and Ecological Statistics* 6: p 197-209.
- Sunquist, M. E. (1981). Social organization of tigers *Panthera tigris* in Royal Chitwan National Park, Nepal. *Smithsonian Contribution Zoology* 336: p 1-98.
- Wang, S. A. and Macdonald, D. W. (2009). The use of camera traps for estimating tiger and leopard populations in the high altitude mountains of Bhutan. *Biological Conservation* 142: p 606-613.
- Wikramanayake, E., Dinerstein, E., Robinson, J. G., Karanth, U., Rabinowitz, A., Olson, D., Mathew, T., Hedao, P., Conner, M., Hemley, G. and Bolze, D. 1998. An Ecology-Based Method for Defining Priorities for Large Mammal Conservation: The Tiger as Case Study. *Conservation Biology* 12: 4, p 865-878.
- Wikramanayake, E. D., Carpentert, C., Strand, H., and McKnight, M. (2001). *Ecoregion-based conservation in the Eastern Himalaya. Identifying important areas for biodiversity conservation*. Kathmandu, Nepal: WWF and ICIMOD.
- Wilson, K. R. and Anderson, D. R. (1985). Evaluation of two density estimators of small mammal population size. *Journal of Mammalogy* 66: p 13-21.
- Wright, B. (2010). Will the tiger survive in India? In Tilson R, and Nyhus J., P. (Eds) *Tigers of the World*, USA: Elsevier. p 87-100



The Transboundary Manas Conservation Complex (TMCC) team in RMNP Park Manager's office at Geluphu, Bhutan © WWF-India

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RESUMEN

El tigre *Panthera tigris*, se utiliza como especie emblemática o sombrilla para la conservación de la fauna y las áreas silvestres en muchas partes de Asia. Utilizamos cámaras trampa accionadas a control remoto y un marco de captura y recaptura dentro del Parque Nacional Manas en India y el Parque Nacional Royal Manas en Bután para estimar la abundancia y densidad de los tigres en el Complejo de Conservación Transfronteriza de Manas (TMCC). Se utilizó un total de 102 pares de cámaras trampa en tres rangos para cubrir un área de más de 400 km². Capturamos 87 fotografías de 14 tigres individualmente identificados (ocho machos y seis hembras), durante el período del estudio que abarcó 5955 noches de cámaras trampa. La población estimada fue de 15 (\pm SE 2,64) individuos con un 95 por ciento de intervalo de confianza de 15 a 29. La estimación de la densidad de los tigres mediante la utilización de 1/2 MMDM (distancia media máxima recorrida) y empleando el MLSECR (método de máxima probabilidad de captura y recaptura basado en datos espacialmente explícitos) fue de 1,9 (\pm SE 0,36) y 0,75 (\pm SE 0,21) individuos/100 km², respectivamente. El TMCC es un paisaje de crucial importancia para el futuro de los tigres, y la gestión eficaz de la biodiversidad debe ir más allá de los límites de las áreas protegidas y a través de fronteras políticas.

RÉSUMÉ

Le tigre (*Panthera tigris*) est utilisé comme une espèce emblématique ou parapluie pour conserver la faune et les aires sauvages dans de nombreuses régions d'Asie. Au sein du Parc national de Manas, en Inde, et du Parc national Royal Manas, au Bhoutan, nous avons utilisé des caméras-pièges pouvant être déclenchées à distance et la méthode capture-recapture, afin d'estimer le nombre et la densité des tigres dans le Complexe transfrontalier de conservation de Manas. Au total, ce sont 120 caméras-pièges qui ont été utilisées dans trois domaines, permettant ainsi de couvrir une zone de plus de 400 km². Nous avons ainsi pu prendre 87 photos de 14 tigres identifiés individuellement (huit mâles et six femelles), au cours de la période d'étude nocturne des 5 955 caméras-pièges. La population estimée était de 15 (\pm Erreur-type 2,64) individus, avec une fourchette d'incertitude de 95 pour cent de 15 à 29. Les estimations relatives à la densité des tigres, en utilisant 1/2 MMDM et l'analyse MLSECR étaient de 1.9 (\pm Erreur-type 0,36) et 0.75 (\pm Erreur-type 0,21) individus/100 km², respectivement. Le Complexe transfrontalier de conservation de Manas est un paysage crucial pour l'avenir des tigres, et il est donc essentiel que la gestion de la diversité biologique s'étende au-delà des limites des aires protégées et des frontières politiques pour être véritablement efficace.



PLACEMAKING AND TRANSNATIONALISM: RECENT MIGRANTS AND A NATIONAL PARK IN SYDNEY, AUSTRALIA

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ABSTRACT

A study of the way Arab and Vietnamese migrants engage with a national park environment in south-west Sydney, Australia, has highlighted the agency of these people as they not merely adapt to that environment but actively make places for themselves in it. The concept of placemaking is useful particularly in showing that ‘place’ can be constructed out of social practice, emotion and affect, and does not have to entail physical impact on or alteration of the existing environment. Migrants bring with them into the park many of the perceptual habits, cultural ‘ways’, and expectations about nature that were formed in their homelands. Participants in the study also reported that certain elements of the park environment, including the river, strongly evoked and triggered memories of their homelands. They experienced being in two places at once. The concept of transnationalism allows us to understand how a national park environment can, for certain people, be situated in transnational more than national space. Transnational connectivity is helping to destabilise park boundaries much the way that, from another perspective, wildlife corridors and the theory and practice of connectivity conservation view them as ideally porous.

KEYWORDS: migrant populations, Arab, Vietnamese, Sydney, Australia, placemaking, national parks

INTRODUCTION

The idea that national park visitors commonly engage in ‘placemaking’ activity in national parks – activity whereby humans construct cultural habitats for themselves – may seem at odds with the idea of protected areas as refuges safeguarding non-human species from the relentlessness of human placemaking elsewhere in the landscape. Most conservationists would probably concede, though, that the national park idea itself represents a certain Western tradition of placemaking. Placemaking, as described below, is one of the most basic characteristics of human culture. In a recent study of the way Arab and Vietnamese migrants in Sydney engage with a national park in their neighbourhood the authors and their co-researchers found the placemaking concept useful in understanding how these people become familiar with and give value to the park landscape.

The city of Sydney in New South Wales (NSW), one of Australia’s six states, is unusual in having large areas of native bushland surviving in the very heart of the cityscape. These include the environment of the Georges River National Park¹, an area of bushland extending along both sides of a river approximately 20km

southwest of the central business district. Steep bush covered slopes run down to alluvial flats along the river, some of these flats having been extended by reclamation (infilling) of mangrove wetlands in the mid-twentieth century to form lawned picnic grounds. The picnic grounds were retained when the present national park was declared in 1992 in recognition of their importance to people in the neighbouring suburbs. At the top of the slopes the bushland extends for a short distance out into the flat surrounding country before it gives way quite abruptly to a suburban landscape of detached houses.

Pre-colonial Aboriginal occupation along the river has left traces in the form of rock paintings, shell middens and scatters of stone artefacts (Goodall & Cadzow, 2009). The British arrived in Sydney in 1788 and from the early nineteenth century the suburbs along the northern side of the Georges River (closest to the city centre) were being settled by successive waves of low-income Anglo-Celtic² working class families. From the 1930s, groups of these settler campaigned to have areas of bushland along the river reserved as parkland for the health and enjoyment of their families in a part of Sydney where parks were few and far between (Goodall & Cadzow, 2010). A community Trust managed this reserve until

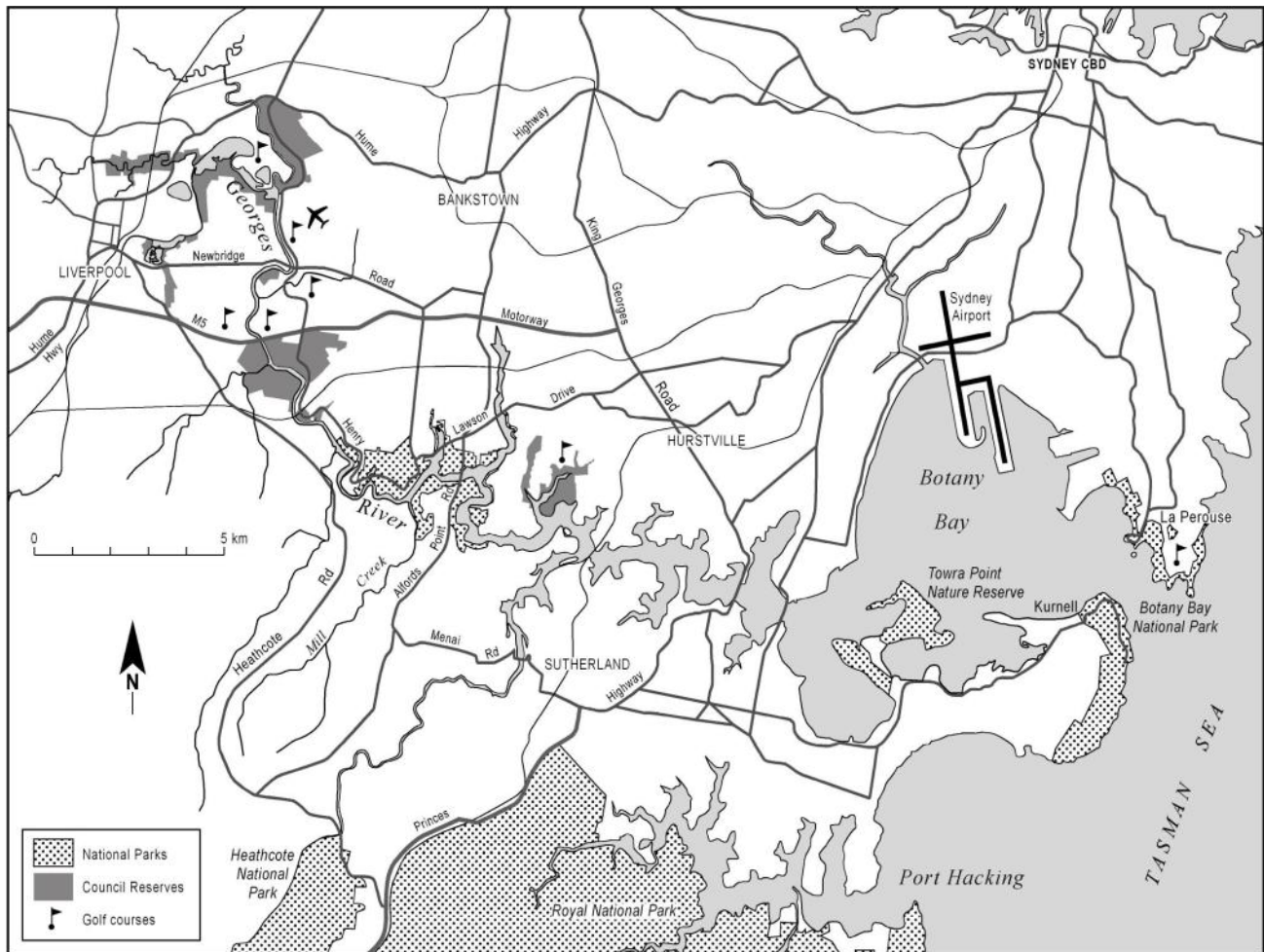


Figure 1: Map of Georges River National Park. Office of Environment and Heritage NSW

1992 when the government-managed Georges River National Park was declared. From the 1970s these suburbs received new waves of migrants, including refugees fleeing post-conflict Vietnam (Thomas, 1999) and Arabic-speakers fleeing civil war in Lebanon and violence elsewhere in the Middle East (Dunn, 2004). These people are sometimes referred to as 'recent migrants' to distinguish them from early waves of mostly Anglo-Celtic migrants.

In the present day, the south-western suburbs of Sydney have the highest concentration of recent migrants in a city of 4.4 million people of whom 40 per cent in 2011 were born overseas³. Of the 360,000 people living in the south-west Sydney census area in 2011, 51 per cent were born overseas and 79 per cent had at least one parent born overseas⁴. In the early 2000s the Office of Environment and Heritage NSW (OEH) began studying how recent migrants engage with national parks in the Sydney area (Thomas, 2001; Thomas, 2002). More recently, research by OEH and the University of Technology Sydney carried out by the present authors and their co-researchers⁵, looked in detail at the way

Arab and Vietnamese migrants living in the suburbs near the Georges River experience the national park there (Byrne et al., 2006; Goodall & Cadzow, 2009, 2010). The results of this latter study, from which the present article is largely drawn, are available in the open-access on-line publication, *Place-making in National Parks* (Byrne et al., 2013).

A PLACEMAKING PERSPECTIVE

Since the innovative work of Jane Jacobs (1961) and William H. Whyte (1980), urban planners, community groups, local governments, geographers and others have made an effort to promote understanding of the way the inhabitants of particular streets, neighbourhoods, villages and other localities have worked to make these spaces habitable by imprinting them with the patterns of their own local lives. Placemaking should not, though, be thought of simply as something humans *do to* the environment since it always entails response to the cues and possibilities of the environment. The process is dialectical. Historians, geographers and anthropologists have sought to better understand human placemaking (e.g., Feld & Basso, 1996; Ingold, 2000; Massey, 2005;

Stewart, 1996; Tilley, 1994). Place, or 'locality', is understood to be a social construct but, more pragmatically, it is understood to be an outcome and achievement of social 'work'. According to Arjun Appadurai (1996: 181), anthropologists working in many different parts of the world have noticed that people never take locality for granted; rather 'they seem to assume that locality is ephemeral unless hard and regular work is undertaken to produce and maintain its materiality'. This work may involve carrying out rituals and other cultural performances that gather people together at certain places, or it may consist of more mundane activities in which people, mostly unconsciously, become identified with localities via the action of memory, emotion, imagination and sociality. The work of making places out of spaces is now seen as a fundamental priority of human existence (Casey, 1993).

Placemaking has a special significance in the context of immigration. In leaving their homeland, emigrants are dis-placed in the sense of being temporarily without places of their own. Arriving in their destination country they cannot immediately adopt its existing place-scape as their own although over time this can and does occur. Local placemaking is a priority for recently arrived migrants because it gives them a spatial foothold from which they can go about the business of fitting in to the larger terrain of the new country and society. This, of course, is a simplification of a more complex process of adjustment: most recently arrived migrants, for instance, gravitate to residential enclaves already settled by friends, family, fellow-villagers and co-ethnics. They thus borrow places that have already been worked on to render them culturally felicitous, places that in some respects are hybrids of home and away.

Migrants are often buffered from the shock of displacement by socialising with people who are already familiar to them via kin ties or commonality of language and culture. This socialising often has a placemaking dimension. In the course of our interviews with Arab and Vietnamese recent migrants in south-west Sydney we found that the activity of picnicking in the national park enabled them to maintain and extend social ties and contacts at the same time as they acquainted themselves with the Australian natural environment. The picnics tended to be held at specific, chosen locations in the park and as these areas became more familiar they constituted a foothold for recent migrants in the park environment.

One element of the shock of displacement is the experience of finding oneself in a natural environment one neither understands nor possesses adaptive

strategies for. Depending on where they come from, migrants arriving in Australia experience subtle or dramatic differences in climate, seasonality, vegetation and fauna. Those arriving in Sydney from humid-tropical southern Vietnam in the 1970s and 80s often described their surprise and discomfort with what they perceived to be its dryness (Thomas, 2001). This resonates with research in the USA which found that many migrants arriving in Los Angeles from humid countries such as Vietnam perceive California's dry Mediterranean environment to be a 'wasteland' (Trzyna, 2007: 39).

PLACEMAKING AND PICNICS

In the case of both the Arab and Vietnamese migrant groups in our study, picnics in the park tended to involve groups larger than the nuclear family. For Arab-Australians interviewed, an average picnic would be attended by 10-50 people who were mostly members of an extended family: 'cousins and their cousins', as one young interviewee put it. Much larger picnics are also organised to mark special occasions, such as the birth of a child, or to bring large fraternities of people together. An example of the latter are the annual picnics held in the Georges River National Park by the families of emigrants from the village of Toula in northern Lebanon. Most picnics are held on weekends and public holidays and many people attend one almost every week of the year. While our interviewees described the picnics primarily as social events, it became clear that for most of them the picnics represented the primary vector that brought them into the national park and into contact with Australia's natural environment.

Large group picnics have been a feature of migrant existence in a number of countries. The British Italian community, for example, has held picnics at Shenley near London (Fortier, 2000: 108). In Los Angeles, large annual picnics were held by those who had migrated from other states, particularly during the Depression years of the 1930s. These 'state picnics' included the famous Iowa Picnic at Bixby Park, Long Beach, which in 1940 attracted 100,000 people. These picnics were not about ethnicity, they were about homesickness, shared identity and a shared experience of being outsiders in a new city.

At the picnics staged by recent migrants in the Georges River National Park we observed that a sensory environment (sensorium) was created that enveloped the participants. Its elements included the smell and taste of food from 'home', the sound of music from 'home', the sounds of familiar language, and the sight of people of familiar facial features. At picnics by Arab-Australians it



Lebanese-Australians picnicking in Georges River National Park © Denis Byrne

included the aroma of the hookah (*sisha* in Arabic). The picnickers might seem to have created a microenvironment for themselves that rather than linking them to the environment of the park insulates them from it. The sensorium described above should not, however, be thought of as insulating picnickers from nature's sensorium: the scent given off by native vegetation baking in the sun, the sound of bird calls, the vision of the cloud patterns over the river and the bushland beyond. Rather, the two sensoria infiltrate each other and out of this intermingling a new place is made.

In the course of the picnics, associations are created between a locale and the social experiences people have there. Eisenhauer et al. (2000) have documented this in a well-known study of recreational use of public lands in Utah. Drawing on the work of earlier researchers they stress that 'activity at a locale is necessary for a space to be regarded as a place' (Eisenhauer et al., 2000: 423). Most park managers presumably would similarly recognise that the activities engaged in by park visitors are constitutive of the bonds they form with a park environment. Since the natural environment of a park is alive, active and 'vibrant' (Bennett 2010), the 'activity at a

locale' referred to by Eisenhauer et al. always has the aspect of a culture-nature *interactivity* – in other words, it is an amalgam of human and non-human agency.

Our interviewees spoke with great affection of places in the park where they had picnicked habitually. One of the authors (Denis Byrne) accompanied a group of young second generation Arab-Australians on a visit to a location they had often been brought to for picnics when they were small children, and then later came to by themselves when they acquired their first bikes. 'We grew up here', one of them said of the place. It was part of the familiar landscape of their growing up, at once unremarkable to them but also intimately known and fondly remembered (Byrne et al., 2012: 13). This was a close-knit group of young people, a number of whom were now at university, whose social cohesion had partly been formed during those long-ago afternoons down by the river. They had this place in common. On the occasion of our visit they pointed out to each other how much certain trees had grown since the days when they were children, implicitly if not consciously registering the fact that they and the place had grown up together.

Unlike some of the ‘wilderness’ parks in New South Wales, the Georges River National Park is a mosaic of bushland, lawns, car parks and river. One can spend a great deal of time in the park without ever being *in* the bush. ‘The bush’, in Australian popular parlance, can refer to any rural landscape, including agricultural areas, but most of our interviewees understood the term to refer to the forested country found in the large national parks to the north, south and west of Sydney’s urban expanse. Second and third generation migrants participating in our study who had gone to school in Sydney were generally relaxed about ‘the bush’ although for the most part they did not spend much time in it. They had little or no interest in ‘bush walking’ (a term which is Australia generally refers to long-distance walks in the forested environments, often involving overnight camping). They identified bush walking as something only Anglo-Australians did.

Speaking with first generation migrants, most of whom were middle-aged or older, the authors found them similarly disinterested in bush walking. In addition, many of them had quite negative views of the bush, often regarding it as dangerous, mostly due to the presence of venomous snakes and the possibility of wildfires (Byrne et al., 2012: 103). They enjoyed seeing the bush from a distance but had little desire to enter it. Some said they enjoyed short walks in the bush provided there were clearly marked tracks or, preferably, constructed ‘pathways’. Many spoke of enjoying having the bush as a backdrop to picnics taking place on the wide lawns of the national park. They preferred to observe the bush from a distance. A number of them mentioned enjoying a riverside boardwalk which crosses a particular area of mangroves because it allowed them to ‘be in’ nature, while still being somewhat removed from it.

EMIPHERALITY AND LOOSENESS

This disinclination of people to engage directly with the bush lends a particular significance to the picnics. They provide for people what is perhaps their ‘closest’ experience of the natural environment. It also lends significance to the spaces in the national park where the picnics are held: a band of flat, lawn-covered land situated along a three kilometre length of the north side of the winding river and extending in from the river bank from about 30 to 200 metres. This space can be considered liminal in that it lies in between the river and the bush-covered slopes but also in that it is conceptually transitional between the suburban streetscape and the natural environment.

A particular aspect of the places ‘made’ by the activity of picnicking is that the making results in few if any physical alternations to the landscape. The picnic infrastructure of portable barbecues, folding chairs, blankets and straw mats, sun umbrellas, CD and MP3 music players, is packed up and taken home. The picnic leaves a footprint only in the form of flattened grass or scraps of food quickly removed by insects, birds and other animals. In its physical aspect, the picnic is ephemeral. The ‘place’ in one sense dissolves after each picnic only to reform again at the next staging. These places do however have a continuous existence in the minds of ‘repeat-picnickers’ who come to think of them as *their* places. This is a non-exclusive claim, one that recognises that other people use the same space at other times. There is competition for these spaces, though, and on summer weekends an advance party of the picnic fraternity may go to the park early in the morning to stake their claim to the familiar spot. While, as mentioned earlier, Appadurai (1996: 181) has stressed the need to maintain the materiality of locality, locality (or placeness) can often be sustained even where materiality is ephemeral.

Anthropologist Setha Low and her co-workers (Low et al., 2005) have studied the way Latino and other migrant groups became a presence in parks in New York. In their research at Jacob Riis Park, New York, for the US National Park Service, they observed that Latino groups picnicked in the ‘back beach’ area of the park where they ‘enjoy music and dancing – especially Latino rhythms and salsa – and would enjoy summer afternoon concerts that remind them of home (and bring a bit of home to their new beach)’ (Low et al., 2005: 125). Low and her colleagues make the point that, for all their ephemerality, these places are of key importance to migrant groups at a time when they are tentatively establishing a presence in national parks. Low et al. maintain that park staff should not merely welcome people of all ethnicities but be sensitive to the kind of placemaking behaviour their research documented. While robust in some ways, there is nevertheless a particular fragility about places that come into being in this way. Their invisibility (to outsiders) means they are unlikely to appear on management plan maps and thus may be vulnerable to revegetation or park development works.

If picnic sites have this aspect of ephemerality, it may also be said that national parks are attractive to recent migrants partly because they constitute what Catharine Ward Thompson (2002: 69) calls ‘loose space’ – space that is not ‘fixed’ or ‘constrained’ in the way that built

urban space is. National parks are relatively unstructured and unsupervised spaces that are far more open and unconstrained than most of the built public spaces of cities. From the point of view of the migrant park visitor, the river and the native bushland (and its associated biodiversity) are also 'loose' in that they are culture-neutral. They can be encompassed by private or state property rights but their life essence is non-proprietary: it cannot be owned by any one culture group.

SPIRITUALITY AND PARK SPACE

Vietnamese Buddhists are known to go to national parks in the Sydney area to meditate (Thomas 2002: 102) and Thai Buddhist 'forest monasteries' have been established in bushland on the outskirts of the city (Byrne et al., 2006). The association of forests with meditation is deeply established within the Buddhist Theravada tradition as it exists in Sri Lanka, Burma, Thailand, Cambodia and Laos. It appears now to have been extended to embrace the Australian bush.

In the Georges River National Park it is common to see Muslim Arab migrants standing or kneeling to pray at the times designated by their religion. One of our Muslim interviewees remarked that since all of nature is God's creation, to be standing or kneeling on the ground in the park is about as close to God as one could be. Islam maintains there is no such thing as a profane world: in the words of the Prophet, 'the whole of this earth is a mosque' (Wersal, 1995: 545). Muslims praying in the Georges River National Park face towards the *Kaaba* in Mecca. The invisible line orienting and connecting them to Mecca, as well as the act of praying itself, might be thought of as bringing Islam into the park or as placing the park within the cosmography of Islam. Meditating or praying are not, however, acts which colonise park space for particular religions, rather these acts occur partly because individual actors experience the park environment as conducive to spiritual experience (Byrne et al., 2006). Or, in the case of Muslims, it may simply be that they happen to be in the park at prayer time and the 'looseness' of park space allows them to pray there whereas in another public space, such as a shopping mall, football stadium, or public library, it would not.

There seems no question that religious ritual and spiritual experience can play a role in placemaking but, as in the case of picnicking, the places it helps make in national parks are ephemeral and non-proprietary. In this regard they are suited to the ideal of national parks as culturally open spaces.

NATIONAL PARKS AS TRANSNATIONAL SPACE

In Australia and perhaps other countries with a high and culturally diverse migrant intake, immigration is widely perceived as a one-way movement of people that entails a process of adaptation to the host country. This is reflected in the way 'migrant heritage' is framed by heritage institutions and practitioners under the themes of settlement and adaptation, a framing that 'contains' the migrant story within Australia's borders. Multicultural policy in Australia is designed to enable the continuance of distinctive migrant cultures within the broader social fabric of the host country and contained by its borders. What this view fails to notice is that each migrant group is also likely to see itself as belonging to a diasporic ethnic community, a 'belonging' experienced by some migrants as intense and pervasive and by others as situational and less intense.

In Australia, as in Canada, the USA and other settler colonies, everyone who is not indigenous is a migrant and most migrants belong to diasporic communities. This of course includes Australia's Anglo-Celtic majority as well as its Chinese, Greek, Lebanese, Vietnamese and other minorities. Looked at in this way, Australia sits within the overlapping fields of numerous diaspora. Since the 1990s there has been a burgeoning interest in the humanities and social sciences in the concept of transnationalism. The term is generally used to refer to a kind of cross-border social connectivity that, while it has long characterised migration and sojourning (for example, that of the Chinese on the nineteenth century goldfields of California and Australia) has from the late twentieth century been amplified by relatively cheap air travel and advances in electronic media (Appadurai, 1996; Ong, 1999). In this aspect of globalisation, certain villages in countries like Lebanon and China are now more intimately connected to suburbs in Sydney than they are to other population centres in Lebanon and China. Transnationalism is a concept with significant implications for the way national parks are socially constituted in Australia: the parks draw migrants to them but park space is also drawn into transnational space.

The dynamics of transnationalism are perhaps most easily seen in the setting of urban migrant enclaves. When, for example, a group of Lebanese men gather in south-west Sydney to listen to the news from Lebanon on the radio they are situated in a Lebanese diasporic 'ethnoscape' (Appadurai, 1996). They can see Beirut quite clearly in their minds, which is to say they can spatialize what they are listening to, often in great detail. But this is also an embodied experience: the way they sit



Arab-Australian children enjoying Georges River National Park © Denis Byrne

around the table, the way they sip their tea, the gestures of their hands in response to what they are hearing, all signal that their bodies and minds are in a space that is neither Beirut nor Sydney but, rather, a Beirut-Sydney continuum. This is the 'diasporic state of mind' that Ien Ang (2011, 86) writes of.

Moving to the situation of national parks, Vietnamese migrant interviewees in our study spoke of how the Georges River would often evoke for them the rivers of Vietnam on which or near which many of them had grown up. More than just a remembering of the homeland, this evocation took the form of an embodied experience: they felt like they were *in* their homeland or, in our terms, in a transnational space that transcended the borders of Vietnam and Australia. For some people, the simple act of holding a fishing rod triggered 'embodied memories' (Connerton, 1989) that took them back to those times they had stood beside a river with a rod in the old country (Goodall et al., 2009). As researchers, we began to appreciate that when we saw a Vietnamese person walking beside the Georges River, while they were ostensibly wholly within the bounds of the national park they were nevertheless situated in a transnational space (see also Low et al., 2005: 33). We could not accurately describe what the national park meant to these visitors without also describing what Vietnam meant to them. The presence of Vietnamese-Australians in the park implied that Vietnam, in transnational form, was also present there.

TRANSNATIONALISM AND CONNECTIVITY CONSERVATION

Transnationalism unsettles the idea of the nation as a spatially bounded entity. It might also be said to challenge the conventional way of thinking of national parks as firmly bounded and stable units of space. The national park concept had its origins partly in Western romantic conceptions of 'wilderness' (Schama, 1995) but was also very much bound up with the emergence of the national state. National parks helped provide the 'imagined community' (Anderson, 2006) of the nation with a tangible, iconic topography (Thomas, 2001: 23-25; Crusin, 2004: 22-29). They helped the nation's citizenry to grasp the physical-geographic totality of the nation, described by Thongchai (1994) as the national 'geobody', and to develop a sense of belonging to it. IUCN and other international conservation bodies have given the national park concept an aspect of internationalism but this has not diminished the close engagement of the concept in national identity formation.

We have found it productive to think about transnationalism in relation to the concept of connectivity as it pertains in the fields of nature conservation and protected area management. The concept of wildlife corridors and the broader theory and practice of connectivity conservation (Bennett, 2003; Sandwith & Lockwood, 2006) appear to have originated in an appreciation that the boundaries of protected areas are more likely to have been drawn in relation to the geometrics of a cadastral grid and to political considerations than to the spatiality of species distribution and mobility. This view and the management approaches flowing from it reconfigure national park boundaries as permeable and conditional rather than solid and fixed.

In a parallel development, the field of nature conservation has acquired a new consciousness of indigenous and local people's dependency on the resources of protected areas and of their cultural connectivity to landscapes, both of which are frequently cut across by protected area boundaries (Peluso, 1995; Zerner, 2003). 'Counter-mapping' approaches have been devised to assist indigenous and local people to contest the kind of state boundary-marking that has often seen protected areas created without local informed consent (Byrne, 2008; Harwell, 2011; Peluso, 1995; Ross et al., 2010) and, in Australia, Indigenous Protected Areas have been created and joint-management agreements over national parks negotiated. There is also a growing appreciation of the social and emotional connectivity that

exists in places like Australia between national park landscapes and those non-indigenous people who formerly owned and farmed that terrain (Brown, 2012).

While there continues to be an appreciation that what protected areas are protected *from* are human processes inimical to the wellbeing of humans and other species, there is an increasing awareness that human social connectivity with, and valuation of, these spaces is critical to their existence and functioning. The concept of transnationality provides a perspective in which social connectivity can be considered in the wider, cross-border frame that modern-era migration and sojourning has given rise to.

CONCLUSIONS

In the context of protected area management, placemaking theory offers a useful way of viewing visitor behaviour and values. In the case of national parks, it is conducive to a management approach that acknowledges the agency of visitors as they socially reconfigure park space. Rather than simply passively enjoying or actively learning from a park environment whose meaning is stable and fixed, they make their own places in it and out of it. It is proposed that for recent-migrant visitors tentatively establishing a presence in parks, placemaking takes on a particular significance. Their development of a sense of ownership of park space, via placemaking, is fundamental to the development of a sense of responsibility for that space. The interest park managers have in respecting and even facilitating migrant placemaking lies to a great extent in the fact that these visitors represent a growing proportion of the constituency national parks rely on for support.

Transnationalism theory offers its own attractions for park management. Ideas about national parks now readily flow backwards and forwards between Australia and Vietnam along diasporic lines. The Georges River National Park, for instance, is now 'known' in southern Vietnam courtesy of photographs and phone videos, increasingly frequent homeland visitation and other vectors. At a broader level, ideas about nature conservation also flow from Australia to places like Vietnam and Lebanon via diasporic networks. Moving in the other direction, traditions and contemporary practices of nature appreciation and nature visitation in Asia and the Middle East now inform patterns of park visitation by many thousands of migrants in Australia.

For park management, multiculturalism and transnationalism are not so much challenges as assets – assets that we are still learning to capitalise on. As hyper-

development in Asia degrades that region's environment (e.g., Wen and Li, 2007), Australia has come to be valued by many in Asia as a tourism and migration destination on account of its 'environmental assets'. There is a transnational sense here in which Australia is becoming one of Asia's protected areas, or a protected area of an Asia-Pacific transnational field. Whatever qualms some Australians might have at this prospect, it carries the implication of a vastly expanded potential support base for the county's protected areas.

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NOTES

¹ For more information see the park homepage: <http://www.environment.nsw.gov.au/nationalparks/parkHome.aspx?id=N0080>

² 'Anglo-Celtic' refers to Australian settlers from Britain and Ireland

³ Australian Bureau of Statistics (ABS), Greater Sydney Statistical Division, 2011 census. http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/1GSYD (Consulted Feb 2013)

⁴ ABS Sydney South West Statistical Division, 2011 census. http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/127 (Consulted Feb 2013)

⁵ The authors' co-researchers on this project were Dr Allison Cadzow of the Australian National University and Dr Stephen Wearing of the University of Technology, Sydney

REFERENCES

- Anderson, B. (2006). *Imagined Communities*, revised edition. London: Verso.
- Ang, I. (2011). 'Unsettling the national: heritage and Diaspora'. In: H. Anheier and Y. R. Isar (eds.) *Heritage, Memory and Identity*, pp.82-94. London: Sage.
- Appadurai, A. (1996). *Modernity at Large: Cultural Dimensions of Globalisation*. Minneapolis, MN, USA: University of Minnesota Press.
- Bennett, A. F. (2003). *Linkages in the Landscape: the Role of Corridors and Connectivity in Wildlife Conservation*, 2nd edition. Gland, Switzerland and Cambridge, UK: IUCN.
- Bennett, J. (2010). *Vibrant Matter: A Political Ecology of Things*. Durham NC, USA: Duke University Press.
- Brown, S. (2012). 'Applying a cultural landscape approach in park management: an Australian scheme'. *PARKS* 18, p 101-110.
- Byrne, D. (2008). 'Counter-mapping in the archaeological landscape'. In B. David and J. Thomas (eds.) *Handbook of*

- Landscape Archaeology*, Walnut Creek, CAL, USA Left Coast Press. p 609-616.
- Byrne, D., Goodall, H, Wearing, S. and Cadzow, S. (2006). 'Enchanted parklands'. *Australian Geographer* 37(1):103-115.
- Byrne, D., Goodall, H and Cadzow, A. (2013). *Place-making in National Parks*. Sydney, Australia: Office of Environment and Heritage NSW and University of Technology Sydney. <http://www.environment.nsw.gov.au/nswcultureheritage/PlaceMakingGeorgesRiver.htm>
- Casey, E. S. (1993). *Getting Back into Place: Toward a Renewed Understanding of the Place-World*. Bloomington IN, USA: Indiana University Press.
- Connerton, P. (1989). *How Societies Remember*. Cambridge, UK: Cambridge University Press.
- Crusin, R. (2004). *Culture, Technology, and the Creation of America's National Parks*. Cambridge, UK: Cambridge University Press.
- Dunn, K. (2004). 'Islam in Sydney: contesting the discourse of absence'. *Australian Geographer* 35:3 p 333-353.
- Eisenhauer, B. W., Krannich, R. S. and Blahna, D.J. (2000). 'Attachments to special places on public lands: an analysis of activities, reason for attachments, and community connections'. *Society and Natural Resources* 13: p 421-441.
- Feld, S. and K. H. Basso (eds.). (1996). *Senses of Place*. Santa Fe: School of American Research.
- Fortier, A-M. (2000). *Migrant Belongings: Memory, Space, Identity*. Oxford: Berg.
- Goodall, H., Cadzow, A., Byrne, D. and Wearing, S. (2009). 'Fishing the Georges River: cultural diversity and urban environments'. In A. Wise and S. Velayutham (eds.) *Everyday Multiculturalism*, Houndsmills, UK: Pelgrave. p 177-196.
- Goodall, H. and Cadzow, A. (2009). *Rivers and Resilience: Aboriginal people on Sydney's Georges River*. Sydney, Australia: University of New South Wales Press.
- Goodall, H. and Cadzow, A. (2010). 'The People's National Park: working class environmental campaigns on Sydney's urban, industrial Georges River, 1950 to 1967'. *Labour History* 99 p 17-35.
- Harwell, E. (2011). *Forests in Fragile and Conflict-Affected States*. Washington, DC: World Bank.
- Ingold, T. (2000). *The Perception of the Environment*. London: Routledge.
- Jacobs, J. (1961). *The Death and Life of Great American Cities*. Harmondsworth, UK: Penguin.
- Low, S. M., Taplin, D. and Scheld, S. (2005). *Rethinking Urban Parks*. Austin, TX, USA: University of Texas Press.
- Ong, A. (1999). *Flexible Citizenship: The Cultural Logic of Transnationalism*. Durham, NC, USA: Duke University Press.
- Peluso, N.L. (1995). Whose woods are these? Counter-mapping forest territories in Kalimantan, Indonesia. *Antipode* 27(4):383-406.
- Massey, D. (2005). *For Space*. London: Sage.
- Ross, A., Sherman, K.P., Snodgrass, J.G., Delcore H.D. and Sherman, R. (eds.). (2010). *Indigenous Peoples and the Collaborative Stewardship of Nature*. Walnut Creek, CAL, USA: Left Coast Press.
- Sandwith, T. and Lockwood, M. (2006). Linking the landscape. In M. Lockwood, G. L. Warboys and A. Kothari (eds.), *Managing Protected Areas*, London, UK: Earthscan p 574-602.
- Schama, S. (1995). *Landscape and Memory*. London, UK: Fontana.
- Stewart, K. (1996). *A Pace on the Side of the Road*. Princeton, USA: Princeton University Press.
- Thomas, M. (1999). *Dreams in the Shadows: Vietnamese-Australian Lives in Transition*. Sydney: Allen and Unwin.
- Thomas, M. (2001). *A Multicultural Landscape: National Parks & the Macedonian Experience*. Sydney, Australia: NSW National Parks and Wildlife Service and Pluto Press. <http://www.environment.nsw.gov.au/nswcultureheritage/MacedonianExperience.htm>
- Thomas, M. (2002). *Moving Landscapes: National Parks & the Vietnamese Experience*. Sydney, Australia: NSW National Parks and Wildlife Service. <http://www.environment.nsw.gov.au/nswcultureheritage/MovingLandscape.htm>
- Thongchai, W. (1994). *Siam Mapped: A History of the Geobody of Siam*. Honolulu, USA: University of Hawai'i Press.
- Trzyna, Ted. (2007). *Global Urbanization and Protected Areas*. Sacramento, USA: California Institute for Public Affairs. <http://www.InterEnvironment.org/cipa/urbanization.htm>
- Ward Thompson, C. (2002). 'Urban open space in the 21st century'. *Landscape and Urban Planning* 60:59-72.
- Tilley, C. (1994). *A Phenomenology of Landscape*. Oxford, UK: Berg.
- Wen, D. and M. Li (2007). China: hyper-development and environmental crisis. *Socialist Register* 130-146.
- Wersal, L. (1995). Islam and environmental ethics: tradition responds to contemporary challenges. *Zygon* 30(3):451-459.
- Whyte, W. H. (1980). *The Social Life of Small Urban Spaces*. Washington, DC: Conservation Foundation.
- Zerner, C. (ed.). 2003. *Culture and the Question of Rights*. Durham, NC, USA: Duke University Press

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RESUMEN

Un estudio sobre la interacción de los migrantes árabes y vietnamitas con relación a un parque nacional en el suroeste de Sydney, Australia, ha puesto de manifiesto que estas personas no sólo se adaptan al entorno, sino que se hacen lugar en dicho entorno. El concepto de hacer lugar es útil sobre todo para demostrar que el 'lugar' puede construirse a partir de la práctica social, la emoción y el afecto, y no tiene por qué implicar repercusión física en o alteración del entorno existente. Los migrantes traen consigo al parque muchos de sus hábitos perceptivos, estilos culturales y expectativas sobre la naturaleza que fueron formados en su país de origen. Los participantes en el estudio también informaron de que algunos elementos del entorno del parque, incluyendo el río, evocaban y activaban los recuerdos de su tierra natal. Experimentaron la sensación de estar en dos lugares al mismo tiempo. El concepto de transnacionalismo nos permite comprender cómo –para algunas personas– el entorno de un parque nacional puede situarse en un espacio más transnacional que nacional. La conectividad transnacional está ayudando a desestabilizar los límites del parque de manera muy parecida a como, desde otra perspectiva, los corredores de vida silvestre y la teoría y la práctica de la conservación de la conectividad los ven como idealmente porosos.

RÉSUMÉ

Une étude portant sur le comportement des migrants arabes et vietnamiens dans un parc national situé dans la région sud-ouest de Sydney, en Australie, a mis en avant un phénomène intéressant. En effet, il est apparu que ces populations font plus que s'adapter à cet environnement : elles y trouvent activement leur place. Le concept de création d'espaces est donc utile, notamment pour montrer que l'espace peut être construit à partir de pratiques sociales, d'émotions et d'affect et qu'il n'implique pas nécessairement d'impact physique ou d'altération de l'environnement existant. Lorsqu'ils sont dans le parc, les migrants apportent avec eux leurs habitudes perceptuelles et culturelles et leurs attentes sur la nature, qui puisent leurs origines dans leurs pays nats. Les participants à l'étude ont également rapporté que certains éléments du parc, notamment la rivière, leur faisaient fortement penser à leurs terres natales. Ils avaient ainsi le sentiment d'être à deux endroits en même temps. Le concept de transnationalisme permet de comprendre comment un parc national peut, chez certaines personnes, être transnational – et donc dépasser le simple espace national. Ainsi, la connectivité transnationale nous aide à dépasser les frontières du parc tout comme, considérés sous un autre angle, les couloirs de la vie sauvage et la théorie et la pratique de la conservation de la connectivité qui considèrent, dans l'idéal, les frontières comme poreuses.



CAN THE IUCN 2008 PROTECTED AREAS MANAGEMENT CATEGORIES SUPPORT PACIFIC ISLAND APPROACHES TO CONSERVATION?

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ABSTRACT

Many Pacific island nations lag behind more developed countries with respect to achieving Convention on Biological Diversity (CBD) targets for protected area coverage. The modified definition of protected areas under the IUCN's 2008 *Guidelines for Applying Protected Area Management Categories* offers opportunities for Pacific islands nations to formally recognize indigenous community conserved and locally managed areas under a range of management styles. However, there are elements to the new definition and principles that are unlikely to be compatible in the context of customary tenure prevailing in the Pacific. The first principle requiring nature conservation to be the primary objective of protected areas runs counter to the majority of functioning Pacific island protected areas that have been established with sustainable livelihoods as the major driver. Furthermore, the definition of conservation as perceived by most Pacific island cultures is inextricably linked with 'sustainable use'. In this context, we offer suggestions for moving forward, including raising awareness of these issues, consulting on the appropriate definitions of protected areas that fit the legal and cultural context of each country, and avoiding incorporating the language of the 2008 Guidelines into definitions or wording for national policy and legislation until broad consensus and understanding is reached.

KEYWORDS: Pacific, IUCN management categories, Locally Managed Marine Area, customary tenure

INTRODUCTION

In decision VII/30 of the Convention on Biological Diversity (CBD), the Conference of Parties (COP) established a target to effectively conserve at least 10 per cent of each of the world's ecological regions by 2010 (UNEP/CBD, 2004). Although global coverage of terrestrial protected areas reached more than 12 per cent in the 2000s, coverage of ecoregions has been uneven and geographically biased to Europe, North Eurasia and North America (Chape et al., 2005; Jenkins & Joppa, 2009).

The global push to increase the coverage of protected areas met with little success in most Pacific island countries until the late 1990s, when appropriate management approaches for the Pacific were developed that recognized the value of customary institutions in decision-making for resource management (Cinner & Aswani, 2007; Govan et al., 2009a). For example, the Locally Managed Marine Area (LMMA) network grew from the principle that local people can be more effective than central governments at implementing management

because of strong ties to the environment through customary tenure and cultural practice (Ruddle et al., 1992; Veitayaki et al., 2003). Due to the strength of participatory planning processes to express community aspirations and foster community implementation, progress in Fiji, Samoa and Solomon Islands has resulted in over 400 locally managed areas documented in these countries alone, with considerably more throughout the region (Figure 1). It has become clear that lasting success of these initiatives relies on development and achievement of local objectives, which largely focus on improved natural resource availability yet still provide tangible benefits to biodiversity (Govan et al., 2009a).

In Pacific island countries with scarce government resources and a majority of land and inshore marine areas under customary tenure, these community-based approaches offer countries the most cost effective and practicable way of achieving most of their international obligations to protected area coverage under the CBD (Govan et al., 2009a; Govan et al., 2009c). Without relying substantially on local management, Pacific countries will not achieve targets from the CBD's new

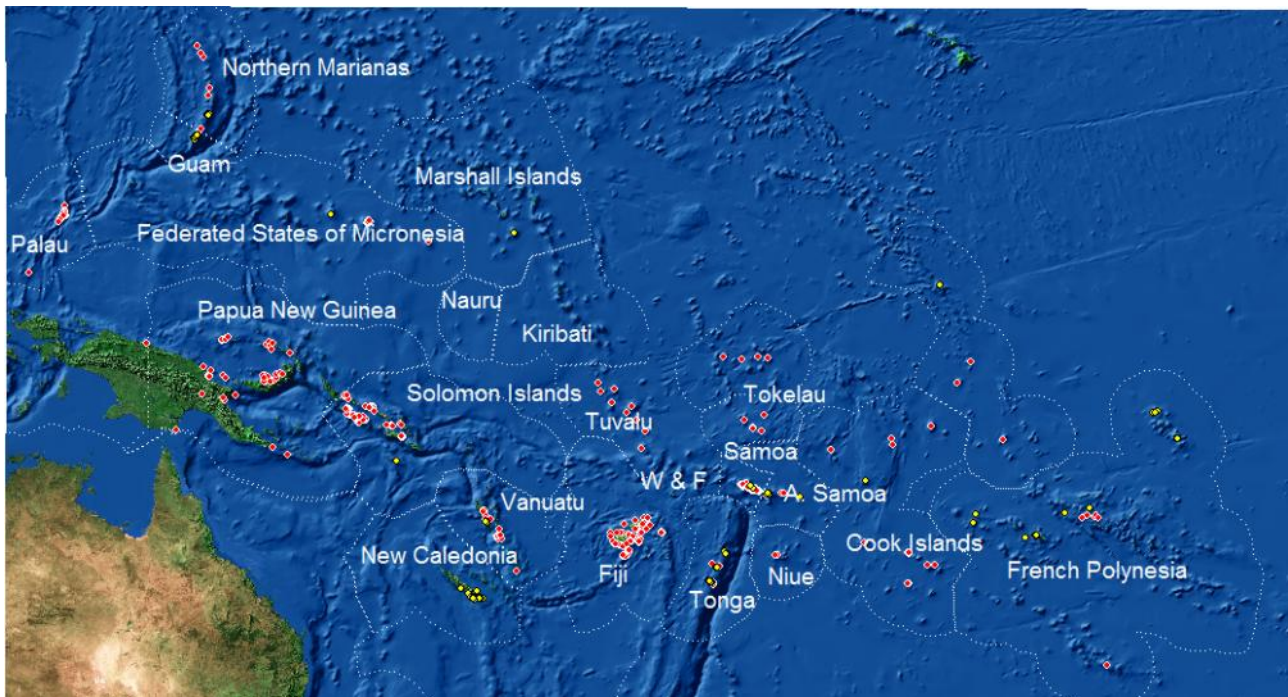


Figure 1: Map showing 743 Pacific Island MMAs recorded as of 2009. The 565 classified as locally managed marine areas (LMMAs) are shown in red. Source: Govan et al., 2009a and <http://pacificgis.reefbase.org>

Strategic Plan under Decision X/2 (the Aichi Targets) to effectively conserve 17 per cent of terrestrial/inland water areas and 10 per cent of coastal/marine areas by 2020 (UNEP/CBD, 2010).

Some national governments such as Samoa, Vanuatu and Tonga have already incorporated community-based approaches into policy and legislation. Others, such as Fiji, Solomon Islands and Papua New Guinea, are in the process of updating the conservation and resource management policy and legislation in the light of more than a decade of experience in community-based management. Developing such legislation represents a considerable challenge given current limits on the extent to which indigenous communities can regulate activities that impact species and habitats and resourcing required to embed institutional support for indigenous community conserved areas (ICCAs) within government agencies (Clarke & Gillespie, 2008; Vukikomoala et al., 2012).

In response to worldwide concerns on the impact of protected areas on indigenous and local people, as well as conflicts with extractive industries such as mining, the IUCN developed and modified guidance on the definition of protected areas and management categories in 2008 (Dudley, 2008; Dudley et al., 2010). These *Guidelines for Applying Protected Area Management Categories* (hereafter 2008 Guidelines) made slight changes to the definition of a protected area that gives extra weight to long-term and effective management.

OPPORTUNITIES UNDER THE IUCN PROTECTED AREA GUIDELINES

The IUCN's 2008 Guidelines seem to offer useful guidance in the development of appropriate legislation in the Pacific islands, but also raise a number of issues with potentially serious consequences. In terms of advantages, the 2008 Guidelines provide opportunities for Pacific island resource managers to clarify the status of their protected areas. For instance, Dudley (2008) discusses how the new definition can provide recognition of ICCAs and South Pacific community managed areas, such as Samoan community fishing reserves, as long as they meet the protected area definition and its associated principles.

The 2008 Guidelines provide a new definition of protected area to be "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". The definition is applied in the context of eleven principles, the first of which reads: "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".

Further, the 2008 Guidelines outline and clarify six categories of protected area management with a wide



Community member from Totoya Island, Fiji, places a cibicibi tree into the reef to mark the location of a sacred, no-take protected area © Keith A. Ellenbogen

spectrum of potential management objectives. The most applicable in the Pacific context may be category V, that can include ‘the preservation of long-term and sustainable local fishing practices or sustainable coral reef harvesting...’, and category VI, that may be ‘predominantly natural habitats but allow the sustainable collection of particular elements, such as particular food species or small amounts of coral or shells’ (Figure 2). The 2008 Guidelines also open the door to different zones within a protected area being placed under different categories, such as the zones within the Great Barrier Reef World Heritage Area (Day, 2002), and thus some current closed areas could conceivably be assigned to the most restrictive IUCN categories. For marine protected areas (MPAs), the guidelines were further refined by Day et al. (2012) such that ‘the appropriate IUCN category is

assigned based on the primary stated management objective of the MPA (which must apply to at least 75 per cent of the MPA), or a zone within an MPA.’ Cases where ‘seasonal, temporary or permanent controls are placed on fishing methods and/or access’ could also qualify as MPAs if they meet the protected area definition and have a primary aim to deliver nature conservation.

POTENTIAL THREATS OF THE IUCN 2008 GUIDELINES TO PACIFIC ISLAND PROTECTED AREAS

In the above respects, the 2008 Guidelines appear to be an opportunity for Pacific islands to ensure that their efforts towards sustainable marine resource management are more widely recognized as protected areas and,

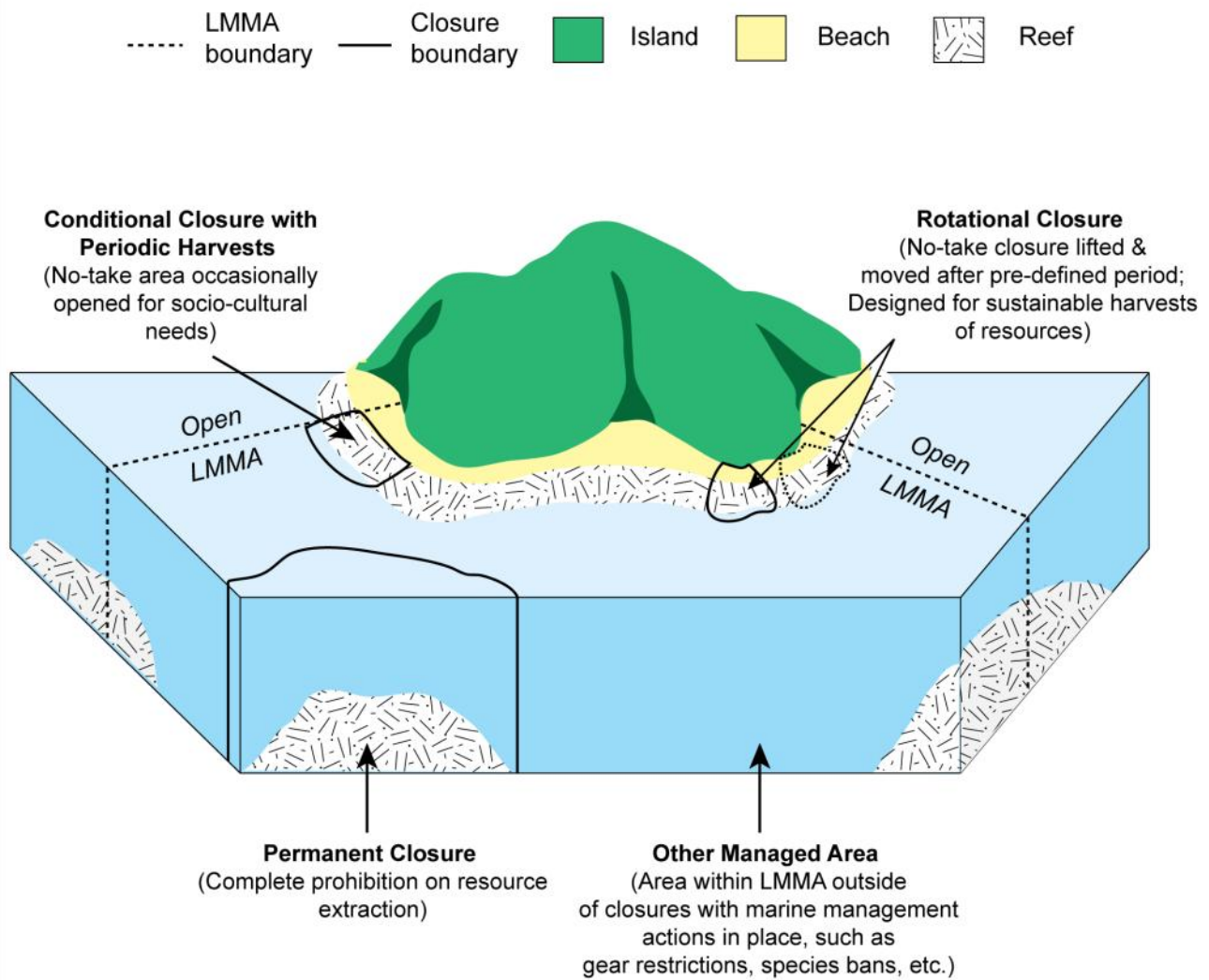


Figure 2: Schematic of a suite of management actions that may be employed within a Pacific Locally Managed Marine Area

therefore, count towards their international commitments and obligations. However, there are two elements to the new protected area definition and principles that are unlikely to be compatible in the Pacific context: (1) the primacy of the nature conservation objective; and (2) the definition of conservation (PIRT, 2008). Further, there may be constraints to providing a basis for legal recognition of locally managed areas if it removes the authority of community decision-makers to flexibly adapt their management rules and objectives in response to environmental or social change (Clarke & Jupiter, 2010).

OBJECTIVES OF PACIFIC PROTECTED AREAS

The first principle to which protected areas must adhere under the IUCN definition states ‘only those areas where the main objective is conserving nature can be

considered protected areas’ sits ill with the bulk of functioning Pacific island protected areas that are driven by local aspirations to achieve sustainable livelihoods based on healthy resources (Govan et al., 2009c). Specifically, the new MPA Guidelines assert that ‘community areas managed primarily for sustainable extraction of marine products’ should not be automatically classified as MPAs if they do not have nature conservation as the primary objective (Day et al., 2012). The question of how to honestly determine the ‘primary’ objective of a Pacific island locally managed area remains a challenge, let alone expressing this in terms that are compatible with the jargon of western conservation. The principle and definition also seem to limit the opportunities for strategies based on sustainable use, even if these are more likely to accrue precisely the long-term conservation benefits intended under the new IUCN definition and guidelines.



Sign denoting community conservation area in Sisili Village, Solomon Islands © Stacy Jupiter

DEFINITION OF CONSERVATION

The 2008 Guidelines define conservation as ‘the in-situ maintenance of ecosystems and natural and semi-natural habitats and of viable populations of species in their natural surroundings’. Previously adopted global, as well as Pacific, definitions of conservation included ‘sustainable use’ as an integral component (IUCN/UNEP/WWF, 1980; PIRT, 2007). Sustainable use was removed from the 2008 Guidelines owing to concerns over abuses by large corporations and even governments in the mining and forestry sectors (Dudley et al., 2010). However, in the Pacific context, concepts equating to ‘conservation’ have dimensions not contemplated in contemporary western culture. Such is the case of the *vanua* (Fiji), *fenua* (Tuvalu), *enua* (Cook Islands), *kaitiaki* (Maori) and the *puava* (Marovo, Solomon Islands), with similar concepts in most of the traditional Pacific societies. These cultural beliefs affect resource allocations and access rights, and environmental stewardship is intrinsic to these property rights regimes (Ruddle et al., 1992; Hdiving, 1996; Berkes, 2004). This contrasts markedly with the demonstrated pitfalls of the western open access approaches (Keen & Lal, 1992). It is unlikely that ‘extraction’ and ‘sustainable use’ are facets that can be meaningfully separated from the Pacific islanders’ concepts of ‘duty of care’ for the environment and conservation in general.

CODIFYING OR GAZETTING PROTECTED AREAS

Discussions on strengths of cultural approaches often highlight the risks involved in trying to define or constrain approaches that function essentially because of their adaptability and flexibility. Many communities may be wary of completing application formalities to codify or

gazette their protected areas, including defining objectives, because of perceived constraints to their capacity to adapt conservation or other strategies in the face of variability. For example, under the current Fiji Fisheries Act, if communities wish to gazette their marine protected area, they must agree to the management authority of the government (Clarke & Jupiter, 2010). Thus, very few communities find this option acceptable, though this could change in the case of Fiji which is producing a revised Inshore Fisheries Decree. Little if any uptake is apparent in Vanuatu, a country with specific provision for Community Conserved Areas and the role of custom in its recent Environmental Management and Conservation Act. Reasons for this lack of uptake include lack of capacity to fill out the requisite paper work, as well as a common perception that that the potential benefits do not outweigh the risks of entering contractual arrangements with the State, known to have limited capacity for enforcement (Govan et al., 2009c).

NEXT STEPS AND RECOMMENDATIONS FOR MOVING FORWARD

There have been several instances of Pacific island government and national technical advisers receiving encouragement to adopt the 2008 Guidelines as part of national policy or legislation, such as during the drafting of the Solomon Islands Protected Areas Act. In the past, Pacific legislation that did not recognize the cultural distinctions between western and Pacific islander world views created conflict. For instance, the New Zealand Conservation Act of 1987 directs the Department of Conservation to undertake co-management of protected areas with Maori under the principles of the Treaty of Waitangi that involve ‘the preservation and protection of ... resources for the purpose of maintaining their intrinsic values’, which is at odds with the Maori concept of sustainable use (Roberts et al., 1995; Berkes, 2004).

Based on the arguments above, it is clear that further discussion and written clarification is needed before Pacific island governments should adopt the 2008 Guidelines. Certain interpretations could exclude many, if not all, the community managed protected areas that currently form the major thrust in meeting their CBD obligations, leaving little in the way of viable alternatives. Driving a wedge between conservation and sustainable use/fisheries management also risks dividing the efforts of government and non-government agencies that are seeking to rationalize approaches and reduce costs through collaboration.



Local fishers from Kia Island, Fiji, with a catch from their adjacent LMMA © Stacy Jupiter

As an alternative, the Subsidiary Body on Scientific, Technical and Technological Advice of the CBD (Ad Hoc Technical Expert Group on Marine and Coastal Protected Areas) adopted the following definition: “Marine and Coastal Protected Areas mean any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna, and historical and cultural features, which has been reserved by legislation or other effective means, including customs, with the effect that its marine and/or coastal

biodiversity enjoys a higher level of protection than its surroundings” (SCBD, 2004). In addition, at the CBD COP 10, Parties committed to achieving the Aichi Targets, including proportions of each state conserved through protected areas and “other effective area-based conservation measures” (Target 11). For the moment, therefore, and notwithstanding efforts to tighten its interpretation (e.g. Woodley et al., 2012), it appears that the CBD text and definitions are more appropriate for Pacific island policy makers and planners in terms of

protected area accounting, especially as it is to the CBD that the main national obligations on protected area coverage pertain.

In moving forward, we offer three potential recommendations for action. First, Pacific island governments and NGOs should be made aware of the issues and implications relating to the current 2008 Guidelines. Secondly, the language of the 2008 Guidelines, particularly the principles, should not be incorporated into definitions or wording for national policy and legislation until broad consensus and understanding is reached. Finally, there appears to be a need for regionally appropriate guidance to be developed through wide consultation and discussion in Pacific island countries which should ensure particular involvement of land-owning communities, as well as government and non-government organizations.

REFERENCES

- Berkes, F. (2004). Rethinking community-based conservation. *Conservation Biology* 18:621-630
- Chape, S., Harrison, J., Spalding, M. and Lysenko, I. (2005). Measuring the extent and effectiveness of protected areas as an indicator for meeting global biodiversity targets. *Philosophical Transactions of the Royal Society B* 360:443-455.
- Cinner, J.E. and Aswani, S. (2007). Integrating customary management into marine conservation. *Biological Conservation* 140:201-216.
- Clarke, P. and Gillespie, T. (2008). *Legal mechanisms for the establishment and management of terrestrial protected areas in Fiji*. Suva, Fiji: IUCN.
- Clarke, P. and Jupiter, S.D. (2010). Law, custom and community-based natural resource management in Kubulau District (Fiji). *Environmental Conservation* 37:98-106.
- Day, J.C. (2002). Zoning - lessons from the Great Barrier Reef Marine Park. *Ocean & Coastal Management* 45:139-156.
- Day, J., Dudley, N., Hockings, M., Holmes, G., Laffoley, D., Stolton, S. and Wells, S. (2012). *Guidelines for applying the IUCN Protected Area Management Categories to Marine Protected Areas*. Gland, Switzerland: IUCN.
- Dudley, N. (2008). *Guidelines for applying protected area management categories*. Gland, Switzerland: IUCN.
- Dudley, N., Parrish, J.D., Redford, K.H. and Stolton, S. (2010). The revised IUCN protected area management categories: the debate and ways forward. *Oryx* 44:485-490.
- Govan, H., Tawake, A., Tabunakawai, K., Jenkins, A., Lasgorceix, A., Schwarz, A.-M., Aalbersberg, B., Manele, B., Vieux, C., Notere, D., Afzal, D., Techera, E., Rasalato, E.T., Sykes, H., Walton, H., Tafea, H., Korovulavula, I., Comley, J., Kinch, J., Feehely, J., Petit, J., Heaps, L., Anderson, P., Cohen, P., Ifopo, P., Vave, R., Hills, R., Tawakelevu, S., Alefaio, S., Meo, S., Troniak, S., Malimali, S., Kukuian, S., George, S., Tauaefa, T. and Obed, T. (2009a). *Status and potential of locally-managed marine areas in the South Pacific: meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs*. Suva, Fiji: SPREP/WWF/WorldFish-Reefbase/CRISP.
- Govan, H., Tawake, A., Korovulavula, I. and Tawakelevu, S. (2009b). *Summary analysis of site support costs for Fiji Locally Managed Marine Area (FLMMA) - IAS, USP sites. IAS Technical Report No. 2009/02*. Suva, Fiji: Institute of Applied Sciences, University of the South Pacific.
- Govan, H., Tawake, A., Tabunakawai, K., Jenkins, A., Lasgorceix, A., Techera, E., Tafea, H., Kinch, J., Feehely, J., Ifopo, P., Hills, R., Alefaio, S., Meo, S., Troniak, S., Malimali, S., George, S., Tauaefa, T. and Obed, T. (2009c). *Community conserved areas: a review of status & needs in Melanesia and Polynesia*. Suva, Fiji: CENESTA / TILCEPA / TGER / IUCN / GEF-SGP.
- Hdiving, E. (1996). *Guardians of Marovo Lagoon: practice, place, and politics in maritime Melanesia*. Honolulu, USA: University of Hawaii Press.
- IUCN/UNEP/WWF (1980). *The World Conservation Strategy*. <http://data.iucn.org/dbtw-wpd/edocs/WCS-004.pdf>.
- Jenkins, C.N. and Joppa, L. (2009). Expansion of the global terrestrial protected area system. *Biological Conservation* 142:2166-2174.
- Keen, M. and Lal, P. (2002). Creating supportive frameworks for community based resource management. *Development Bulletin (Canberra)* 58:46-51.
- PIRT (2007). *Action Strategy for Nature Conservation 2008-2012*. Alotau, Papua New Guinea: Pacific Islands Round Table for Nature Conservation.
- PIRT (2008). *Letter to the Chair, IUCN World Commission on Protected Areas, Regarding the Application of the Proposed IUCN Protected Area Guidelines in the context of the Pacific Islands*. Suva, Fiji: Pacific Islands Round Table for Nature Conservation.
- Roberts, M., Norman, W., Minhinnick, N., Wihongi, D. and Kirkwood, C. (1995). Kaitiakitanga: Maori perspectives on conservation. *Pacific Conservation Biology* 2:7-20.
- Ruddle, K., Hviding, E. and Johannes, R.E. (1992). Marine resource management in the context of customary tenure. *Marine Resource Economics* 7:249-273.
- SCBD (2004). *Technical Advice on the Establishment and Management of a National System of Marine and Coastal Protected Areas*. Montreal, Canada: Secretariat of the Convention on Biological Diversity.
- UNEP/CBD (2004). Decision VII/30. *Strategic Plan: future evaluation of progress*. Kuala Lumpur, Malaysia: Conference of the Parties to the Convention on Biological Diversity, Seventh Meeting.
- UNEP/CBD (2010). *Decision X/2. The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets*. Nagoya, Japan: Conference of the Parties to the Convention of Biological Diversity.
- Veitayaki, J., Aalbersberg, B., Tawake, A., Rupeni, E. and Tabunakawai, K. (2003). *Mainstreaming resource conservation: the Fiji Locally Managed Marine Area Network and its influence on national policy development*. Canberra, Australia: Research School of Pacific and Asian Studies, The Australian National University.
- Vukikomola, K., Jupiter, S., Erasito, E. and Chand, K. (2012). *An analysis of international law, national legislation, judgments, and institutions as they interrelate with territories and areas conserved by indigenous peoples and local communities. Report No. 19 Fiji*. Bangalore and Delhi, India: Natural Justice and Kalpavriksh.
- Woodley, S., Bertzky, B., Crawhall, N., Dudley, N., Londoño, J.M., MacKinnon, K., Redford, K. and Sandwith, T. (2012). Meeting Aichi Target 11: what does success look like for protected area systems? *PARKS* 18:1.

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RESUMEN

Muchas naciones insulares del Pacífico van a la zaga de los países más desarrollados con respecto al logro de metas para la cobertura de áreas protegidas del Convenio sobre la Diversidad Biológica (CDB). La definición modificada de áreas protegidas en las Directrices para la aplicación de las categorías de gestión de áreas protegidas (UICN 2008), ofrece oportunidades a las naciones insulares del Pacífico para reconocer formalmente las áreas conservadas y gestionadas localmente por las comunidades indígenas bajo diferentes enfoques de gestión. Sin embargo, hay aspectos de la nueva definición y principios que son incompatibles en términos del contexto de la tenencia consuetudinaria prevaleciente en el Pacífico. El primer principio que requiere que la conservación de la naturaleza sea el objetivo principal de las áreas protegidas va en contra de la mayoría de las áreas protegidas establecidas en las islas del Pacífico, cuyo principal impulsor es asegurar medios de subsistencia sostenibles. Por otra parte, la definición de la conservación según la percepción de la mayoría de las culturas de las islas del Pacífico está inextricablemente ligada con el "uso sostenible". En este contexto, ofrecemos sugerencias para seguir avanzando, incluyendo aumentar el conocimiento sobre estas cuestiones, realizar consultas en torno a las definiciones sobre áreas protegidas que más se ajustan al contexto legal y cultural de cada país, y evitar la incorporación del lenguaje de las Directrices de 2008 en las definiciones o redacción de las políticas y leyes nacionales hasta alcanzar un amplio consenso y comprensión.

RÉSUMÉ

De nombreuses îles-nations du Pacifique sont moins bien classées que les pays plus développés en ce qui concerne la réalisation des objectifs de la Convention sur la diversité biologique liés aux aires protégées. La modification de la définition des aires protégées dans les Lignes directrices pour l'application des catégories de gestion aux aires protégées de l'UICN, publié en 2008, permet aux îles-nations du Pacifique de reconnaître officiellement les aires conservées par les communautés autochtones et localement gérées et de les classer ainsi dans plusieurs catégories de gestion. Cependant, certains éléments présents dans la nouvelle définition et les principes seront certainement incompatibles avec les régimes fonciers coutumiers qui prévalent dans le Pacifique. Le premier principe, selon lequel la conservation de la nature doit être le principal objectif des aires protégées, s'oppose à la majorité des aires protégées en fonctionnement dans le Pacifique, pour lesquelles le principal moteur est la création de moyens de subsistance durables. En outre, la définition de la conservation est perçue par la plupart des cultures des îles du Pacifique comme inextricablement liée à « l'utilisation durable ». Dans ce contexte, nous proposons donc d'aller plus loin et de vulgariser ces questions, de s'interroger sur les définitions appropriées des aires protégées qui correspondent au contexte culturel et juridique de chaque pays, et d'éviter le langage des Lignes directrices de 2008 dans les définitions ou l'énoncé des politiques et législations nationales, jusqu'à trouver un consensus et une entente satisfaisants pour tous.



PUTTING NATURE ON THE MAP: APPLYING THE IUCN PROTECTED AREAS MANAGEMENT CATEGORIES IN THE UK

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ABSTRACT

Putting Nature on the Map is the title of the ongoing project for applying the IUCN protected areas management categories to all protected areas in the UK under state, private, charitable or community control, in the light of IUCN's adoption of revised guidance in 2008. The standard two-stage test is applied: do the designated sites/areas conform to the IUCN definition of a protected area? And, if so, to which IUCN management category and governance type should they be assigned? The paper describes the innovative methods used, including a Statement of Compliance to test whether a designated area system complies with the IUCN definition of a protected area, and an independent Assessment Panel as a quality control on data input from originating bodies before formal submission of official data through government to the UNEP-WCMC World Data Base on Protected Areas. The benefits of the approach, both in applying international standards and providing a basis for increasing the prominence of protected areas as a key mechanism for nature conservation, are set out and interim results are presented.

KEYWORDS: IUCN management categories, UK, WDPA, governance types, Statement of Compliance

INTRODUCTION

Protected areas are fundamental in safeguarding species and habitats, ecological systems, geodiversity and landscapes, and improving the stewardship of natural resources in defined sites and areas. This has been long recognised in the UK through legislation dating back more than 60 years beginning with the National Parks and Access to the Countryside Act 1949. But the UK remains behind many other countries in applying the international standards set by IUCN in Guidelines for Protected Areas Management Categories (Dudley, 2008). Early in 2010, the former Chair (Nik Lopoukhine) of the IUCN World Commission on Protected Areas (WCPA) challenged the UK protected areas community to rectify the situation and place the UK in a leading position globally in the implementation of the 2008 IUCN Guidelines. In response, a collaborative project was established, led by the IUCN National Committee for the United Kingdom (IUCN NC UK). Funded by The Sibthorp Trust, Natural England and The John Muir Trust, the work began in mid 2010 and is due for completion in time for the World Parks Congress in 2014. After initial work undertaken by Middlemarch Environmental, the project is now being taken forward

under the guidance of a small expert group drawn from the statutory agencies and senior members of WCPA. Many organisations owning protected areas or with particular statutory responsibilities for protected areas are involved in implementation.

THE IUCN PROTECTED AREAS MANAGEMENT CATEGORIES SYSTEM

The system established by IUCN is "an important global standard by facilitating the planning of protected areas and associated systems, improving information management about protected areas, and helping to regulate activities in protected areas" (Dudley, 2008). It has been adopted by the Conference of Parties of the Convention on Biological Diversity (CBD) as a global standard and included in its Programme of Work on Protected Areas (POWPA) in 2004 and 2010. It is enshrined in statute in some countries, but not in the UK and its constituent parts.

The IUCN Guidelines recommend a two-stage approach: The site/area or protected area system **must** conform to the IUCN protected area definition. The revised definition now in use is as follows: "A *clearly defined*

Table 1: Summary of Protected Area data currently held by the WDPA (2011)

National description/designation	Purpose	Geographical area	Number of sites on data	Present IUCN category
Area of Outstanding Natural Beauty	Statutory protection of landscape quality	E, W; NI	49	V
Area of Special Scientific Interest	Statutory protection of bio & geo features	NI	226	IV
Heritage Coast	Coastal landscape protection and access	E, W	32	V
Local Nature Reserve	Statutory nature protection and access	UK	1,372	IV
Marine Conservation Area	Voluntary for consultation	UK	2	unknown
Marine Nature Reserve	Voluntary for consultation	UK	3	IV
National Nature Reserve	Statutory strict nature protection	UK	403	IV
National Park	Statutory landscape protection, access & enjoyment	E, W, S	14	V
National Scenic Area	Statutory protection of natural beauty	S	40	V
Regional Park	Non statutory landscape protection and access	S	4	V
Site of Special Scientific Interest	Statutory protection of bio and geo features	E, W, S	6,586	IV
Biosphere Reserve	Non statutory UNESCO designation for sustainable development	UK	9	not classified
Ramsar site	International protection of wetlands and wetland species	UK	158	not classified
World Heritage Site	UNESCO designation to safeguard Outstanding Universal Significance	UK	3	not classified

Source: UNEP WCMC World Database on Protected Areas with purpose added for clarification

Notes: E = England, NI = Northern Ireland, S = Scotland, W = Wales

geographical space, 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, p.8). Sites recognised as protected areas by IUCN must adhere to a number of principles. The most important, in this context, is recognition of the multiple roles of protected areas but with nature conservation (broadly defined) as the ultimate priority: “in the case of conflict, nature conservation will be the priority” (Dudley, 2008, p.10).

All sites that have been identified as ‘protected areas’ under the IUCN definition are assigned one of the six management categories and one of four governance types defined by IUCN.

WHY APPLY THE IUCN SYSTEM IN THE UK?

The World Data Base on Protected Areas (WDPA), managed by the UNEP World Conservation Monitoring Centre (UNEP WCMC), currently lists some but not all of

the designated sites/areas in the UK (Table 1) and most of them are reported under one of the IUCN Management Categories. However, the UK entry is out of date, does not conform with the 2008 Guidelines and is incomplete, thus not giving an accurate picture of the position in the UK. Many sites owned and managed by environmental NGOs are not included. Some other areas that are included may not meet the current definition of a protected area. Some types are classified generically, regardless of differences in management objectives. For example, all Sites of Special Scientific Interest (SSSIs), which is the main domestic designation for nature protection in the England, Scotland and Wales are considered to be Category IV, although some SSSIs have a different purpose to those of that category.

By applying the 2008 IUCN Guidelines, the quality of information on the UK’s protected areas will be greatly improved, and the data held by the WDPA will provide a much more accurate reflection of the position in the UK.



Snowdonia National Park, Wales © Nigel Dudley

This will help in understanding how the UK is meeting international commitments, for example in achieving the Aichi Target 11 agreed at the Nagoya session of the CBD (which set a global target to establish protected areas covering at least 17 per cent of terrestrial and inland water areas and 10 per cent of marine and coastal areas by 2020) (Convention on Biological Diversity, 2011), and obligations set by the European Union (EU). The revised material will help the UK Government and devolved administrations in Northern Ireland, Scotland and Wales, to understand how they are meeting their country-level nature conservation priorities; for example, in relation to Nature Improvement Areas and the new Biodiversity Strategy in England (Defra, 2010); and help to build on the UK National Ecosystem Assessment (UK National Ecosystem Assessment, 2011). The information will also help to raise the public profile of protected areas which meet international standards, especially by giving free public access to maps and interactive computerised records (through www.protectedplanet.net the website of the WDPA). Better information for land use strategies will be available through the database; local people should be able to make better informed decisions about the designation and management of protected areas; and

the information will also display the full range of places that can attract tourists seeking contact with nature and landscape. It will also identify what needs to be done to bring the management of other areas which currently do not meet the IUCN protected area definition up to international protected area standards. Finally, the outcome of the project should enable UK nature conservation to be showcased more effectively.

APPROACH ADOPTED

The basic aim of the project is to identify all the places in the UK that meet the IUCN definition of a protected area, and then to assign them to one of the six IUCN protected area management categories and one of the four protected area governance types. A Handbook (IUCN NC UK, 2012) has been prepared by the IUCN NC UK to guide the assessment process. While this Handbook is derived from the 2008 IUCN Guidelines, and should be regarded as subordinate to it, it is designed to assist UK users to apply the international guidance in the national context. It recommends a step by step approach to supplement the international guidance and make it more relevant to UK circumstances.



*Loch Lomond & The Trossachs National Park from Ben Lomond owned in part by NGO The National Trust for Scotland
© Roger Crofts*

Step 1: Determine what is, what is not, and what may be a protected area within the UK under the IUCN definition.

For this, the material in the IUCN Guidelines (Dudley, 2008) should be used. Additional guidance is provided in the UK Handbook for some types of designation where the fit with the IUCN definition requires very careful consideration, such as National Parks, Areas of Outstanding Natural Beauty, and Sites of Special Scientific Interest; this advice was generated following workshops with expert groups. Other countries could usefully use the same approach, annotating the Guidelines to help make decisions on national designations. In addition, Statements of Compliance are required to aid the assessment (see below).

Step 2: If the site/area passes the IUCN definition, determine its management category and governance type.

The UK Handbook presents a systematic way for assigning a site/area to the relevant IUCN category and governance type, focussing particularly on the fit with the primary objectives of each of the categories. The process involves answering the following three questions.

- **Does the site meet the IUCN definition?**

If it is not immediately clear whether the site/area passes the IUCN definition some further assessment is required to determine the position. Three stages are used in the UK process: first to test the site/area against each element of the IUCN definition, second to test the site/area against the common objectives set out in the IUCN Guidelines, and third to assess the site/area against the optional additional criteria set out in the IUCN Guidelines. Descriptive text is provided in the UK Handbook to help reviewers, but it is based on the IUCN Guidelines to ensure that there is no variation from the agreed international system. If the assessment proves negative, the site/area is rejected and no further action is taken. If the assessment proves positive, the site/area is then assigned to one of the IUCN categories and governance types.

For each of the main protected area designations in the UK where there is some uncertainty about whether they generically pass the IUCN definition test, the Handbook advises that a **Statement of Compliance** is drawn up to demonstrate conformity with the IUCN definition. Since the publication of the Handbook, such statements

Table 2: A key to determine if a site is a Protected Area

1	Is the site a clearly defined geographical area?	Yes	Go to 2
		No	FAIL – Not a protected area
2	Is it recognised, dedicated and managed to achieve the long-term conservation of nature? NB 'nature' includes all levels of biodiversity as well as geodiversity, landforms and broader natural values (see Appendix 4 for detailed definition)	Yes	Go to 3
		No	FAIL – Not a protected area
3	Is the main management objective nature conservation? Other objectives of equal standing may be present but they do not cause conflict, i.e. nature conservation is the priority	Yes	Go to 4
		No	FAIL – Not a protected area
4	Does the designation of the site aim to prevent, or eliminate where necessary, any exploitation or management practice that will be harmful to the objectives of designation?	Yes	Go to 5
		No	FAIL – Not a protected area
5	Is the long-term nature conservation ensured through legal or other effective means? E.g. national or international statutory law/ agreement/convention, traditional rules or NGO policy.	Yes	This is a protected area
		No	FAIL – Not a protected area

Source: IUCN NC UK, 2012

have been developed, for example, for the domestic designations of Areas of Outstanding Natural Beauty (AONBs), National Parks, and Sites of Special Scientific Interest, (SSSIs) as well as for international designations of Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Biosphere Reserves.

Each statement consists of text which addresses the following questions:

- Is the site a clearly defined geographical area?
- Is it recognised, dedicated and managed to achieve the long-term conservation of nature? 'Nature' includes all levels of biodiversity as well as geodiversity, landforms and broader natural values.
- Is the main management objective nature conservation? Other objectives of equal standing may be present, but when they cause conflict, nature conservation should be the priority?
- Does the designation of the site prevent, or eliminate where necessary, any exploitation or management practice that will be harmful to the objectives of designation?
- Does the designation of the site aim to maintain or, ideally, increase the degree of naturalness of the ecosystem being protected?

- Is long-term nature conservation ensured through legal or other effective means? e.g. through national or international statutory law/agreement/convention, traditional rules or NGO policy?

In some cases, these statements may conclusively demonstrate compliance for a whole suite of sites. However, in many cases sites will need to be examined on an individual basis; for this, the Handbook provides a series of step by step keys, accompanied by a descriptive text, to aid decisions on whether these sites fit the IUCN definition (Table 2).

The Statements of Compliance for SSSIs, SPAs, SACs and Biosphere Reserves have now been reviewed by the Assessment Panel (see below for details) and approved as fulfilling the IUCN protected areas definition.

• **What IUCN management category should the site be assigned to?**

For those sites which meet the IUCN protected areas definition, the Handbook provides detailed keys and descriptive material to allow a step by step assessment of management objectives to aid the determination of the most appropriate IUCN management category.



Puffins (*Fratercula arctica*) on the Farne Island, England © Nigel Dudley

The names that IUCN attaches to the categories are not used in the Handbook, because of the confusion that can occur between these names and the national names for protected areas. In the UK, for example, all national parks are presently classified not as category II (which IUCN terms ‘national parks’) but as category V, and it seems likely that most, if not all, will remain in that category after assessment under the 2008 Guidelines. Also, not all the designations are clear cut and the example of category V is given below to highlight some of the issues to be resolved during the assignment process.

Category V poses some specific issues for the UK under the revised 2008 IUCN definition of a protected area, with its emphasis on nature conservation objectives. The Handbook gives some general guidance on this as follows: “This category has been used to classify National Parks in England and Wales, Areas of Outstanding Natural Beauty in England, Wales and Northern Ireland, National Scenic Areas in Scotland, the two Scottish National Parks and some other landscape designations. Some current category V protected areas may need to re-examine their management plans in light of the revised IUCN definition of a protected area and its greater emphasis on nature conservation. The proposed Statements of Compliance for AONBs and National Parks

would provide a good basis for this.” (IUCN NC UK, 2012). Those statements are currently in the course of development.

- **What is the governance type?**

Once the category has been established, the type of governance should be assigned using one of the four kinds listed in the IUCN Guidelines, along with the supporting material there and in the UK Handbook.

- *Governance by government*: governance by a statutory body, such as a government nature agency or a specifically established body, such as a national park authority;
- *Shared governance*: governance by partnership of public bodies, charities and other bodies approved by government agencies because of their management capabilities, such as the National Trusts and Wildlife Trusts;
- *Private governance*: protected areas owned and managed by charities, other non-government organisations, individuals and private companies; and
- *Governance by local communities*: who own land through traditional rights or more recent acquisition, or in Scotland have acquired land through special statutory measures.

Protected areas data flow

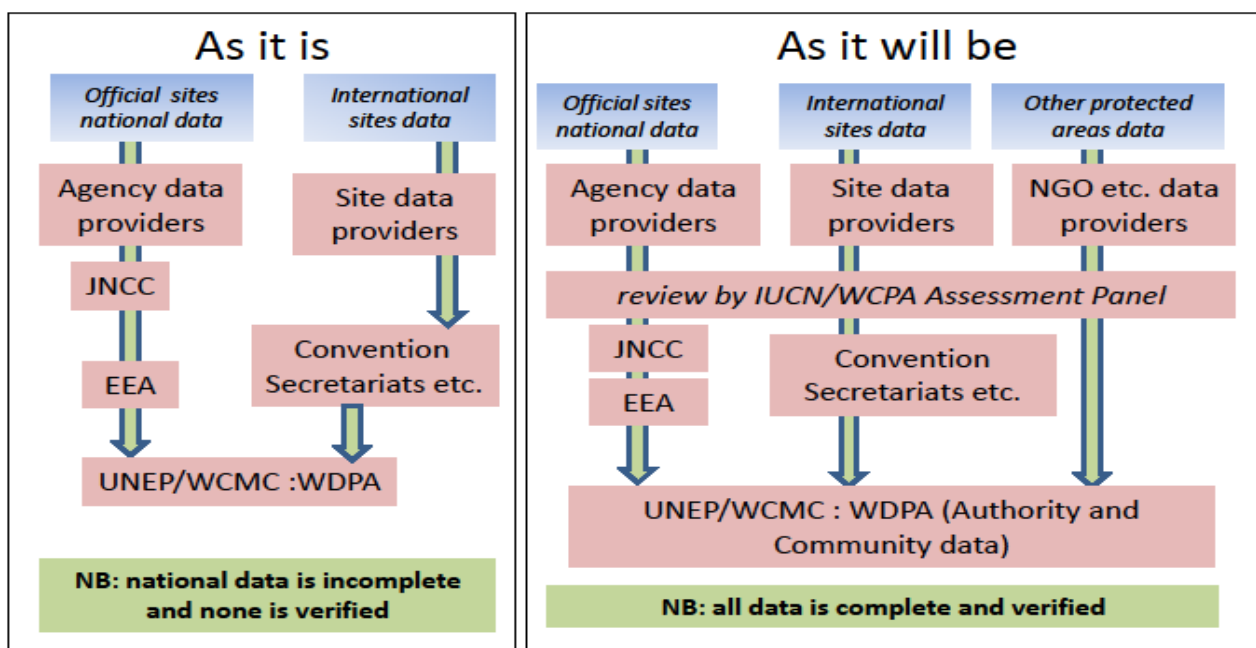


Figure 1: Current and future data flows for protected areas

IUCN is currently working on more detail understanding and assigning governance type which will be produced in 2013.

VERIFICATION AND SUBMISSION OF THE ASSESSMENTS

It is important that the information that is generated through the project is checked for accuracy before it is entered on the WDPA. So, as part of this project, the Steering Group has developed a new approach to the verification of protected areas against the IUCN Guidelines. This follows a number of trials in other areas of the world and is part of an international effort within IUCN WCPA to increase the use of the IUCN Guidelines and to improve the accuracy of assessments using accredited members of the IUCN WCPA as an Assessment Panel (Stolton, 2013). Figure 1 illustrates the new system and how it differs from the current one in use. There are two important innovations in the new process:

- The inclusion of the IUCN WCPA Assessment Panel to verify the accuracy of the data provided by UK bodies for sites and areas to the WDPA against the published IUCN guidance; and
- The possibility being offered to NGOs etc. to provide data on their protected areas which are not currently put forward to the WDPA as they are not part of the official network of protected sites in the UK (even though many meet the IUCN definition).

All the data will be included in the WDPA and made accessible through the Protected Planet portal www.protectedplanet.net.

At present, the members of the Assessment Panel are several long-standing members of IUCN WCPA who have experience of the category system and its application in different countries (including the authors of this paper). The Panel reviews, first of all, the Statements of Compliance and provides feed back to the originators, and on resubmission approves them as the basis for assigning individual sites and areas to the appropriate IUCN management category. The Panel will, in future, review a series of sites and areas to judge the standard of assignments and make comments as necessary. Once the assessments of category and governance assignment are complete, the Panel will pass its views on to the Joint Nature Conservation Committee (JNCC) which submits the data to UNEP WCMC via the European Environment Agency (EEA), or (in the case of NGOs' data) straight to UNEP WCMC.

INTERIM ASSESSMENT

From the work undertaken to date, we have made an interim assessment of those designation types which we consider may pass the IUCN definition test (Table 3—overleaf) and those that do not (following text). The Handbook states that a number of places with some form of protection do *not* pass the IUCN protected area test,

Table 3: Interim assessment of types of UK protected areas in relation to the IUCN Protected Areas definition

Type of site	Geographical coverage				
	UK	England	Scotland	Wales	Northern Ireland
International Sites (Global and EU)					
Biosphere Reserves (core and buffer zone)	✓				
Biosphere Reserves (transition zone)	x				
Ramsar (wetland) site	✓				
European Union Habitats Directive: Special Area of Conservation (SAC)	✓				
European Union Birds Directive: Special Protection Area (SPA)	✓				
World Heritage site (Natural and Mixed)	✓				
National or Country Level Sites					
Area of Outstanding Natural Beauty (AONB)		✓		✓	?
Area of Special Scientific Interest (ASSI) for biological & geological interests					✓
Heritage Coast (HC)		?		?	
Marine Nature Reserve (MNR)	✓				
National Nature Reserve (NNR)	✓				
National Park (NP)		✓	✓	✓	
National Scenic Areas (NSA)			?		
Regional Park (RP)			?		?
Site of Special Scientific Interest (SSSI)		✓	✓	✓	
NGOs, Private sites etc with nature conservation as the main objective					
John Muir Trust			✓		
Scottish Wildlife Trust			✓		
National Trust land held inalienably when managed for nature conservation		✓		✓	✓
National Trust for Scotland land held inalienably when managed for nature conservation			✓		
Land owned by a NGO for nature conservation	✓				

Key:

- ✓ **Probably likely to pass IUCN Protected Area definition test**
- ? **Some doubt about fit with IUCN Protected Area definition**
- x **Unlikely to pass the IUCN Protected Area definition test**

for example because nature conservation is not the primary management objective or because they are of a temporary nature. These are:

- Designations to guide decision making through the statutory Town and Country Planning system, such as Green Belt (safeguarding countryside by halting the extension of large settlements) or Areas of Landscape Value (non statutory for protecting valued local and regional landscapes), as nature conservation is not their main purpose.
- Agri-environmental and rural development instruments, such as Environmentally Sensitive Areas or areas covered by Higher Level Stewardship or Rural Development Contracts-Rural Priorities, as these are essentially temporary measures under the EU's Common Agricultural Policy to encourage environmentally sustainable farming and land-use.
- Measures to protect the built heritage, such as Listed Buildings (to force consultation on measures which may affect the quality and surroundings of buildings)

of special architectural or historical merit), Scheduled Ancient Monuments (to protect features of historical and archaeological importance) or Conservation Areas (to safeguard historically valued areas within urban settings).

- Natural Environmental Research Council Act Section 42 Priority Habitats as there is no certainty about protecting nature and the mechanism is rarely used.
- Local sites of nature conservation value determined by local government authorities (e.g. EcoSites, Sites of Importance for Nature Conservation, Regionally Important Geological and Geomorphological Sites); these are not protected by legislation (or other effective means) and do not offer longer term guarantees of nature protection.
- Local Nature Reserves a statutory designation by the government nature agencies and run by local government authorities: although gaining some protection through local government, possibly including bye-laws, these sites generally do not provide guaranteed long term protection of nature.
- Any sites of the National Trust/National Trust for Scotland (charities established by statute to protect and preserve natural and built heritage properties, allow public access and enjoyment) that are not owned forever and not managed primarily for nature conservation.

It should be noted that some of the above will sometimes be designated as SSSIs or under other effective nature conservation legislation, in which case they will be recognised as protected areas.

CONCLUSION

A new approach has been developed in the UK to enable all sites that meet the IUCN definition of a protected area to be identified and formally included in the WDPA, replacing the current unreliable data, thus allowing the UK to declare that its protected areas meet internationally recognised standards. A collaborative approach has been used in the development of a comprehensive Handbook to aid users of the system prepared under the aegis of the IUCN NC UK. The development of Statements of Compliance and the setting up of an Assessment Panel of UK based experts represent innovations that could be replicated elsewhere.

The completed data will be available to everyone with an interest in protected areas, hopefully in time to present to the 2014 World Parks Congress. It will also help promote the value of protected areas in the UK internationally, nationally and locally. It is hoped that this practical

approach in the UK will be of interest to other countries in applying the 2008 IUCN Guidelines for Protected Areas Management Categories.

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REFERENCES

- Convention on Biological Diversity (2010). *Strategic Plan for Biodiversity 2011-2020: Aichi Biodiversity Targets*, www.cbd.int/sp/targets
- Defra (2010). *The natural choice: securing the value of nature*. Cm. 8082. London, England: The Stationery Office. www.defra.gov.uk/environment/natural.whitepaper/
- Dudley, N. (Ed.) (2008). *Guidelines for Applying Protected Areas Management Categories*. Gland, Switzerland: IUCN
- IUCN NC UK. (2012). *Putting Nature on the Map: Identifying Protected Areas in the UK - A Handbook to help identify protected areas in the UK and assign the IUCN Management Categories and Governance Types to them*. London, England: IUCN National Committee for the United Kingdom
- Stolton, S., Shadie, P. and N. Dudley. (2013). *IUCN WCPA Standards on the Process for Recognising Protected Areas and Assigning Management Categories and Governance Types*, Gland, Switzerland: IUCN.
- UK National Ecosystem Assessment. (2011). *UK National Ecosystem Assessment: Synthesis of the key findings*. Cambridge, England: UNEP – WCMC

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RESUMEN

Putting Nature on the Map (Poner a la naturaleza en el centro) es el título del proyecto en curso para la aplicación de las categorías de gestión de áreas protegidas de la UICN para todas las áreas protegidas del Reino Unido bajo control estatal, privado, de beneficencia o comunitario, a la luz de las definiciones modificadas por la UICN en sus Directrices de 2008. Se formulan dos preguntas: ¿Se ajustan las áreas o sitios designados a la definición de la UICN de un área protegida? Y, en caso afirmativo, ¿a qué tipo de categoría de gestión y gobernanza de la UICN deben asignarse? En el documento se describen los métodos innovadores utilizados, incluyendo una Declaración de cumplimiento para comprobar si un sistema de áreas designadas cumple con la definición que hace la UICN de un área protegida, y un Grupo de evaluación independiente para efectos de control de calidad de los datos suministrados por los órganos que los originan antes de la presentación formal de los datos oficiales por conducto del gobierno a la Base de Datos Mundial sobre Áreas Protegidas del PNUMA-CMCM. Se exponen los beneficios de este enfoque, tanto para la aplicación de las normas internacionales como para proporcionar una base para aumentar la importancia de las áreas protegidas como un mecanismo clave para la conservación de la naturaleza, y se presentan los resultados provisionales.

RÉSUMÉ

Putting Nature on the Map est le titre d'un projet en cours visant à appliquer les catégories de gestion des aires protégées de l'UICN à toutes les aires protégées au Royaume-Uni – que ce soient des aires contrôlées par l'état, des organismes privés, à but non-lucratifs ou communautaires – à la lumière des Lignes directrices de l'UICN révisées en 2008. Le test standard en deux étapes est appliqué : les sites/aires désignés sont-ils conformes à la définition de l'UICN d'une aire protégée ? Si oui, dans quelle catégorie de gestion et type de gouvernance se classent-ils ? La présente étude décrit les méthodes innovantes utilisées, notamment une Déclaration de conformité, qui permet de tester la conformité d'une aire désignée par rapport à la définition de l'UICN d'une aire protégée, et un Groupe d'évaluation indépendant qui contrôle la qualité des données provenant des institutions, avant leur envoi formel par le gouvernement à la Base de données mondiale sur les aires protégées du PNUE-CMAP. Cette approche permet d'appliquer les normes internationales et offre une base pour accroître l'importance des aires protégées en tant que mécanisme principal pour la conservation de la nature. Les avantages et les résultats intermédiaires de cette approche sont présentés dans la présente étude.



AN ELEPHANT CORRIDOR IN A FRAGMENTED CONSERVATION LANDSCAPE: PREVENTING THE ISOLATION OF MOUNT KENYA NATIONAL PARK AND NATIONAL RESERVE

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ABSTRACT

Increasing human population, land fragmentation, fencing and the spread of agricultural development around the lower slopes of Mount Kenya are progressively isolating the fauna and flora of Mount Kenya National Park and National Reserve. The consequence of this fragmentation around the mountain is a reduction in the total area available for wildlife and disruption to movements of large mammals between the mountain and the grassland/savannah habitats of the surrounding plains. The disappearance of two large mammals from the forest ecosystem over the past three decades, the Black Rhino (*Diceros bicornis*) and the African Wild Dog (*Lycaon pictus*), can in part be attributed to the isolation of upland forest habitats preventing occasional movements of wildlife from lowlands where they are more common. A 14 km strip of land on the north-western section of the Mountain has been developed to help mitigate this isolation. The strip has recently been secured as a habitat and migratory pathway to the north for wildlife within the 2,000 km² ecosystem. Using the Elephant Corridor on Mount Kenya as a case example, the authors highlight issues and theoretical considerations that have led many scientists, planners and conservation managers to recognize the importance of maintaining connectivity for species, communities and ecological processes within rapidly fragmenting conservation landscapes. The principle argument is that connectivity can be achieved for wildlife species and communities by managing the entire landscape mosaic through appropriate habitats such as corridors.

KEYWORDS: Elephant, corridor, Mount Kenya, fragmentation, migration, connectivity

INTRODUCTION

The general concern within Kenya's protected area landscape of wildlife habitats becoming isolated and in need of conservation redress was brought to light in a recent initiative by the Government of Kenya. The ongoing process seeks to map all wildlife migratory pathways, linkages and corridors in the country in light of recent conservation challenges ¹. This initiative also comes against the backdrop of continuing efforts at protecting the few remaining wildlife and habitat linkages between the Mount Kenya forest ecosystem and lowland grassland and savannah habitats by the Kenya Wildlife Service (KWS), private wildlife conservancies, large scale farms and non-governmental conservation bodies including the Mount Kenya Trust ². The role of corridors and connectivity in wildlife conservation is seen as a high priority area for the conservation of large mammal fauna particularly charismatic herbivores such as the African Elephant (*Loxodonta africana africana*).

It is also noteworthy that these concerns are being addressed at a time when fencing as a conservation strategy has been adopted in virtually every major wildlife habitat in Kenya including National Parks, Private Conservancies and Community lands. The KWS and Kenya Forest Service (KFS) Management Plan for Mount Kenya (2009 - 2019) states that several areas adjoining the park and reserve will be "... fenced off to mitigate human-wildlife conflict...", despite the fact that there has always been movement of wildlife between the high country on Mount Kenya and the dry low country to the north and west (KWS & KFS, 2008). While the ecological consequences of fencing are yet to be fully assessed especially within the Laikipia/Samburu/Mount Kenya region by conservation practitioners, policy and decision makers alike, the complementary role of habitat and migratory corridors as effective means of promoting landscape connectivity is just beginning to take cognizance amongst policy and decision makers in the

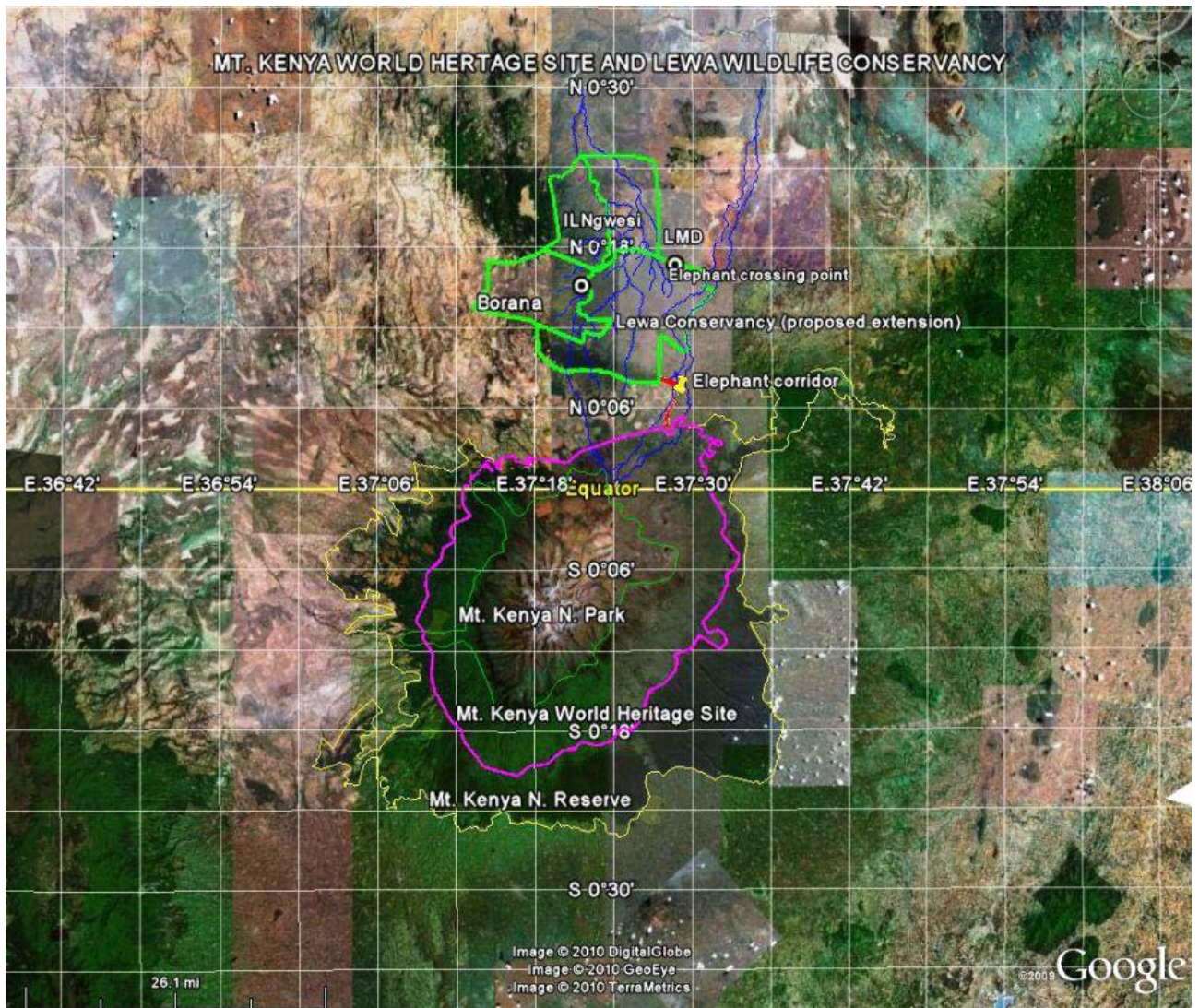


Figure 1: General location of the Elephant Corridor in relation to the Mount Kenya/Laikipia ecosystem. The map shows the two connected ecosystems of Mount Kenya and Laikipia (Lewa wildlife conservancy, Ngare Ndare Forest, Borana and Il Ngwesi all shown in green). The purple colour shows the boundary of Mount Kenya National Park – which is also the boundary of the current WH property. Source: Lewa Wildlife Conservancy.

country. Such corridors within Africa have been variously termed ‘wildlife corridors’, ‘dispersal corridors’, or ‘movement corridors’ where they are known to be used by animals for movement (Newmark, 2008).

This article reflects on an Elephant Corridor on the north-western side of Mount Kenya; an area of ecological importance linking a core area of Mount Kenya with the surrounding lowland forest of Ngare Ndare and the savannah areas of Lewa Wildlife Conservancy and Il Ngwesi Community Conservancy (Figure 1). The Corridor is also seen as central to a nomination for an extension of the Mount Kenya World Heritage property to include the Ngare Ndare Forest and the Lewa Wildlife Conservancy under natural criteria *vii* and *ix* (Government of Kenya, 2012; UNESCO, 2012; Mount Kenya Trust, 2012).

THE SETTING: MOUNT KENYA / LAIKIPIA CONSERVATION LANDSCAPE

The Mount Kenya ecosystem which includes the National Park and Reserve, is located to the east of the Great Rift Valley, along Latitude 0° 10’S and longitude 37° 20’E. It bestrides the equator in the central highland zones of Kenya. The ecosystem is situated in two provinces and five counties of Kenya. The Park and National Reserve³ also serve as a Man and Biosphere Reserve and a Natural World Heritage property⁴ (IUCN, 1997).

The forest zone is the largest single contiguous forest stand remaining in Kenya and its ecosystem as a whole plays a critical role as a water tower for the two main rivers in the country, the Tana and Ewaso Ngiro which are relied upon by millions of Kenyans. Additionally, varying geographical conditions on Mount Kenya

contribute to a diverse range of flora and fauna. The forest zones alone hosts a rich biological diversity with 81 known endemic bird species (Birdlife International, 1998; 2000) 5. There are several wildlife species dwelling within the natural forest including mammals of international conservation interest such as Bongo (*Tragelaphus eurocerus isaaci*), Elephant (*Loxodonta africana africana*), Giant Forest Hog (*Hylochoerus meinertzhageni*) and Leopard (*Panthera pardus*). Given its global significance as a Man and Biosphere Reserve complex, a World Heritage Site and a region of significance conservation interest, a systematic approach to the conservation of the landscape is long overdue.

A refinement of the landscape approach within the Mount Kenya /Laikipia ecosystem is to consider the need for movement of species in the face of ongoing threats. Owing to land use patterns, population dynamics and political constraints, the expansion of conservation linkages through corridors in the Laikipia /Mount Kenya landscape will take time. This constraint requires a strategy that maximises the retention of habitat patterns (or minimises loss and extinction) by scheduling the allocation of limited conservation resources to areas with high biodiversity values (in terms of irreplaceability and vulnerability) (Jodi, *et al.*, 2006).

Providing ecological connectivity via habitat and migratory corridors to areas with high concentrations of threatened species within the Mount Kenya ecosystem will fulfill conservation goals in the short term but will not buffer the ecosystem from long term negative impacts on biodiversity from changes in climate and land use outside of protected areas. Several steps, informed by elephant corridor experience and outlined below are required to identify and implement a conservation landscape strategy designed for persistence of biodiversity.

- Identify types, patterns and rates of threatening processes on Mount Kenya and Laikipia
- Identify natural features to be protected. These will be elements of biodiversity attributes, e.g. species, habitats, as well as spatial components of the region that act as surrogates for ecological and evolutionary processes
- Set targets for representation and design
- Lay out options for achieving representation and design targets
- Locate and design potential conservation areas to achieve representation and design targets
- Implement conservation actions in priority order.

LINKING THE LANDSCAPE IN MOUNT KENYA/ LAIKIPIA REGION

For most contemporary conservationists involved with the conservation and management of protected areas, the inevitable and deeply challenging question is how much of the original complement of wildlife habitat / biodiversity will any given protected area system protect in 50, 100 or 1,000 years time? In the case of the Mount Kenya /Laikipia ecosystem, the rapidly receding glaciers (Lambrechts *et al.*, 2003) mean that in the not too distant future the National Reserve and its surrounding will be subject to a great deal of change. It is predicted that climate change will have influenced all aspects of ecosystem structure and function inside the protected areas and under the influence of a growing human population, the un-conserved matrix outside the reserve will have been almost entirely transformed. Studies elsewhere have shown the need to manage such systems for overall ecosystem resilience (Stolton & Dudley, 2010). The challenge in Kenya as in many other African countries is how to provide appropriate connectivity between the existing protected area networks, so as to protect unique compliments of species and habitats, as well as absorb the impacts of change within and outside their boundaries and so allow the persistence of species and habitats far into the future.

The benefits of protected area connectivity have been discussed extensively throughout the conservation world (e.g. IUCN, 2005; UNEP, 2012; SCBD, 2010; AWF, 2001). The park management system in Kenya cannot achieve its potential if conservation areas become isolated fragments surrounded by incompatible land uses. While there are numerous definitions of, and approaches to, identifying spatial scales for connectivity conservation planning and management (Bennett, 2003), the Mount Kenya case is primarily concerned with the role of corridors in linking protected areas to enhance wildlife conservation. One of the earliest practical recommendations on land use to arise from studies of habitat fragmentation was the suggestion that fragments that are linked by corridors of suitable similar habitat are likely to have greater conservation value and be more resilient than isolated fragments of similar size (Lindenmayer & Fischer, 2006). This initial recommendation was based entirely on theoretical considerations, primarily stemming from 'Island biogeography theory' (McArthur & Wilson, 1967). Subsequently, protection or provision of continuous corridors to link isolated habitats has been widely recommended as a conservation measure to counter the impacts of habitat reduction and fragmentation.

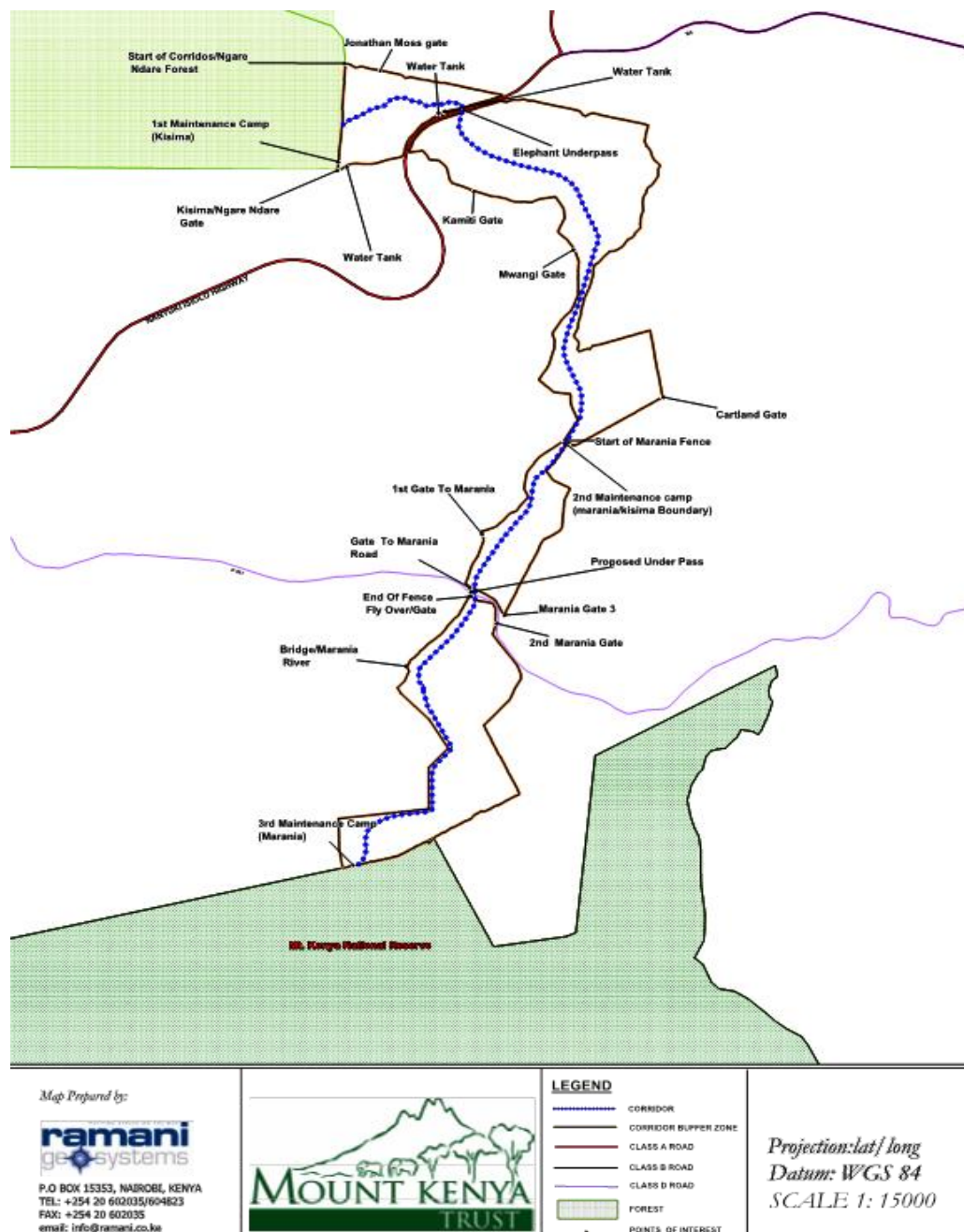


Figure 2: Detailed map of the elephant corridor

There had been no previous holistic conservation approach that works with multiple landowners in Kenya, and there is therefore a need to learn how to work across fragmented jurisdictional distinctions, such as those between public, communal and private land; national park and state forest; or one local government area and another. The goal within the Laikipia/Mount Kenya project is to achieve connectivity conservation, to establish networks of protected areas and to manage these cooperatively in the context of sustainable management of the whole matrix of land uses. The region being a multiple land use area would also benefit immensely from conservation strategies at landscape level (Sara, et al., 2008).

This strategy would be in conformity to other global agendas such as the Convention on Biological Diversity which advocates for protected area systems and networks as a key strategy for conservation. Parties to the convention, including Kenya, have an imperative to mobilize these at the national scale, and to collaborate with neighbouring countries to achieve these goals at the scale of regional networks. This approach is also in tandem with the 2003 World Parks Congress which had as its central theme ‘Benefits beyond boundaries’ where concern was raised as to how integrated landscape management could support protected areas, and recommend that governments, NGO’s and communities:



Aerial view of the underpass © Mount Kenya Trust

- Adopt design principles for protected areas that emphasize linkages to surrounding ecosystems and ensure that the surrounding landscapes are managed for biodiversity conservation
- Recognize the need to restore ecological processes in degraded areas, both within protected areas and in the surrounding landscapes, to ensure the ecological integrity of protected areas
- Recognize that the presence and needs of human populations, consistent with biodiversity conservation within and in the vicinity of protected areas, should be reflected in the overall design and management of protected areas and the surrounding landscapes; and
- Recognize the importance of participatory processes that link a diverse array of stakeholders in stewardship of the landscape linkages (IUCN, 2005).

THE ELEPHANT CORRIDOR

Theoretical plans to establish wildlife corridors between Mount Kenya/Laikipia and the adjacent landscapes were conceptualized several years ago by concerned parties including the Mount Kenya Trust, Kisima Farm, Marania Farm, Lewa Wildlife Conservancy, Ngare Ndare Forest Trust and the Kenya Wildlife Service. Though a World Heritage Site and a Biosphere Reserve, Mount Kenya's rich biodiversity is under extreme threat from external influences. Activities such as poaching, logging, livestock grazing, encroachment and charcoal burning continue to threaten the integrity of the property and undermine the values of the ecosystem in the medium and long-term. It was against this background that through a consultative

mechanism, surrounding landowners to the northwest of the National Reserve boundary agreed to cede a critical part of the northern sections of their farms to serve as migratory pathways for wildlife (mainly Elephant) (Coulson Harney Advocates, 2011). This corridor 14 km in length and an average width of 100 m+ links the existing property to the northern historical dispersal areas of Laikipia and Samburu. The Corridor is entirely fenced and acts as a buffer between adjacent farmlands and the corridor habitat (Figure 2).

A detailed study and Environmental Impact Assessment of the corridor was undertaken from 2006 to 2007 with funding to commence fencing of the corridor and construction of the Elephant underpass procured in 2008⁶. The project cost was around US\$1 million plus annual maintenance costs. The formation of this corridor through to the Ngare Ndare Forest aimed to strengthen the protection of the protected area and help create a more continuous and contiguous protected zone to enhance conservation in the area. The corridor was initially envisaged as providing protection for a significant population of the African Elephant (3,000+) (Vanleeuwe, 2000); ensuring genetic diversity and freedom of movement within natural migration zones; and reducing human-wildlife conflict in the area. Although the corridor was developed primarily for migration of elephants and other large mammals, the overall integrity of Mount Kenya is enhanced through improved security, complimentary management regimes, co-ordinated tourism activities, research and monitoring between Park /Forest authorities and the private sector (Mount Kenya Trust, 2007). Also, conservation



Camera trap evidence of multiple species using the corridor in 2012: Hyena (*Hyaena hyaena*), Caracal (*Caracal caracal*), and Aardvark (*Orycteropus afer*) © Mount Kenya Trust

initiatives for charismatic herbivore species continue to be enhanced under this partnership with the presence of rare and endangered species at the Lewa Wildlife Conservancy (Grevy's Zebra – *Equus grevyi* and the Black Rhino). These, together with similar values within Mount Kenya specifically the presence of critically endangered and rare species such as the Bongo (*Tragelaphus euryceros issaci*) made the case for World Heritage extension of a joint property with an additional natural criterion very strong (Nyaligu & Abungu, 2007; Lewa Wildlife Conservancy, 2007).

USING ELEPHANT CORRIDOR DATA TO IDENTIFY CONSERVATION PRIORITIES

Months after opening the Elephant Corridor, conservationists began receiving the first concrete evidence of an elephant using the underpass as a

throughway between the Ngare Ndare Forest and Mount Kenya. The pioneering elephant (known as Tony) walked the full length of the corridor on 26th January 2011 (Figure 3). Tony was also the first elephant to use the corridor's underpass which crosses the Nanyuki - Meru Highway on New Year's day, just a couple of days after the access was opened and joined to the elephant underpass. The elephant was collared shortly after his walk beneath the busy highway and has since been monitored by satellite tracking. His lead resulted in hundreds of elephants using this vital link between the historical elephant rangelands. 123 elephants have been recorded using the underpass (45 towards the Ngare Ndare and 78 towards Mount Kenya) in May and June of 2011 alone and several more since. Within the corridor itself there are large numbers of elephants counted on a daily basis. The most elephants sighted in a single day were a herd of 26 which included three calves.

Within the Mount Kenya/Laikipia ecosystem, there exist clear opportunities to connect areas of conservation-compatible land-use, through strategic investment in areas of high potential wildlife habitats, where land-use is currently incompatible with wildlife conservation. Further opportunities exist, within a regional context, to assess and build on the gaps created in electrified fences (constructed around wildlife conservancies) to allow wildlife movement between areas of similar natural habitat. Similarly there exist certain fence designs which appear to allow the movement of most wildlife species, with the exception of Rhinos. Understanding what options exist for enabling desirable wildlife movement through fenced landscapes should be a priority for further research and conservation action, and experiences gained through the Elephant Corridor, could feed directly into these processes.

Work is also ongoing amongst the Elephant Corridor stakeholders on how to utilize incoming data to prioritize conservation action plans especially for keystone species and species of conservation interest. It is well understood that protected areas in the region are under some degree of threat. This pessimistic analysis is a good common sense background to any assessment but does not help in prioritizing funding or programmatic activities for conservation. Based on Elephant Corridor data analysis, threats that are either only of minor consequence or are still remote possibilities should receive less attention than major threats that are undermining the whole reason for protection. Data analysis of the corridor will therefore serve to identify migratory patterns of several species within the ecosystem.

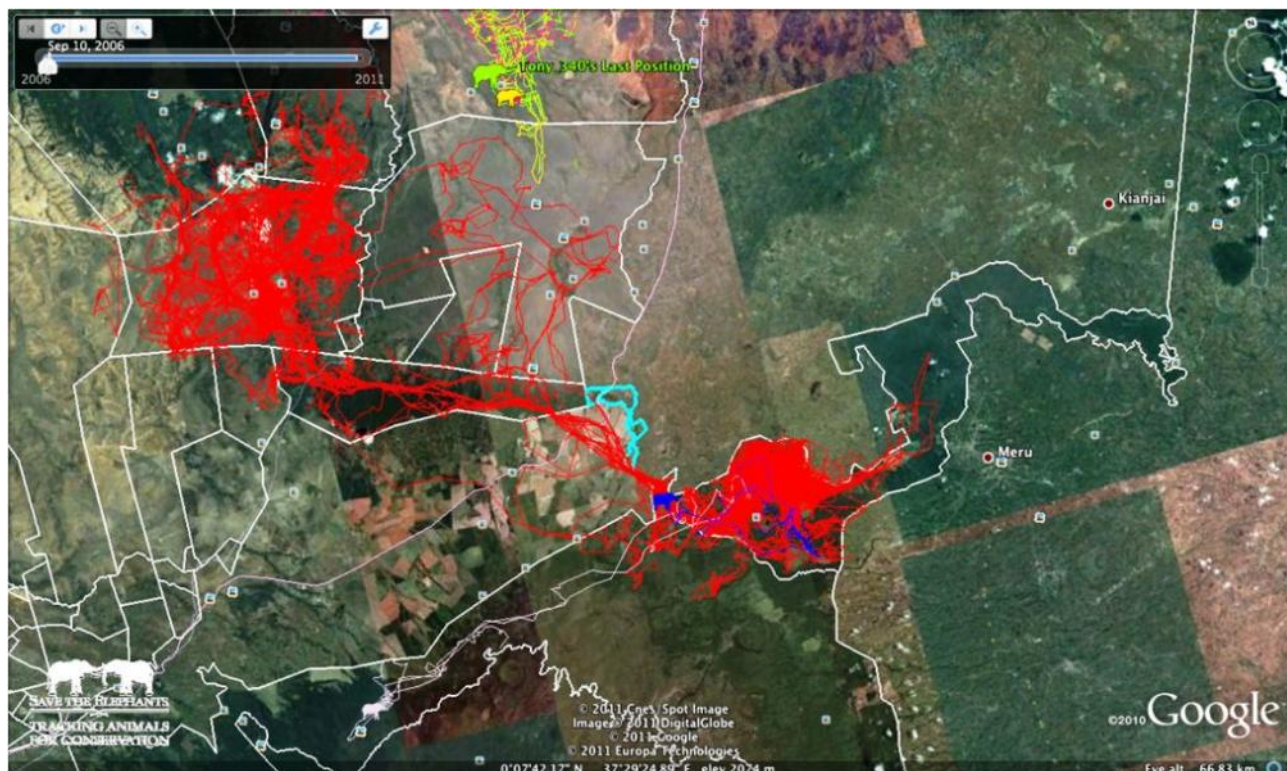


Figure 3: Specific location of the Elephant Corridor showing movement of collared elephants. The red lines indicate satellite tracking movements of the pioneering elephant Tony, while the blue lines indicates the locality of the Elephant corridor in relation to the two connected ecosystems (Laikipia to the north and Mount Kenya to the south). Source: Save the Elephants

REPLICABILITY OF THE ELEPHANT CORRIDOR TO SIMILAR SCENARIOS IN THE EAST AFRICAN REGION

The Mount Kenya Corridor is offered as a conservation model in a challenging environment. The position has been clearly validated by data (acquired via camera traps, foot print counts and actual sightings) showing other wildlife species utilizing the corridor and underpass almost on a daily basis in addition to elephants. This scenario provides a template on the design and use of underpasses as well as stakeholder approaches relevant to such fragile ecosystems and offers some hope for similar plans for a corridor between Laikipia and the Aberdare Mountain range as well as Aberdare and Mount Kenya within the immediate neighbourhood and for similar initiatives elsewhere in the country. Other areas of interest would be the Kilimanjaro/Amboseli ecosystem which is part of the transboundary landscapes of Kenya and Tanzania still endowed with large populations of free ranging wildlife species. However, over the past three decades, significant land use changes coupled with a rapid human population increase have occurred in prime wildlife dispersal areas creating all manner of threats to wildlife populations. There have been localized extinctions of at least three large mammals reported

along this transboundary frontier; the African Wild Dog (*Lycan pictus*), the Klipspringer (*Oreotragus oreotragus*) and the Mountain Reedbuck (*Redunca fulvorufula*) (AWF, 2001). This situation calls for urgent interventions that will help secure wildlife dispersal areas and thus ensure wildlife conservation for posterity. In this regard, the African Wildlife Foundation (AWF) has begun a study to specifically examine land use changes and land tenure systems within the unsecured Kitenden wildlife corridor and their impacts on conservation of wildlife (Kiringe & Okello, 2012).

INSTITUTIONAL ARRANGEMENTS FOR COLLABORATING WITH GOVERNMENT AGENCIES, PRIVATE SECTOR AND COMMUNITIES

Given the international recognition that public/private/community partnership arrangements have attained since the World Parks Congress of September 2003 especially in relation to the themes: 'Linkages in the landscape and seascape', 'Building broader support for Protected Areas' and 'Governance of Protected Areas – New ways of working together', (IUCN, 2005); Governments and conservation agencies have increasingly been faced with the question of whether all private wildlife habitats are to be considered protected

areas? This question was the subject of discussion at the World Parks Congress and has been extensively considered and reviewed within fora such as the Elephant Corridor stakeholder committees (Mount Kenya Trust, 2007). The landscape scenario on Mount Kenya/Laikipia conforms to 'Protected Areas' as defined by the Convention on Biological Diversity (CBD) as '*a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives*' and IUCN '*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). Key elements according to these definitions which are equally relevant to the Elephant Corridor and Mount Kenya are:

- Geographical limits or boundaries
- Predominantly aimed at achieving conservation benefits, but not excluding other related benefits
- Designation and management by legal or other effective means
- Existence of a body of governing rules; and
- A clearly identified organization or individual with governance authority.

Sources such as Mount Kenya Trust (2007) suggest that the Mount Kenya, Ngare Ndare, Elephant Corridor, and Lewa Wildlife Conservancy have all these elements in place. Of equal importance has been the ability of the Elephant Corridor stakeholders to institutionalize and manage local and landscape level conservation programmes on Mount Kenya, the Elephant Corridor, Lewa Wildlife Conservancy and Ngare Ndare Forest. Managing protected area challenges within the Mount Kenya/Laikipia landscape, demands organization at a number of scales. At the connectivity level, effective management includes identifying the reasons for establishing the Corridor link, maintaining or putting in place a management system, including a statement of objectives, the implementation options for management, the means to ensure adaptive management of the protected area in relation to its objectives and purpose, and maintaining relationships with stakeholder groups including local communities and KWS.

KEY MOTIVATIONS

National governments often establish and manage protected areas with the primary objective of biodiversity conservation; a concept understood as having a positive impact for the provision of goods and services to human communities, but which may impose local separation between humans and nature. Biodiversity is perceived as

having intrinsic value, independent from consideration of other human and social interests and concerns. Private entities and local communities, on the other hand, are motivated by a diversity of interests and concerns, while establishing their own conserved areas, or entering into a partnership to manage protected areas established by other social actors or the state. These may include one or more of the following motivations:

- A concern for wildlife protection. In this case the Elephant Corridor stakeholder's movement and dispersal of elephants to and from the Mount Kenya Forest Reserve
- Mitigation of human-wildlife conflicts
- Promotion of tourist related activities.

EXPERIENCES IN CO-MANAGEMENT

Co-management by the stakeholders has become entrenched within the Elephant Corridor, where it is seen as a mechanism of improving management by supplementing the limited resources available to the KFS and KWS with those of the private wildlife conservancies and NGOs. It also formalizes the rights and responsibilities of management partners. There exist two products of a management partnership within the Elephant Corridor arrangement. The first is a stakeholder structure of large scale farm land owners, the Mount Kenya Trust, Lewa Wildlife Conservancy and the Ngare Ndare Forest Trust detailing the management purpose and the roles, rights and responsibilities of each of the parties. This arrangement is reviewed regularly within the Elephant Corridor Committee meetings and engagements. The second is a pluralistic management arrangement structure designed to remain in charge at all times and includes representatives from the principle government agencies – the Kenya Wildlife Service and the Kenya Forest Service. This arrangement also concerns itself with policy and governance provisions at the national level.

CONCLUSION

The key issue this article has attempted to illustrate is that of community/private/public participation in the management of protected area habitats through the provision of linkages within Kenya's conservation landscape.

The following are some conclusions that can be derived from this assessment:

- The long-term persistence of biodiversity within the Mount Kenya/Laikipia ecosystem depends on a system of conservation links that will capture not only examples of various habitats but



Some of the first elephants to make it through the underpass © Associated Press

biodiversity that is both irreplaceable and vulnerable to various threatening processes throughout the region.

- These examples could be replicated elsewhere in the country as for example in the Kitenden Corridor on the Amboseli – Kilimanjaro ecosystem.
- The present capacity of Kenya to provide effective conservation links within the wildlife habitat landscape is limited, partly due to complexities in the land tenure system, rights accorded to private land owners, and prohibitive costs of land acquisition. However, as capacity and awareness to identify potential wildlife migratory corridors (based on the ongoing survey in the Ministry of Environment and Mineral Resources under the Department of Resource Surveys and Remote Sensing) increases, the country will be able to add significant areas as corridors and other habitat linkages to enhance the existing network of protected areas in the country. This optimism is seen in light of new developments; the new constitution and proposed wildlife bill make provision for compulsory acquisition of land to allow for free movement of wildlife and for ecosystem services and this understanding is

rapidly gaining ground amongst landowners, policy and decision makers.

- The key to making the system work from the onset, is to map out, in an explicit and transparent manner which conservation areas are most urgently in need of linkages and which areas can be negotiated and traded for other alternatives (Jones, *et al.*, 2009). In the Kenyan case, this process will require consultations with land owners, private entities and community members if success is to be registered. Provisions within the proposed wildlife bill provide for the creation of Community Wildlife Associations (CWA's) a mechanism that provides for private and community landowners to conserve wildlife outside of mainstream government agencies.

It is also noteworthy that the Elephant Corridor provides a crucial link to the application for an extension of the Mount Kenya World Heritage Property to the Lewa Wildlife Conservancy under natural criteria *vii* and *ix*. Should this application be successful, the proposed site '*Mount Kenya - Lewa Wildlife Conservancy World Heritage Site*' will provide a conservation template for future private/public partnership arrangement under the World Heritage label. Private natural heritage properties

would serve as an important instrument complementing government efforts in biodiversity conservation, providing as in the case of Mount Kenya Trust, Lewa Wildlife Conservancy and Ngare Ndare Trust, a conservation benefit that is public in essence but does not originate with the state agencies concerned.

At a more localized level and in line with the 2003 World Parks Congress theme '*Benefits Beyond Boundaries*', this arrangement will induce sustainable development, creating a cluster of activities such as ecotourism, scientific research and environmental education, as well as providing non-timber forest materials such as seeds and seedlings that can be profitable to their owners and local communities.

Such landscape linkages through private property are also contributing to a rapid and substantial increase in the amount of protected areas in the country. They represent a positive cost/benefit equation to the Government of Kenya which does not have to buy or expropriate important parcels of land for conservation. At the same time, land owners gain recognition as conservationists and receive support from environmental law enforcement, and benefit from co-operation with local and foreign universities and NGO's to develop research and sustainable activities on their lands. The rights given to private land owners under the new constitution (Government of Kenya, 2010) and the Wildlife Bill (Government of Kenya, 2011), has facilitated the proactive participation of private land owners in the national effort to restore and protect biodiversity (Ministry of Tourism and Wildlife, 2007). Private protected areas and community conservancies constitute one of the most conspicuous types of protected areas in the country, be it by their fast growth in number and area or by the attention these areas are receiving from landowners, government, NGO's and the local and international media. While conservation lands under private ownership may be vulnerable to land-use change, in the context of the Elephant Corridor, this is unlikely to be the case as a deed (covenant agreement) exists and this involves the two principle state agencies – KFS and KWS. In addition, the Government of Kenya is encouraging private/public partnership arrangements along this front (the World Heritage extension is a case in point). As such, the authors of this article do not envisage any change in land-use in the immediate Corridor vicinity for the foreseeable future.

ACKNOWLEDGEMENTS

The authors are grateful to the principle stakeholders of the Elephant Corridor, the surrounding communities on the upper and lower ends of the Corridor, the KWS and KFS for transforming what was essentially a conceptual theoretical idea into a practical Elephant Corridor. Special appreciation goes to Marania and Kisima farms for dedicating land for conservation posterity, several donors who made it possible to secure funding for this project, other like minded conservation agencies including the Ngare Ndare Forest Trust, the Lewa Wildlife Conservancy, the organization Save the Elephants and the Government of Kenya for creating an enabling environment that has in turn led to the creation of viable private/public partnership arrangements.

NOTES

¹ <http://www.environment.go.ke/archives/2030>

² The Mount Kenya Trust is a not for profit organization dedicated entirely to the conservation of the Mount Kenya ecosystem. <http://www.mountkenyatrust.org>

³ In 1999, a detailed forest status report by UNEP and other stakeholders' highlighted the challenges facing the conservation of the mountain and brought Mount Kenya to the national and international limelight. This report in part acted as the basis of conservation support by Mount Kenya Trust to KWS and KFS.

⁴ The property was inscribed on the UNESCO World Heritage List in 1997 and two years later inscribed on the list of World Heritage in Danger

⁵ <http://www.birdlife.org/datazone/sitefactsheet.php?id=6395> accessed 17th December 2012

⁶ Major donors for the Elephant underpass were: The Royal Netherlands Embassy through the Laikipia Wildlife Forum, Virgin Atlantic, The Nature Conservancy and supporters of the Lewa Wildlife Conservancy. Maintenance costs since construction have been met by the Safaricom Foundation and the immediate Corridor stakeholders.

REFERENCES

- AWF, (2001). *Study on the Development of Transboundary Natural Resource Management Areas in Africa: Kilimanjaro Heartland Case Study*. The African Wildlife Foundation. Nairobi, Kenya. <http://www.awf.org/documents>
- Bennett, A.F., (2003). *Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation*. Gland, Switzerland and Cambridge, UK: IUCN
- BirdLife International, (1998). *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*, Cambridge, UK: BirdLife International
- BirdLife International, (2000). *Threatened Birds of the World*. Barcelona, Spain and Cambridge, UK: Lynx Edicions and BirdLife International.
- Coulson Harney Advocates (2011). *Deed relating to the establishment and maintenance of a fenced elephant corridor and buffer zone*. Nairobi, Kenya: Coulson Harney Advocates
- Dudley, N. (ed.) (2008). *Guidelines for Applying IUCN Protected Area Categories*. Gland, Switzerland: IUCN

- http://www.iucn.org/dbtw-wpd/edocs/paps-016.pdf
 Government of Kenya, (2010). *Laws of Kenya: The Constitution of Kenya 2010*. Nairobi, Kenya: The National Council for Law Reporting
- Government of Kenya, (2011). *The Wildlife Bill 2011*. Government Press. Nairobi, Kenya.
- Government of Kenya, (2012). *Mount Kenya – Lewa Wildlife Conservancy World Heritage Site: A Nomination Dossier* p. 10 – 34. The Kenya National Commission for UNESCO. Nairobi, Kenya.
- IUCN, (1997). *World Heritage Nomination – Technical Evaluation of Mount Kenya*. Programme on Protected Areas, Gland, Switzerland.
- IUCN, (2005). *Benefits Beyond Boundaries: Proceedings of the Fifth (Vth) IUCN World Parks Congress*. Gland, Switzerland and Cambridge, UK: IUCN
- Jodi, A.H., et al., (2006). *Corridor Ecology: The science and practice of linking landscapes for biodiversity conservation*. Washington DC, USA: Island Press
- Jones, T., et al. (ed), (2009). *Wildlife Corridors in Tanzania*. Arusha, Tanzania: Tanzania Wildlife Research Institute
- Kiringe, J.W. and Okello, M.M., (2012). *Land use and land tenure changes and their impact on the Kitenden Wildlife Corridor between the Amboseli and West Kilimanjaro ecosystems*. Nairobi, Kenya: The African Wildlife Foundation.
- KWS and KFS, (2008). *Mount Kenya Integrated Ecosystem Management Plan 2009 – 2019*. Nairobi, Kenya: KWS & KFS.
- Lambrechts, C., Woodley, B., Vanleeuwe, H., and Gachanja, M., (2003). *Changes in the State of Conservation of Mount Kenya Forests: 1999 – 2002*. Nairobi, Kenya: DICE (University of Kent), Kenya Wildlife Service, UNEP, Kenya Forests Working Group.
- Lewa Wildlife Conservancy, (2007). *The Lewa Wildlife Conservancy Meru District, Kenya: Management Plan*. Laikipia, Kenya: The Lewa Wildlife Conservancy
- Lindenmayer, D.B. and Fischer, J., (2006). *Habitat Fragmentation and Landscape Change*. Washington D.C., USA: Island Press.
- McArthur, R.H. and Wilson, E.O., (1967). *The Theory of Island Biogeography*. Princeton, NJ, USA: Princeton University Press.
- Ministry of Tourism and Wildlife, (2007). *Draft Wildlife Policy*. Nairobi, Kenya: National Wildlife Policy Steering Committee and Secretariat.
- Mount Kenya Trust (2007). *An Elephant Corridor linking the Mount Kenya National Forest Reserve and the Ngare Ndare Forest*. Nairobi, Kenya: Mount Kenya Trust
- Mount Kenya Trust, (2012). *Monthly Progress and Activity Report for October*. External evaluation of the Lewa – Mount Kenya World Heritage extension. Nanyuki, Kenya.
- Newmark, W.D., (2008). Isolation in African protected areas. *Frontiers in Ecology and Environment* 6: p 231 – 328.
- Nyaligu, M.O. and Abungu, G.O., (2007). *Feasibility Report on the Assessment of Lewa Wildlife Conservancy as a possible extension to the Mount Kenya World Heritage Property*. Lewa Wildlife Conservancy. Unpublished report p. iii.
- Sara J. S., Jeffrey A. M. and Seth S., (2008). *Ecoagriculture: Agriculture, Environmental Conservation, and Poverty Reduction at a Landscape Scale*. In: Galizzi, P. and Herklotz, A. (eds.). 2008. *The Role of the Environment in Poverty Alleviation*. Washington, DC , USA. Fordham University Press
- SCBD, (2010). *Making Protected Areas Relevant: A guide to integrating protected areas into wider landscapes, seascapes and sectoral plans and strategies*. CBD Technical Series No. 44. Montreal, Canada: Convention on Biological Diversity
- Stolton, S. and Dudley, N., (2010). *Managing for Climate Change – Developing Strategies for Protected Area Managers*. Isle of Vilm, Germany: German Federal Agency for Nature Conservation.
- UNESCO, (2012). *Operational Guidelines for the Implementation of the World Heritage Convention*. WHC.05/2, 1 February 2012. Paris: UNESCO World Heritage Centre.
- UNEP, (2012). *Protected Planet Report 2012: Tracking progress towards global targets for protected areas*. Gland, Switzerland and Cambridge, UK: IUCN and UNEP - WCMC
- Vanleeuwe, H., (2000). *Habitat use and movements of the Mt. Kenya Elephant population*. Unpublished PhD. Thesis.

ABOUT THE AUTHORS

Maurice Nyaligu has over twelve years of protected area experience in the Eastern Africa region. His engagements have previously involved work with the Kenya Wildlife Service, the IUCN and independent consultancy assignments for various conservation agencies. A Kenyan by birth, Maurice is a member of the WCPA. He holds a post-graduate degree (MA) in International Relations (Washington International Univ.) and a bachelor's (Bsc.) degree in Wildlife Management (Moi Univ.). His interest in the Mt. Kenya ecosystem stems from a childhood passion. His hobbies include mountaineering and outdoor sports.

Susie Weeks is a Kenyan conservationist with extensive wildlife and environmental knowledge of East Africa. She graduated from the School of Oriental and African Studies at the University of London with a Bachelor of Arts (BA) and obtained a postgraduate Masters degree in Environmental Protection and Management from the University of Edinburgh a few years later. She is a gazetted Kenya Wildlife Service Honorary Warden, a member of the Kenya Professional Safari Guides Association. Susie has participated in many private/public partnership arrangements within conservation circles in Kenya and has been responsible for the successes of several projects on Mount Kenya since 2001 including playing a major role in the establishment and construction of the Mount Kenya Elephant Corridor.

RESUMEN

El aumento de la población humana, la fragmentación de las tierras, el cercado y la proliferación del desarrollo agrícola en las faldas del Monte Kenia están aislando progresivamente la fauna y flora del Parque Nacional/Selva Natural del Monte Kenia. Esta fragmentación alrededor de la montaña se traduce en la reducción de la superficie total disponible para la fauna silvestre y la interrupción de los movimientos de grandes mamíferos entre la montaña y los pastizales y sabanas de las llanuras circundantes. La desaparición de dos grandes mamíferos del ecosistema forestal en las últimas tres décadas, el rinoceronte negro (*Diceros bicornis*) y el perro salvaje africano (*Lycaon pictus*), puede atribuirse en parte al aislamiento de los hábitats forestales de altura que impide los movimientos ocasionales de la fauna silvestre desde las tierras bajas donde son más comunes. Se ha desarrollado una franja de 14 km de tierra en el sector noroccidental de la montaña para ayudar a mitigar este aislamiento. La franja ha sido recientemente afianzada como hábitat y ruta migratoria hacia el norte para la fauna silvestre dentro del ecosistema de 2000 km². Usando el Corredor de Elefantes en el Monte Kenia a modo de ejemplo, los autores destacan cuestiones y consideraciones teóricas que han llevado a muchos científicos, planificadores y administradores de la naturaleza a reconocer la importancia de mantener la conectividad para las especies, las comunidades y los procesos ecológicos dentro de paisajes de conservación que son objeto de una acelerada fragmentación. El principal razonamiento es que la conectividad se puede lograr para las especies silvestres y las comunidades gestionando el mosaico completo del paisaje a través de hábitats adecuados, como es el caso de los corredores.

RÉSUMÉ

La croissance de la population humaine, la fragmentation des terres, les clôtures et le développement de l'agriculture sur les pentes les plus basses du mont Kenya isolent de plus en plus la faune et la flore du Parc national du mont Kenya et de la Réserve nationale. Cette fragmentation des terres du mont Kenya entraîne une réduction de la surface totale disponible pour la vie sauvage, et perturbe les déplacements des grands mammifères entre leurs différents habitats – la montagne et les pâturages/la savane des plaines environnantes. La disparition de deux grands mammifères de l'écosystème forestier au cours des trente dernières années, le rhinocéros noir (*Diceros bicornis*) et le chien sauvage africain (*Lycaon pictus*), peut d'ailleurs en partie être imputée à l'isolement des habitats forestiers des terres supérieures, qui empêche les déplacements occasionnels de la faune sauvage occupant les terres plus basses, où elle est plus commune. Une bande de terre de 14 kms dans la région nord-ouest du mont Kenya a récemment été délimitée pour atténuer cet isolement. Au sein d'un écosystème de 2000 km², cette zone a été déclarée couloir d'habitat et de migration vers le nord pour la faune sauvage. Prenant l'exemple du couloir de l'éléphant sur le mont Kenya, les auteurs soulignent les problèmes et les considérations théoriques ayant conduit de nombreux scientifiques, planificateurs et gestionnaires de la conservation à reconnaître à quel point il est important de préserver la connectivité pour les espèces, les communautés et les processus écologiques au sein de paysages naturels qui se fragmentent rapidement. En effet, il est possible d'améliorer la connectivité entre les espèces de la vie sauvage et les communautés en gérant l'ensemble de la mosaïque du paysage par des habitats appropriés comme des couloirs.



COLLABORATIVE GOVERNANCE AND BENEFIT SHARING IN LIUWA PLAIN NATIONAL PARK, WESTERN ZAMBIA

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ABSTRACT

Several models of public private partnerships have emerged focusing on wealth creation from high value resources, risk distribution through cost and benefit sharing, and prevention of loss of biodiversity through collaboration among members of the public and private sectors and local communities. However, there remain many information gaps underlying their social-ecological system performance. A case study of Liuwa Plain National Park (3,660 km²), western Zambia, to demonstrate the relationship between social capital and operational management by multiple partners between 2004 and 2011 was carried out. Literature review, expert knowledge and interviews of 57 informants with historical perspectives of the area were employed. We determined that social-economic-ecological gains and benefit distribution were influenced by the capacity of partners to negotiate collective interests. Intra and inter-partnership networking, social learning and differential capacity were also important factors.

KEYWORDS: public private partnerships, Liuwa Plain National Park, Zambia, benefit distribution

INTRODUCTION

The continued loss of biodiversity in most African countries has triggered policy attempts to experiment with various forms of partnerships in state owned protected areas (Fearnhead, 2009; Leverington et al., 2010; Lockwood, 2010). Though there has been proliferation of partnerships in Africa in the last few decades, literature on public private partnerships (PPPs) in protected areas remained limited (Farlam, 2005). Experiments with partnerships for protected area management are usually conducted in tandem with initiatives that seek to address park-neighbour conflicts and natural resources privatisation (Abbot et al., 2000; Barrow et al., 2000; Jones & Murphree, 2001; Fearnhead, 2009). Partly driven by the notion of 'sustainable' institutions (Arrow et al., 1995), the main objective of these partnerships has been to manage the carrying capacity and social-ecological resilience of protected areas (Dearden & Bennett, 2005). This involves collaborative and legally binding relationships based on shared responsibilities, resources, risks and benefits associated with protected area management within a defined period of time (Phillips, 2003). This

objective was stressed at the 2002 World Summit on Sustainable Development in South Africa where civil societies and local communities were also explicitly recognised as being vital elements of traditional partnerships. The notion of partnerships has also been advanced through other international instruments such as the Convention on Biological Diversity (CBD) and particularly CBD Aichi targets that provide a platform for effective conservation, sustainable use and equitable sharing of benefits from natural resources (CBD, 1992 and 2011). In addition, community based natural resource management (CBNRM) fosters mutually beneficial partnerships, and collective management of natural resources by the state, local communities and other stakeholders (Suich et al., 2009).

The introduction of the theme of benefit sharing in discussions around partnerships has led to research efforts aimed at exploring ways to promote and assess progress towards effective benefit sharing (Farley & Costanza, 2010; Howard, 2010; Nkhata et al., 2012), particularly in state owned protected areas. These efforts have incorporated analyses of broader aspects of benefit

sharing initiatives such as social and human development goals, recognition of social justice and the uniqueness of each country's indigenous culture, and acknowledgment of the limits imposed by natural resource management (Gruber, 2010). These research efforts have further reflected growing recognition that benefit sharing initiatives cannot be successful in the absence of well-functioning governmental organisations, local community institutions and free-market mechanisms (Schuklenk & Kleinsmidt, 2006; Wunder, 2007). Given the implications of diverse entities working together to accomplish common objectives and produce greater public value (Turton, 2008), such research efforts have been identified as belonging to a new area of inquiry focusing on the theme of collaborative governance (Brower et al., 2010). Although a significant amount of literature on the topic of collaborative governance does exist, there is still much to be learned from studying a diverse array of these systems to better understand how they function and what it takes for them to be successful (Pomeroy et al., 2010; Lockwood, 2010).

In this paper, we use the theory of collaborative governance to analyse the partnerships arrangements behind a benefit sharing scheme in Liuwa Plain National Park (LPNP) in Zambia. The case study provides useful information about how collaborative governance systems are designed and managed so as to function effectively in the context of benefit sharing. It presents an instructive example of the complexities of collaborative governance. The core objective of the partnership in LPNP had a public-oriented focus, while the benefit sharing programme was fundamentally a private sector initiative. Although both the public sector and local community actors actively participated in the partnership, questions still remain whether the private sector actor adopted a more competitive or collaborative approach in the benefit sharing programme. We argue that a collaborative governance perspective illustrates how, through the use of cross-sectoral partnerships, the level of stakeholder participation in benefit sharing schemes can be either enhanced or diminished. Therefore, the questions we consider in this paper are: How does collaborative governance enhance partnership performance of a state owned protected area such as LPNP? What is the role of partnership process in fostering implementation of the partnership? Are power relations and benefit sharing between parties important factors in a partnership for protected area management? We hypothesise that benefit sharing among the stakeholders influences performance of parts of the socio-ecological system in the LPNP.

COLLABORATIVE GOVERNANCE PERSPECTIVE FOR EXPLORING PARTNERSHIPS FOR BENEFIT SHARING

It is important to acknowledge that the term collaborative governance means different things to different people (Paavola et al., 2009). In the environmental sector, the term only emerged in the recent years in response to perceived failures in policy making and implementation (Phillips, 2003; Lockwood, 2010). The limitations of conventional command and control approaches to environmental problems played a critical role in the emergence of the term. We begin by breaking down the term into the two concepts on which it is based: collaboration and governance (Armitage et al., 2008).

Collaboration is essentially a social process that involves different actors working together to create more benefits than could be produced in unilateral settings (Hall, 1995; Imperial & Kauneckis, 2003; Imperial, 2005). This process is founded on social relationships in which different actors influence each others' behaviour to promote common interests. The advantages of collaboration include reduced transactional costs, greater social-ecological resilience, and enhanced performance. Most researchers do not view collaboration as a 'fix-all' strategy for all social problems. As such, its significance is usually contingent upon a range of contextual, preferential and contingency factors (Wondolleck & Yaffee, 2000; Imperial, 2005).

Governance is usually defined as 'the interactions among structures, processes and traditions that determine how power is exercised, how decisions are taken on issues of public concern, and how citizens or other stakeholders have their say' (Graham et al., 2003). Essentially, governance processes reveal the interactions amongst social actors, of which government is just a part (Olsson et al., 2004; Imperial & Kauneckis, 2003). This process can be institutionalised at different levels of human interaction as a means of social coordination that engenders ordered rule, collective action (Ostrom, 1990; Stoker, 1998), and allows members of society to share power and make decisions (Berkes, 2009; Plummer & Armitage, 2007).

From the above, collaborative governance can be conceived as societal arrangements where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented and deliberative and which aims to make or implement public policy or manage public programmes or assets (Armitage & Plummer, 2010).



Cheetah (*Acinonyx jubatus*) © Martin Harvey / WWF-Canon

LIUWA PLAIN NATIONAL PARK: BIODIVERSITY, HISTORY AND MANAGEMENT

LPNP (3,660 km²) is one of the 20 National Parks in Zambia. It is managed under Wildlife Act. No. 12 of 1998 by the Zambia Wildlife Authority (ZAWA). It is located in the western part of Zambia at 14°13'-14°51'S and 22°18'-22°55'E, and is approximately 1050 m above sea level. The Park is characterised by human habitation; sedentary agriculturists practicing mixed farming system but living with wildlife. It is a generally flat grassland landscape, with seasonal floodplain where land is inundated from December to June. The floodplain is typified by grass species of Common Russet grass (*Loudetia simplex*) and Oats grass (*Monocymbium ceresiiforme*). Drier areas also develop termite mounds, forming wooded islands. Floodplain fringes have Zambesi Redwood (*Baikiaea plurijuga*) and Burkea (*Burkea africana*) dominated woodlands (van Gils, 1988; ZAWA, 2009).

Liuwa plain has a high biological diversity of conservation importance. According to Leonard (2005), the plain is important bird area for variety of bird species that include Wattled Cranes (*Grus carunculatus*), Southern-crowned Cranes (*Balearica regulorum*), Spur-winged Goose (*Plectropterus gambensis*), Caspian

Plovers (*Charadrius asiaticus*), Common Pratincoles (*Glareola pratincola*), Black-winged Pratincoles (*Glareola nordmanni*), Saddle-billed Storks (*Ephippiorhynchus senegalensis*), endemic Clapper Larks (*Mirafra apiata jappi*) and Pink-billed Larks (*Spizocorys conirostris makawai*). Fauna found in LPNP include migratory Blue Wildebeest (*Connochaetes taurinus*), Common Zebra (*Equus burchelli*), Tsessebe (*Damaliscus lunatus*), Red Lechwe (*Kobus leche leche*), Lion (*Panthera leo*), Wild Dog (*Lycaon pictus*), Cheetah (*Acinonyx jubatus*), Spotted Hyaena (*Crocuta crocuta*), Spotted-necked Otter (*Lutra maculicollis*), Oribi (*Ourebia ourebi*) and Southern Reedbuck (*Redunca arundinum*). The migratory Blue Wildebeest population of LPNP is probably second only from that of Serengeti in East Africa (Estes & East, 2009). The plain is drained by two large rivers, Luambimba and Luanginga, dominated by *Syzygium* spp.

Liuwa plain was managed by King Litunga Lubosi Lewanika of the Lozi people as a hunting reserve until its establishment as National Park in 1972 (ZAWA, 2009). Management was through representatives of traditional leadership, the area chiefs and traditional advisors, indunas, responsible to the King Litunga. Upon establishment of the Park, management of natural resources was transferred to the government, by legal

statute, and ZAWA was mandated to manage the Park. Local communities contested the ownership of the Park and its resources, some conspired with Angolan renegades from the neighbouring civil war, who were well equipped with firearms, to plunder the natural resources of Park. This situation went on for several years. As a consequence of this and inadequate resource protection, poor management and tourism infrastructure, and limited benefits to local communities residing in the Park, the government began to explore new partnerships towards more effective management.

METHODS

The study was motivated by information gaps in the underlying collaborative governance processes of many partnerships for benefit sharing schemes in Africa. We employed a literature review and expert knowledge coupled with focused interviews with 57 randomly selected informants. The authors have worked extensively in the wildlife sector of Zambia and have amassed technical knowledge in protected area management for over two decades. The informants were drawn from public sector organisations, private sector lead organisations, NGOs and local communities. An interview guide was used to generate historical perspectives of LPNP for the period between 2004 and 2011 (Annex 1). A case study approach, as described by Noor (2008), was used to develop a detailed account of the situation. Qualitative field research methods were used to establish the relationships between concepts and themes (Strauss & Corbin, 1998) relating to social capital, events and mechanisms in collaborative governance and benefit sharing in the partnership. Protocols suggested by Bradburn et al. (2004) were used to guide interviews with knowledgeable people about LPNP. The scope of the case study was limited to partnership events and mechanisms, power relations and socio-economic-ecological performance.

THE PARTNERSHIP ARRANGEMENTS UNDERLYING BENEFIT SHARING IN LIUWA PLAIN NATIONAL PARK

In Zambia, partnerships for protected area management can be traced back to the mid-1980s (Dalal-Clayton & Child, 2003) and were aimed at addressing the poaching crisis during a time of limited state funding. Partnerships were based on emerging decentralisation policies for rural development and poverty reduction (Suich et al., 2009). They usually involved the government, philanthropic partners with interest in biodiversity conservation and local communities co-existing with natural resources. Partnerships were legitimised by legal

instruments (e.g. Agreements or Memoranda of Understanding), running for varied periods, ranging from one to 20 years. Documentation on partnerships in protected areas was, however, limited compared to those in transport infrastructure and agricultural sectors.

The PPP in LPNP was characterised by five discrete but interlinked constituencies: LPNP as a part of the Upper Zambezi social-ecological system; the ZAWA as LPNP management agency; Strichting African Parks Foundation (SAPF) as a private partner; Barotse Royal Establishment (BRE) representing local communities in the Park; and a Partnership Board which governed the partnership on a company basis (Figure 1). The social-ecological system of LPNP was characterised by high value common property resources such as migratory blue wildebeests, locally utilised through tourism and licensed hunting.

There are about 20,000 inhabitants in 432 villages in LPNP (Apse & Seybert, 2010), who were originally sanctioned by King Litunga to keep game animals. In 1972 when the hunting reserve was established as LPNP, the government allowed human settlements to continue as the local communities were previously entrusted by their traditional leadership to manage natural resource. However, as noted above in the period following the establishment of the Park, natural resources were depleted due to poorly funded operations and disenfranchised local communities. In May 2004, the PPP was established between ZAWA, SAPF and BRE through a Management Agreement (relationship 1, 2 and 3 in Figure 1) to help resolve these problems. The existence of local communities in the Park who were managing wildlife prior to establishment of the Park was the basis for co-management and shared governance over the Park resources. BRE, working through the traditional chiefs and indunas, liaise with local communities on their inspirations and challenges and worked in turn with ZAWA and SAPF, to collectively discuss and resolve issues. Issues of equity are dealt with in a transparent manner by disclosure during public and Board meetings. The chiefs and indunas are accountable to both King Litunga and local communities through regular feedback (e.g. through local meetings).

The 2004 Agreement aimed at providing financial, ecological and political sustainability for the Park governed by the Partnership Board. The main components of Agreement are given in Annex 2. Operational management function was relinquished to SAPF by the government. Three distinctive levels of

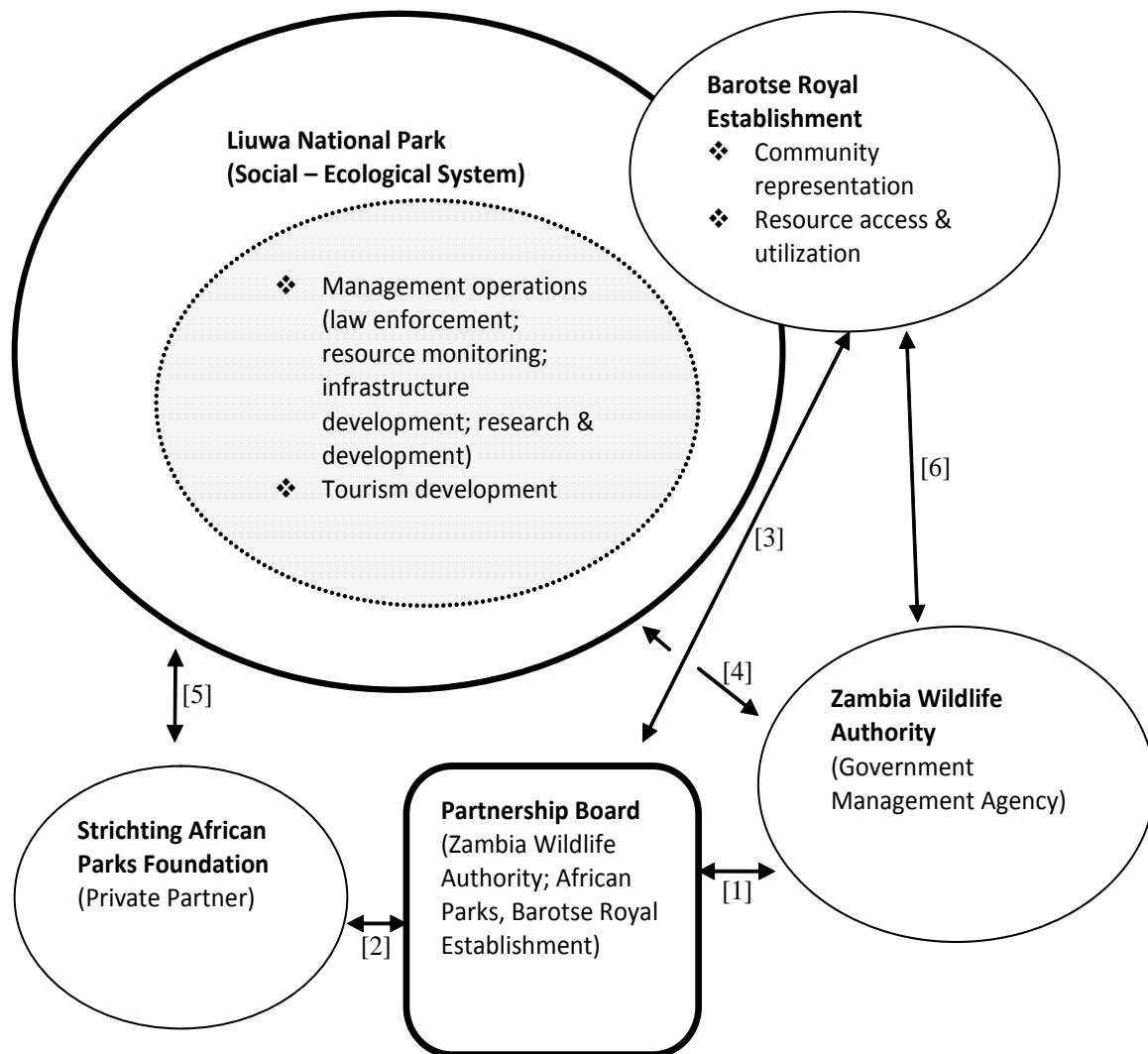


Figure 1: Operational framework of public private partnership in Liuwa Plain National Park, 2004 -2011.

interactions were identified for the entire partnership: at contractual level relating to the Agreement, decision-making level relating to consensus made inter-party and operational level relating to activities in the field.

Incentives were a central activity and the basis for collective action. ZAWA maintains the regulatory roles as the employer of the Park's law enforcement staff, supplier of animals to restock the Park (relationship 4) and provides relevant legislative interpretation to the Park management team. SAPF is responsible for upgrading wildlife tourism development, valorisation of natural resources, transferring of income generated to benefit local communities and facilitate preservation of cultural heritage (relationship 5). In terms of income generation, local communities manage four rice grinding mills and five community campsites. They retain camping fees, sell firewood to tourists, charge for traditional cultural performances at the campsites, weave

and sell baskets made from raw materials obtained in the Park, catch fish in designated Park fish ponds free of charge and are allowed to hunt animals in the surrounding Upper West Zambezi Game Management Area on 'resident' licences issued by the government. The other main role for local communities is conducting resource protection and monitoring through village scouts, trained by SAPF. In order to secure funds, SAPF was mandated to raise substantial funding from cooperating partners and recruit technical personnel for park operations and tourism development. Further, SAPF was responsible for animal population growth, capital asset, wildlife translocations, resource economics and local leadership. Recognising the importance of garnering conservation support, BRE was involved at the policy making level, facilitating community projects and participating in conservation programmes (relationship 6). External support to the partnership and legitimisation of its operations were indirectly applied via SAPF.

PARTNERSHIP PROCESSES AND POWER RELATIONS

In the process of establishing the LPNP partnership, lessons learnt previously within Southern Africa (Fearnhead, 2009) on institutional experiences of partners on, for instance, partnership administrative structures and park management systems development resulted in a shorter 'learning curve'.

Negotiation processes for the partnership development lasted for more than one year. Political and traditional BRE leadership played a critical role in the establishment and maintenance of the partnership. However, the seemingly top down approach of the partnership establishment processes undermined ZAWA's participation. SAPF articulated, in substance and process, roles and responsibilities while other partners struggled with interpretation of the provisions of the partnership. More positively these matters were redressed through partnership communication channels, including regular quarterly Board meetings, though these efforts were protracted due to officialdom within ZAWA (Annex 2). Regardless of the challenges, high confidence by private donors in SAPF resulted in substantial start-up and implementation funds. Early in the partnership process, the resources acquired were spent in offsetting high transaction costs of establishing and implementing the protected area management partnership, sensitising and training stakeholders, providing operational logistics and personnel placements.

Though initially parties conceded to the Board's decision making, unbalanced representation caused skewed power relations at contractual, decision making and even operational level. Uneven power relations and rights favoured SAPF, due to what turned out to be a poorly and inequitably negotiated partnership contract. ZAWA's decision making mostly prevailed at contractual level, hence ZAWA embarked on re-engaging partners to strengthen decision making provisions in the operational management of LPNP while enfranchising SAPF.

Some people also felt that partnership negotiations were not adequate. During the implementation of Agreement, partnership decision making was undertaken in quarterly meetings of the Board. Ground rules for implementation of the partnership included upholding by all parties decisions agreed during the meetings, openness of each party to the other, the agreement of definitive channels of communication and pursuing amicable means to resolve any developing conflict. Despite the initial problems, a planned independent performance

evaluation in the first five years of the PPP gave a positive assessment of partnership credibility (Apse & Seybert, 2010).

The partnership operates at a strategic business unit, where funds raised from park fees, tourism and private donations are retained for conservation and rural development, with the aim that operations became cost neutral or profit making. Local communities retained revenues from various income generating activities and community projects noted above. Financial benefits' sharing on company profits is based on partner shareholding with 70 per cent going to SAPF and 30 per cent to BRE. No revenues generated in the Park were shared with ZAWA, although they have expressed a wish to be included as a shareholder in the partnership.

The partnership adopted an adaptive management approach. Through innovations and competition, the management team was able to learn from other parks within Zambia and the region on how they were managing for instance park law enforcement, tourism development, infrastructure development and community relations. This type of cooperative learning allowed the testing of various approaches and allowed the management team to adapt operations to meet specific circumstances. For example, with an increased emphasis on discipline, provision of incentives and a targeted patrol system, the management team of LPNP were able to effectively manage environmental crimes in the Park. At an operational level, marketing and planning, whose outputs included business and land use plans, were core elements in guiding management decisions. The capture of benefits by elites was avoided by widespread local participation instead of targeting interventions to a few selected influential individuals. The main checks and balances put in place for avoidance of capture of benefits by elites were openness and transparency with local communities, through notifying BRE on benefit distribution.

ECOLOGICAL PERFORMANCE

As noted, prior to partnership establishment, large mammal populations were overhunted in LPNP by Angolan armed factional forces and fugitive refugees. The partnership restored the fragile ecosystem and ecosystem processes that threatened the traditional cultural and ecological integrity of LPNP. Restoration activities included wildlife re-introductions of major species such as Eland (*Taurotragus oryx*) (49), Cape Buffalo (*Syncerus caffer*) (50) and Lion (2). Increased anti-poaching activities; including use of investigation

Table 1: Changes in animal populations prior to and during the Liuwa Plain National Park partnership

Wildlife species	Prior to partnership implementation		During partnership implementation			
	1991 ¹	December 2001 ²	December 2004 ³	April 2007 ⁴	April 2009 ⁵	April 2011 ⁶
Plains Zebra (<i>Equus burchelli</i>)	771	2,500	2,706	3,977	4,992	4,431
Oribi (<i>Ourebia ourebi</i>)	463	116	1,241	1,411	911	935
Red Lechwe (<i>Kobus leche leche</i>)	534	215	966	1,167	1,405	1,272
Tsessebe (<i>Damaliscus lunatus</i>)	7,674	300	430	501	1,231	878
Blue Wildebeest (<i>Connochaetes taurinus</i>)	29,369	15,000	23,455	33,088	36,494	42,717
Wattled Crane (<i>Bugeranus carunculatus</i>)	-	588	-	-	1,695	1,717

Notes: Adapted from Viljoen (2011) for the period between 1991 and 2011 (¹Tembo & Saiwana, 1991; ²Kamweneshe et al., 2003; ^{3, 4, 5 & 6}Viljoen, 2005; 2007; 2009; 2011)

and intelligence information, conducting of regular 'village sweeps' (i.e. systematic and legitimised search for illegal items such as firearms) and field patrols. Regular animal censuses and population monitoring have been conducted since the beginning of the partnership.

Table 1 depicts the changes in animal populations from baselines in 1991 and 2001, compared with period of partnership. The annual operational expenditure reached US\$230 per km² for LPNP in 2011 from less than US\$101 per km² prior to the partnership. In 2007, a management effectiveness tracking tool for protected areas in Zambia (METTPAZ) assessment confirmed through the use of scorecards and nominal rating that LPNP was effectively managed by the partnership, and was effective against threats such as poaching, wild fires, human encroachment and deforestation (Mwima, 2007). As a result of partnership conservation efforts, tourist arrivals in LPNP increased and averaged at 440 tourists per annum from 291 tourists in 2003 (Apse & Seybert, 2010). Further, establishment of Transfrontier Conservation Area between Mussuma Area in Angola and LPNP in Zambia is currently underway.

SOCIO-ECONOMIC PERFORMANCE

Local communities in LPNP received several financial and non-financial benefits resulting from the LPNP partnership between 2004-2011. The transfer of benefits for rural development was linked to wildlife conservation; as a result project development by local communities is increasingly supporting Park sustainability. The benefits *inter alia* include: annual jobs increased by 733 per cent from 12 jobs in 2004 to 100 jobs by 2011 for local people in 'low volume, high value' tourism development. A total of 37 pupils received school scholarships. At Lukoko School, one block of two

classrooms and two teachers' houses were constructed. Six campsite attendants' houses were built. A reforestation programme in settled areas included the supply and planting of 700 fruit and indigenous trees (plus 82 watering cans), 500 of which were planted on the school grounds of 18 local schools. Kalabo High School computer room and V-Sat internet facility were constructed, and thirty computers donated. Twenty-six boreholes were sunk for domestic water supply to 26 villages and schools. Three water wells were dug at the three community campsite at Lyangu, Kwale and Katoyana. Four hundred solar cookers were distributed for local communities' use, to help address the unsustainable harvesting of fuel wood. In addition, 79 energy saving stoves were supplied to local community members for use. Four rice grinding mills were distributed for use by local communities. Eleven women's clubs were registered, and were financially and technically supported in skills and product development. LPNP inter-schools drama festivals, community training in conservation and the Liuwa Environmental Education Programme (LEEP) involving 5,000 school children were facilitated and all focused on a strong outreach component. Core conservation values such as traditional fishing and animal grazing grounds were protected, and the historical Libonda Kuomboka and Liyenya annual traditional ceremonies were promoted through provision of financial benefit transfers.

These projects were funded from revenues generated from enterprises such as tourism community campsites and from donor funds. Over the years substantial funding has come from donors, and funds generated from other revenue streams in LPNP are steadily increasing. The management team administer the funds through Liuwa Community Development Fund (Annex 2).



Tsessebe (Damaliscus lunatus) © Roger Leguen / WWF-Canon

CONCLUDING REMARKS

The collaborative governance of LPNP in form of a tripartite partnership of ZAWA, SAPF and BRE has contributed to the positive performance of Park management. The period assessed (2004-2011) is relatively short but it provides an indication of the impact of such a partnership when collaborative governance is integrated with benefit sharing mechanisms. The LPNP partnership is dynamic but could have probably achieved more if the design was better negotiated by government and BRE. Even though the partnership negotiations lasted over a year, allowing for lengthy but effective negotiations can maximise ownership by stakeholders and minimise future bottlenecks in the progression of a partnership (Roe et al., 2001).

As the partnership formed a nexus of conservation and rural development, it drew participation from many different stakeholders, whose successful benefit depended on the strength of fair collective bargaining of their interests. Due to the failure by ZAWA and BRE to comprehensively bargain at the beginning of the partnership, however cooperative trust reduced over the years. According to Glasbergen (1995), effective performance of protected area management and benefit equitable sharing is linked to levels of trust between partners. Hence, the need to constantly discuss and resolve emerging issues through mechanisms such as the Partnership Board and stakeholder meetings. Nevertheless, the SAPF demonstrated its capacity to raise funds from cooperating partners and generate revenues from LPNP. However, since much of the funding utilised for Park management and community projects remains largely donor contributions, sustainable financing plans will need to emphasis further generation of revenues from local LPNP partnership processes.

Since the establishment of the partnership, benefits have been generated and transferred to stakeholders. The Park's profile has improved but stakeholder expectations still remain very high based on the promises made in respect to enhancing biodiversity, infrastructure, tourism and community development at the beginning of the partnership. However, in order to generate substantial profits further enhancement of the resource base, tourism and management infrastructure, community relations and community livelihoods is recommended. This agenda will require parties to further fine tune their responsibilities and accountability. In particular, ZAWA and BRE will need to be robust enough as 'institutions of sustainability' to be able to fairly and firmly negotiate, and counteract external influences.

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ANNEX 1: INTERVIEW GUIDE ON COLLABORATIVE GOVERNANCE AND BENEFIT SHARING IN LIUWA PLAIN NATIONAL PARK FOR THE PERIOD BETWEEN 2004 AND 2011

A: Preliminaries

1. Disclosure of the purpose and contents of the interview
2. Confirmation of the participants' historical knowledge of the Park
3. Obtaining participants' consent
4. Assuring participants of confidentiality of their input
5. Personal details and affiliations

B: Collaborative governance and benefit sharing

1. Elucidate, in timeline, natural resource management in the Park prior and after partnership establishment. Note the changes in who managed the resources, how they managed them and impacts of their management.
2. Obtain factors that could have brought about changes in the management arrangements.
3. Establish what transpired during the process of establishing the partnership and what followed thereafter. This should include elements of partnership negotiations, heads of agreement/contract, activities and implementation modalities.
4. Ascertain who held and exercised the power over management and utilization of natural resources, and benefit sharing in the partnership. To what degree they exerted such power. [Where did the 'active' power lie?]
5. Find out how partners related to each other vis-à-vis the partnership Agreement.
6. Establish what were the benefits of the partnership and how they were generated and, subsequently, how they were shared among the parties.
7. What were the roles and responsibilities of each party and how were they implemented?
8. Obtain the description of ecological and socio-economic performance attributed to the partnership.

N.B.: Probe further on each of the above issues depending on the willingness of the participant to be interviewed more, where necessary.

ANNEX 2: MAIN COMPONENTS OF PARTNERSHIP AGREEMENT IN LIUWA PLAIN NATIONAL PARK FOR LOCAL GOVERNANCE

- The partnership works under a Company called African Parks Zambia, established through the Companies Act which provides shareholding among parties (SAPF and BRE). ZAWA, however, has in the recent years made a claim to have shareholding position in the Company.
- The partnership Board constitutes representation from SAPF (4), Barotse Royal Establishment (2) and ZAWA (1). It is the main governance body, with legal standing. The Chairman is appointed by SAPF from four of its representative Board members. Decisions are by consensus. Management activities are conducted by a combined team on the ground. The team is responsible for such activities as resource protection, tourism development, infrastructure

development, community support and management of community relations.

- The Agreement's jurisdiction is over the Park and does not include areas surrounding it. In practice, however, the partnership operations have spilled over to the surrounding areas especially in the area of community projects such as social amenities and human wildlife conflict mitigation.
- The Agreement advocates regular communication among stakeholders, ZAWA, SAPF and BRE, mainly in writing. In practice, besides sharing written operational reports, presentations are also made when necessary and agreed by the partners. For instance, BRE representatives locally known as Silalo Induna Committee report to their constituencies (area committees) and the Board on various community issues and projects, and so do field team of SAPF and ZAWA on park operations. At times, however, internal communication and officialdom among some members of parties have been challenging.
- The Agreement provides for establishment of a BRE Cultural and Support Fund for support of BRE cultural and administrative activities and Liuwa Community Development Funds (LCDF) to speedily support anti-poaching and community projects. Management team administers both funds. Further, penalties in form of deductions from LCDF are implemented on monthly basis in accordance with the Agreement when poaching incidents or other unlawful activities by the local communities occur in the Park. These measures are supported by the local communities and prove to be effective in curbing biodiversity loss in LPNP.
- The Agreement devolves management authority to a management team but also further gives the rights such as granting of tourism concessions to SAPF. In practice, based on the Agreement, ZAWA is consulted and approves policy decisions such as granting of tourism concession prior to implementation.

REFERENCES

- Abbot, J., F. Ananze, N. Barning, P. Burning, E. de Merode, A. Dunn, E. Fuchi, E. Hakizumwami, C. Hasse, R. Mwinyihali, M. Sani, D. Thomas, P. Trench and R. Tshombe (2000). *Promoting partnerships: managing wildlife resources in Central and West Africa*. Evaluating Eden series no. 3. London: International Institute for Environment and Development.

- Apse, C. and R. Seybert (2010). *African Parks management of Liyuwa Plain National Park*. Lusaka, Zambia: The Nature Conservancy.
- Armitage, D. and R. Plummer. (Eds.) (2010). *Adaptive Capacity and Environmental Governance*. Berlin Heidelberg, Germany: Springer-Verlag
- Armitage D., M. Marschke and R. Plummer (2008). Adaptive co-management and the paradox of learning. *Global Environmental Change* 18(1): 86–98
- Arrow, K., B. Bolin, R. Constanza, P. Dasgupta, C. Folke, C. Holling, B. Jansson, S. Levin, K. Malër, C. Perrings and D. Pimentel (1995). Economic growth, carrying capacity and the environment. *Science* 268: 520-521.
- Barrow, E., H. Gicholi and M. Infield (2000). *Rhetoric or reality? a review of community conservation policy and practice in East Africa*. Evaluating Eden series no. 5. London: International Institute for Environment and Development.
- Berkes, F. (2009). Evolution of co-management: role of knowledge generation, bridging organisations and social learning. *Journal of Environmental Management* 90(5): 1692-1702.
- Bradburn, N., S. Sudman and B. Wansink (2004). *Asking questions: the definitive guide to questionnaire design – for market research, political polls, and social and health questionnaires*. California: Jossey-Bass.
- Brower, A., S. Coffey and B. Peryman. (2010). *Collaborative Environmental Governance Down Under, in Theory and in Practice*. Lincoln Planning Review, North America, 2, Aug. 2010. Available at: <http://journals.lincoln.ac.nz/index.php/LPR/article/view/533/389>>. Accessed on 2 March 2013.
- CBD (1992). *Convention on Biological Diversity*. Available at <http://www.cbd.int/convention/convention.shtml>. Accessed on 3 March 2010.
- CBD (2011). *Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets: 'Living in Harmony with Nature'*. <http://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf>. Accessed on 1 February 2013.
- Dearden, P. and M. Bennett (2005). Trends in global protected area governance. *Environmental Management* 36(1):89-100.
- Dalal-Clayton, B. and B.Child (2003). *Lessons from Luangwa: the story of the Luangwa Integrated Resource Development Project, Zambia*. Wildlife and Development Series 13. London: International Institute for Environment and Development.
- Estes, R.D. and R. East (2009). *Status of the wildebeest (Connochaetus taurinus) in the wild, 1967-2005*. Working Paper No. 37. New York, USA: Wildlife Conservation Society.
- Farlam, P (2005). *Assessing public private partnership in Africa*. Nepad policy focus series number 2. Pretoria: SAIIA.
- Farley, J. and R. Costanza (2010). Payments for ecosystem services: From local to global. *Ecological Economics* 69: 2060–2068.
- Fearnhead, P. (2009). Privately managed protected areas. In: Suich, H., B. Child, and A. Spenceley (eds), *Evolution and innovation in wildlife conservation: parks and game ranches to transfrontier conservation areas*. London: Earthscan. p 409-424
- Glasbergen, P. (1995). *Managing environmental disputes: network management as an alternative*. Boston: Kluwer Academic publishers.
- Graham, J., B. Amos and T. Plumptre (2003). *Governance principles for protected areas in the 21st Century*. A Discussion Paper. Ottawa: Institute on Governance in Collaboration with Parks Canada and Canadian International Development Agency.
- Gruber, J. S. (2010). Key principles of community-based natural resource management: a synthesis and interpretation of identified effective approaches for managing the commons. *Environmental Management* 45 (1): 52–66.
- Hall, A.W. (2006). Global experience on governance. In: Turton, A.R., H. Hattingh, G. Maree, D. Roux, M. Claasen and W. Strydom (eds), *Governance as a dialogue: government-society-science in transition*. Berlin: Springer.
- Hardin, G. (1968). The tragedy of the commons. *Science* 162: 1243-1248.
- Howard, J.L. (2010). Managing for justice in community-based water planning: a conceptual framework. *Environmental Conservation* 37 (3): 356–363
- Imperial, M.T. (2005). Using collaboration as a governance strategy: lessons from six watershed management programs. *Administration and Society* 37(3): 281-320
- Imperial, M.T. and D. Kauneckis (2003). Moving from conflict to collaboration: lessons from the Lake Tahoe experience. *Natural Resources Journal* 43(4): 1009-1005.
- Jones, B. and M. Murphree (2001). The evolution of policy on community conservation in Namibia and Zimbabwe. In: Hulme, D. & M. W Murphree (eds), *African wildlife and African livelihoods: the promise and performance of community conservation*, Oxford, UK: James Currey. p 38-58.
- Kamweneshe, B., R. Beilfuss and K. Morrison (2003). *Population and distribution of Wattled Cranes and other large waterbirds and large mammals on the Liyuwa Plains National Park, Zambia*. Lusaka: Zambia Crane and Wetland Conservation Project.
- Leonard, P. (2005). *Important bird areas in Zambia*. Lusaka: The Zambian Ornithological Society.
- Leverington, F., K.L. Costa, H. Pavese, A. Lisle and M. Hockings (2010). A Global Analysis of Protected Area Management Effectiveness. *Environmental Management* 46: 685–698.
- Lockwood, M. (2010) Good governance for terrestrial protected areas: A framework, principles and performance outcomes. *Journal of Environmental Management* 91: 754-766.
- Mwima, H. K. (2007). *Management effectiveness tracking tool for protected areas*. Lusaka: Ministry of Tourism, Environment and Natural Resources.
- Nkhata, B. A., A. Mosimane, L. Downsborough, C. Breen and D.J. Roux (2012). A typology of benefit sharing arrangements for the governance of social-ecological systems in developing countries. *Ecology and Society* 17:
- Noor, K.B. M. (2008). Case study: a strategic research methodology. *American Journal of Applied Science* 5(11): 1602-1604.
- Olsson, P., C. Folke and F. Berkes (2004). Adaptive co-management for building resilience in social-ecological systems. *Environmental Management* 34: 75-90.
- Ostrom, E. (1990). *Governing the commons: the evolution of institutions for collective action*. New York: Cambridge University Press.

- Paavola J., A. Gouldson and T. Kluvankova-Oranska (2009). Interplay of actors, scales, frameworks and regimes in the governance of biodiversity. *Environmental Policy and Governance* 19: 148-158.
- Phillips, A. (2003). Turning ideas on their head: the new paradigm for protected areas. *The George Wright Forum* 20(2): 8-32.
- Plummer, R. and D. Armitage (2007). A resilience-based framework for evaluating adaptive co-management: linking ecology, economics and society in a complex world. *Ecological Economics* 61: 62-74.
- Pomeroy, R., L. Garces, M. Pido and G. Silvestre (2010). Ecosystem-based fisheries management in small-scale tropical marine fisheries: emerging models of governance arrangements in the Philippines. *Marine Policy* 34: 298-308.
- Roe, D., M. Grieg-Gran and W. Schalken (2001). *Getting the lion's share from tourism: private sector – community partnership in Namibia*. Poverty, inequality and environment series 1. London: International Institute for Environment and Development.
- Schuklenk, U. and A. Kleinsmidt (2006). North-South benefit sharing arrangements in bioprospecting and genetic research: a critical ethical and legal analysis. *Developing World Bioethics* 1471-8847 (online): doi:10.1111/j.1471-8847.2006.00149.x. Accessed on 15 August 2011.
- Stoker, G. (1998). Governance as theory: five propositions. *International Social Science Journal* 50(155): 17-28.
- Strauss, A. and J. Corbin (eds.) (1998). *Basics of qualitative research: techniques and procedures for developing grounded theory*. Thousand Oaks, California: Sage Publications.
- Suich, H., B. Child and A. Spenceley (eds.) (2009). *Evolution and innovation in wildlife conservation: parks and game ranches to transfrontier conservation areas*. London: Earthscan.
- Tembo, A. and L. Siawana (1991). *Abundance, biomass and distribution of common herbivores of the Liuwa National Park, Zambia*. Chilanga: Zambia National Parks & Wildlife Service.
- Turton, A. (2008). A South African perspective on a possible benefit sharing approach for trans-boundary waters in the SADC Region. *Water Alternatives* 1(2):180-200.
- van Gils, H. (1988). *Environmental profile of western province, Zambia*. Mongu, Zambia: Provincial Planning Unit.
- Viljoen, P. (2005). *Liuwa Plain National Park aerial wildlife survey – December 2004*. White River: African Parks Network.
- Viljoen, P. (2007). *Liuwa Plain National Park aerial wildlife survey – April 2007: survey result summary*. White River: African Parks Network.
- Viljoen, P. (2009). *Liuwa Plain National Park aerial wildlife survey – April 2009: survey result summary*. White River: African Parks Network.
- Viljoen, P. (2011). *Liuwa Plains National Park and adjacent Game Management Area, Zambia aerial wildlife survey*. White River: African Parks Network.
- Wondolleck, J.M. and S.L. Yaffee (2000). *Making collaboration work: lessons from innovation in natural resource management*. Washington, DC, US: Island Press.
- Wunder, S. (2007). The efficiency of payments for environmental services in tropical conservation. *Conservation Biology* 21:48-58.
- ZAWA (2009). *Land use plan for Liuwa Plain National Park*. Chilanga, Zambia: ZAWA.

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RESUMEN

Han surgido varios modelos de asociaciones público-privadas centradas en la creación de riqueza a través de recursos de alto valor, de la distribución del riesgo a través de la participación en los costos y beneficios, y de la prevención de pérdida de biodiversidad a través de la colaboración entre los miembros de los sectores público y privado y las comunidades locales. Empero, aún subsisten muchas lagunas de información en cuanto al desempeño de su sistema socioecológico. Se realizó un estudio de caso sobre el Parque Nacional de Liuwa Plain (3660 km²), en la zona occidental de Zambia, para demostrar la relación entre el capital social y la gestión operativa por múltiples asociados entre 2004 y 2011. Se utilizaron análisis biográficos, conocimientos especializados y entrevistas a 57 participantes con perspectivas históricas sobre el área. Determinamos que tanto los beneficios económicos, ecológicos y sociales como la participación en ellos se vieron influenciados por la capacidad de los asociados para negociar los intereses colectivos. La creación de redes de asociaciones inter e intrainstitucionales, el aprendizaje social y la capacidad diferencial también fueron factores importantes.

RÉSUMÉ

Plusieurs modèles de partenariats public-privé ont fait leur apparition, axés sur : la création de richesses à partir de ressources à forte valeur ajoutée, la répartition des risques grâce au partage des avantages et des coûts, et la prévention de la perte de la diversité biologique. Ces partenariats ont été possibles grâce à une collaboration entre membres du secteur public et privé et les communautés locales. Cependant, peu d'informations sont disponibles quant à leur performance socio-écologique. Une étude de cas a été réalisée entre 2004 et 2011 dans le parc national de Liuwa Plain (3 660 km²), en Zambie occidentale, afin de démontrer la relation entre le capital social et la gestion opérationnelle par des partenaires multiples. Cette étude s'est basée sur un examen des études publiées, les connaissances d'experts ainsi que des entretiens menés auprès de 57 répondants, en s'appuyant sur une perspective historique de la zone concernée. Nous avons ainsi pu déterminer que les gains et la répartition des avantages en termes socio-économiques-écologiques étaient déterminés par la capacité des partenaires à négocier des intérêts collectifs. Par ailleurs, la mise en réseau au sein et à l'extérieur du partenariat, l'apprentissage social et les capacités différentielles s'avèrent être également des facteurs importants.



LESSONS FROM LARGE-SCALE CONSERVATION NETWORKS IN AUSTRALIA

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ABSTRACT

Australia has seen a rapid growth in the establishment of networks of lands managed for connectivity conservation across tenures, at landscape and sub-continental scales. Such networks go under a variety of names, including biosphere reserves, biolinks, wildlife corridors and conservation management networks. Their establishment has varied from state government-led initiatives to those initiated by non-government organizations and interested landholders. We surveyed existing major landscape scale conservation initiatives for successes, failures and future directions and synthesized common themes. These themes included scale, importance of social and economic networks, leadership, governance, funding, conservation planning, the role of protected areas and communication. We discuss the emergence of national policy relating to National Wildlife Corridors in Australia and the relationship of this policy to the long standing commitment to build a comprehensive, adequate and representative National Reserve System. Finally we outline areas for further research for connectivity conservation projects in Australia.

KEYWORDS: connectivity, wildlife corridors, conservation networks, landscape scale conservation, Australia

INTRODUCTION

The Convention on Biological Diversity Strategic Plan for Biodiversity 2011-2020 (Aichi Targets), committed parties to the convention to establish 'ecologically representative and well connected systems of protected areas and other effective area-based conservation measures' as part of Target 11. Woodley et al. (2012, p. 29) recommend that 'countries need to move into the next phase of protected area and conservation planning by incorporating connectivity between protected areas at both regional and national scales, including transboundary conservation areas'.

Australia has seen significant advances in recent times in creating networks and initiatives that seek to restore and link up natural habitats at a landscape scale. These efforts have evolved under a range of names including 'biosphere reserves', 'wildlife corridors', 'conservation management networks', and 'biolinks' (see Box 1) and collectively seek to achieve many aspects of the emerging field of connectivity conservation, amongst other things. Such initiatives have been developed by a range of contributors including governments, private individuals,

and conservation NGOs and occur at various scales from cross continental 'wildlife corridors' to regional conservation management networks.

Until now there has been relatively little analysis of these diverse and practical initiatives in a single synthesis, but a recent project has assembled the experiences of practitioners from 14 networks and corridor initiatives (Figure 1), to fill the void between the theoretical ecological proposals and research in technical journals and the practical projects that have been operating in the field (i.e. Fitzsimons et al., 2013). The facilitators/coordinators of the connectivity initiatives were asked to document the history of the initiative, successes, constraints and directions for the future (Figure 1 highlights the initiatives surveyed as part of this research). These experiences were complemented by those of policy makers and organizations seeking to design and implement 'networks of networks' beyond the individual initiative, as well as broader perspectives from researchers in the fields of ecological science and socio-economics (see Fitzsimons et al., 2013). This information is synthesised in this paper. Such information is important to not only inform policy makers, land

BOX 1. DIFFERENT TYPES AND NAMES OF MULTI-TENURE CONSERVATION INITIATIVES IN AUSTRALIA

Biosphere Reserves are an international UNESCO designation and are concerned primarily with integrating biodiversity conservation with ecologically sustainable development across a variety of land tenures and uses (UNESCO; 1995; Brunckhorst et al., 1997). The theoretical biosphere reserve model revolves around a 'core' protected area managed primarily for nature conservation, a 'buffer' zone where activities that impact on the biodiversity of the core are minimised, and a 'transition' zone, where the sustainable use of natural resources is encouraged.

Biolinks are identified broad areas of the landscape at the subcontinental scale in which the functional ecological connectivity for biodiversity is enhanced and/or restored in order to provide space for species to 'self adjust' to changing environmental conditions (e.g. Mansergh et al., 2008).

Conservation Management Networks (CMNs) are biophysical networks of remnant vegetation sites across a variety of tenures and a social network of managers, owners and interested people (Thiele & Prober, 2000). A CMN brings together the social and biophysical networks in order to improve land management and biodiversity outcomes. The term '

Wildlife Corridors' has multiple meanings in Australia. It can refer to narrow bands of native vegetation connecting core habitat areas but more recently has been adopted by the Australian Government as the label for large-scale connectivity conservation networks (i.e. National Wildlife Corridors).

See Fitzsimons et al. (2013) for greater detail on each of these models and case studies on where they have been applied in Australia.

managers, facilitators and scientists, but to stimulate even greater conservation efforts 'on the ground'.

The initiatives are being implemented across multiple land tenures (including public, private and Indigenous owned or leased land) and the aim of the project was to identify some critical common lessons that have been learnt already by practitioners in this new and evolving field. In particular, we were keen to see if there were emerging models of governance which could potentially be adapted by new entrants into connectivity conservation (nationally and internationally), so that they did not need to 'reinvent the wheel' in establishing their network.

This paper describes some of the lessons from practical, 'on the ground' implementation of landscape scale and connectivity conservation projects in Australia. We also provide an outline of the Australian Government's recently released National Wildlife Corridors Plan (DSEWPC, 2012) and suggest future research needs for the evolving field of implementing and managing large-scale, multi-tenure conservation networks. Initiatives featured include those from all Australian states and territories, and many initiatives which cross state and territory boundaries.

Although there is already a significant literature on ecological connectivity and connectivity conservation both internationally (e.g. Soulé & Terborgh, 1999; Crooks & Sanjayan, 2006; Hilty et al., 2012) and for Australia

(e.g. Saunders et al., 1996; Bennett, 2003; Soulé et al., 2004; Lindenmayer & Fisher, 2006; Mackey et al., 2010), our focus here is on practical experiences with implementing large scale, on the ground connectivity initiatives in real landscapes.

COMMON THEMES IN AUSTRALIAN CONNECTIVITY PROJECTS

There were a number of clearly recurring themes that emerged from the analysis of operating connectivity projects in Australia. These are described under separate headings below.

- **Scale**

The scale of the operation of a network was a topic discussed by many of the project coordinators. Many of the larger corridor initiatives highlighted that they considered a large scale of operation to be important for ecological function and for creating an inspiring vision. However, operating at such a large scale was also recognized to have significant challenges, particularly for coordination, governance and communication. Almost all of the larger corridor initiatives which operated at continental or sub-continental scale therefore divided their total area into smaller 'operating units' or 'regional partnership areas'; landscape zones that reflected similarities in ecological or social attributes. The identification of groups with their regional landscape was considered to be important, as was effective and regular communication, both of which contribute to the important element of social connectedness, .

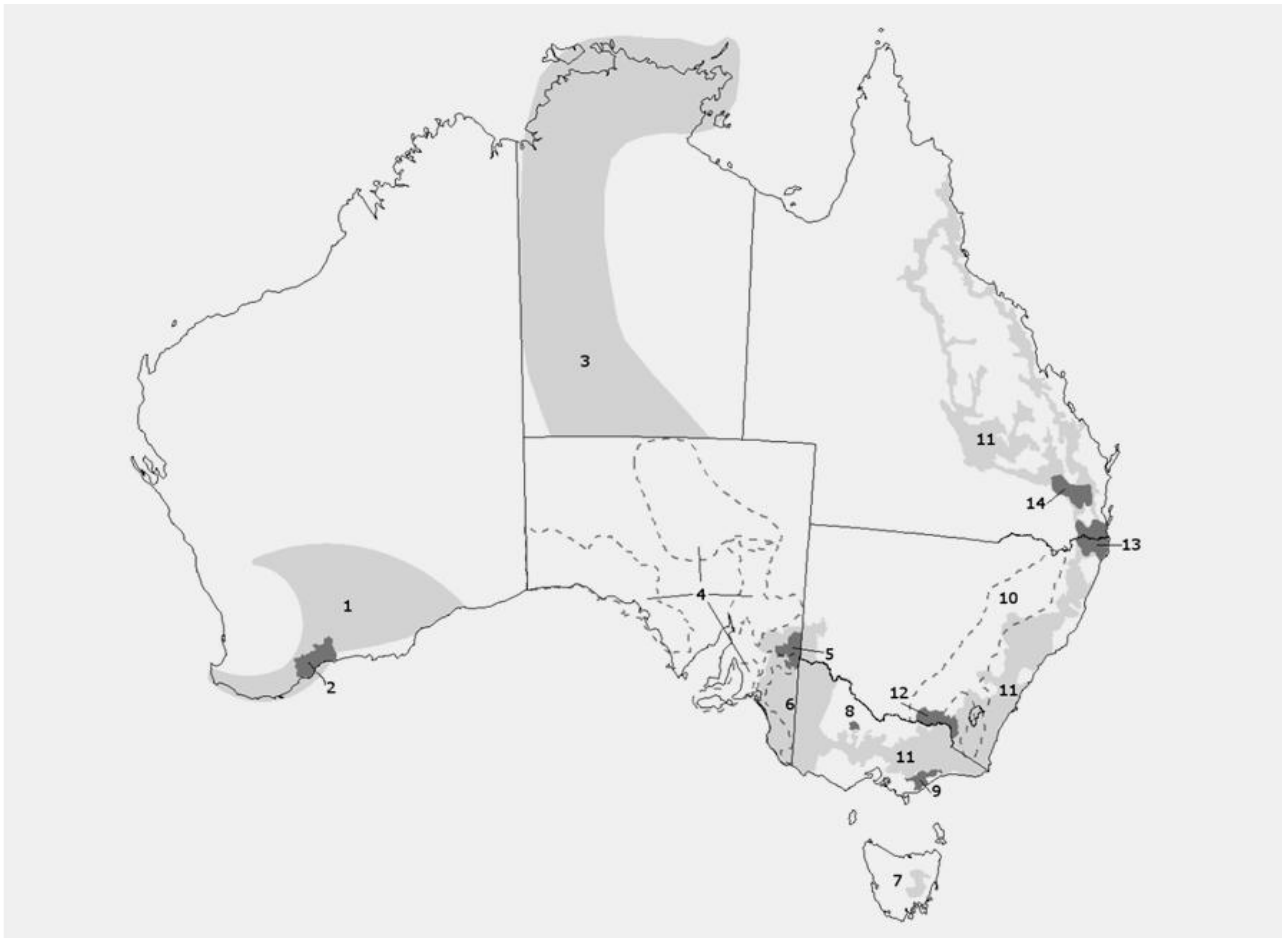


Figure 1. Australian connectivity conservation initiatives surveyed as part of this project. Differences in shading differentiates overlapping initiatives. 1 – Gondwana Link, 2 – Fitzgerald Biosphere Reserve, 3 – Territory Eco-link, 4 – South Australian NatureLinks, 5 – Riverland (Bookmark) Biosphere Reserve, 6 – Habitat 141°, 7 – Tasmanian Midlandscapes, 8 – Wedderburn Conservation Management Network, 9 – Gippsland Plains Conservation Management Network, 10 – Grassy Box Woodlands Conservation Management Network, 11 – Great Eastern Ranges Initiative, 12 – Slopes to Summit, 13 – Border Ranges Alliance, 14 – Bunya Biolink. Note: ‘Slopes to Summit’ and ‘Border Ranges’ are regional landscape projects within the larger Great Eastern Ranges Initiative.

- **The importance of a shared and guiding vision**

Landscape-scale conservation networks, as well as the larger corridor initiatives, inspire people, help create conservation communities and provide opportunities where individuals can see their conservation efforts make a difference. Such ‘stories’ provide a narrative that becomes a powerful basis for engagement, governance and decision-making. A key element is a shared vision that describes a desired future landscape or biodiversity condition and seeks the involvement of people in achieving this outcome. The vision is combined with several subsidiary goals and usually supported by a plan that identifies aspirational targets and priorities for investment. While the vision is an important part of any initiatives’ success, it may not be static and can evolve over time and with increased ecological community understanding and feedback, provided it brings its communities along with the evolution of the initiative.

- **Social and economic networks are critical elements of success**

Conservation management is required across multiple tenures in order to protect and restore biodiversity on a landscape-wide basis, and different connectivity conservation strategies are needed in different Australian landscapes. This is because the type of conservation actions required in cleared and fragmented forest and woodland landscapes can be different to the contiguous habitats for arid and northern Australia or from peri-urban areas. In different landscapes and communities the social willingness, and economic circumstances of landholders and communities, require quite different solutions and mixes of programmes. For example, in the more intact habitats typical of northern and central Australia the inclusion of Indigenous Protected Areas and pastoral properties, is important if not essential, whilst initiatives in fragmented forest and woodland landscapes of southern and eastern Australia (such as



Kosciuszko2Coast partnership facilitator, Lauren Van Dyke, launching the inaugural Kosciuszko2Coast Open Day event on 13 April 2008 on a landholders property near Bredbo, New South Wales. Kosciuszko2Coast is a regional landscape projects within the larger Great Eastern Ranges Initiative © Ian Pulsford

Gondwana Link, the Great Eastern Ranges Initiative, Habitat 141° and many Victorian conservation management networks) utilise an integrated range of voluntary conservation instruments and programmes. These include the establishment of private protected areas by NGOs and/or encouragement of landholders to sign in-perpetuity conservation agreements, and habitat restoration projects through short and long-term grant agreements with various funding bodies.

A key challenge for some initiatives is to be able to maintain partner and community interest once initial funding sources are discontinued or grant applications are unsuccessful due to changing priorities of funding bodies. There can be mismatch between partner and community expectations when a vision is not matched by sufficient funding to make an impact quickly enough, with this loss of social capital being a potential threat to the sustainability of the initiative. The strength of committed leadership over long periods was considered a key factor for success.

Programmes built on trust and openness appear to be more resilient in hard times, hence investing the time and effort early in development to build trust was highlighted by many initiatives. Another critical element is the achievement of visible and tangible on the ground

results early on. Initiatives also reported on the importance of building on past conservation programmes and activities that were in operation prior to the formation of the connectivity/landscape initiative. These past activities are likely to have built important social networks and shared visions. Finally, it is critical to maintain a core group of volunteers to ensure the continuity of the programme if a facilitator, or equivalent government officer, is lost through leave, forced redundancies, 'burn-out' or loss of funding.

- **Leadership and the notion of 'champions'**

Leadership of initiatives was provided usually at several levels. As with so many other endeavours in nature conservation and natural resources management, many initiatives are instigated by an individual (or a few individuals) with drive, energy, passion, commitment and strong personalities who inspire others to join in. In addition, they also inspire sponsors to provide critical funds and resources. The challenge is to have succession planning in these groups in case the leader 'burns out' and to build a leadership group that is supported by external champions. These may include influential individuals in business, government or wider community. The role of a dedicated 'facilitator' was highlighted in the various case studies as an essential element of success for connectivity initiatives. At the

same time, the often short-term and uncertain security of funding for these positions was seen as a major limitation to the operation of these initiatives. This situation is not unique to connectivity initiatives; it is cited as a common limitation to natural resource management activities more generally in Australia (e.g. Robins & Dovers, 2007; HC Coombs Policy Forum, 2011).

- **Governance**

Connectivity conservation initiatives seek to coordinate many actions, undertaken by diverse players, across multiple scales. Designing collaborative governance arrangements that harness the energies and capacities of these many players remains a challenge for conservation connectivity networks. The case studies revealed that there are a wide variety of governance models for connectivity initiatives in Australia. These ranged from top down approaches initiated by government (e.g. Great Eastern Ranges Initiative, Territory Eco-link, South Australian NatureLinks, Wedderburn Conservation Management Network) to non-government organization-initiated networks such as Gondwana Link and Bunya Biolink, to a mix of both (e.g. Tasmanian Midlandscapes).

Large scale conservation initiatives in Australia need strong, but not necessarily complex, governance arrangements. There is currently a diverse array of systems which reflects a diverse array of reasons and motivations for establishment and the different mix of groups involved. What works in one place may not easily be transferred as a successful model elsewhere.

Governance mechanisms must also be flexible and adaptive to changes in knowledge and context, and evolution of governance arrangements has been documented for a number of networks (see also Fitzsimons & Wescott, 2008a). The diversity of partners and the range of spatial scales of these initiatives are likely to require new modes of governance that span multiple scales and diverse interests. However, it has been possible to identify some governance principals that are common requirements for all successful initiatives.

These principals can be framed around the requirements for communication, collaboration and coordination. Within a few years there may well be enough experience and data in to draft a 'template' of successful governance and coordination arrangements so that the 'wheel is not reinvented' continuously or the same mistakes are not repeated.

- **Funding**

Funding arrangements varied between initiatives but primarily consisted of government, philanthropic and corporate funding to varying extents. Not surprisingly, a lack of funding for on the ground actions was identified as a major limitation for many initiatives.

Connectivity initiatives in Australia face a number of risks in delivering on their potential, due to the need to build investment at scale (particularly if a threshold investment is needed to achieve benefits), the organizational challenge of landscape-scale conservation, scientific and implementation uncertainties, and misalignment of goals and opportunities and even the ability to prioritise actions based on scientific and social criteria. A number of initiatives are encouraging new investment tools, such as capitalizing on the emerging carbon market, although offsets and credits are still a relatively new concepts and these funding opportunities at the scale required for landscape restoration are still in their relative infancy in Australia.

The two biosphere reserves established under the UNESCO Man and Biosphere programme that were examined (i.e. Fitzgerald and Riverland) both highlighted a 'reduction of government funds as a significantly factor in loss of momentum. As time progressed, interest by both the state and national governments waned and most of their input became 'in-kind. During the writing of this paper the fragility of some corridor initiatives was also demonstrated with the withdrawal of funding for Territory Eco-link by the new Northern Territory Government in late 2012 (Conlan, 2012). This initiative was particularly vulnerable as its coordinating staff were funded only by the government, with little if any other funding.

The final point concerning funding is the security and nature of current government funding arrangements which typically sees funds directed for relatively short term projects whose continuity is at risk from change in government priorities. Several case studies noted the significant impact from loss of a facilitator or other staff when funds cease and the difficulty of sustaining organisations under these circumstances. As well, there is often little or no provision for operational expenses for NGOs and government agencies participating in connectivity initiatives. Most money is short-term and directed at site-specific projects. Without funding for continuing stewardship programmes and operational expenses much of the effort on initial on-ground work could be wasted. Sustainability should be a key requirement to funding.



Habitat links extend from Woomargama National Park into surrounding private farm lands; part of the Slopes to Summit section of the Great Eastern Ranges Initiative, New South Wales © Ian Pulsford

- **Conservation planning and delivery of broader natural resource management objectives**

The preparation of a conservation plan which contained goals and identified areas for conservation activities and investment was considered important by most initiatives. An ability to spatially prioritise conservation actions is also important for demonstrating the most efficient allocation of limited resources when reporting back to funding bodies. Methods used by the different initiatives varied considerably depending on the availability of spatial information and analytical skills. Connectivity initiatives were also considered to be useful delivery mechanisms for other natural resource management objectives, at national and state levels. For example, South Australia's NatureLinks aligned well with the principles underpinning regional natural resource management planning.

- **Monitoring, evaluation and reporting**

Reporting on progress is a requirement of most funding bodies and is essential for demonstrating progress to partners and to ensure that support is maintained. Effective monitoring provided the essential information required so that an adaptive approach to setting priorities for further investment can be made for

achieving long-term goals. It is also essential to ensure that taxpayers and private investors are receiving value for money for these long-term investments. For many initiatives, limited and inadequate resources have been made available by funding bodies or agencies to develop monitoring, evaluation and reporting systems. Nonetheless, ecological monitoring does often occur at the individual site-scale (i.e. protected areas or private conservation lands) within connectivity initiatives and aligning these often disparate efforts and methods should be a high priority. Under the National Wildlife Corridors Plan (see below) the Australian Government has undertaken to develop guidelines and provide information on monitoring, reporting and evaluation (DSEWPC, 2012); however it remains to be seen whether adequate funds will be provided so that suitable indicators for accurately measuring progress at various spatial scales can be established.

- **Role of existing and new protected areas**

Protected areas and remnant vegetation provide the essential core components for most multi-tenure connectivity initiatives. All initiatives sought to improve the conservation and management of areas around and between these core protected areas by either focusing on protecting or better managing properties with significant

ecological value and/or actively restoring cleared or degraded properties that provide strategic linkages.

The mechanisms used varied but included a mix of land purchase for conservation (as public or private protected areas), signing of in-perpetuity conservation covenants or shorter term management agreements linked to stewardship payments, or non-binding voluntary agreements. The mix of these options used depended on the underlying land tenure, types of investment by government and non-government sectors and social drivers. For example, in some regions, land purchase was not an option for social or legal reasons, and new, innovative approaches were developed to protect freehold or Indigenous lands. These included partnership agreements with several non-government conservation organisations such as Bush Heritage Australia, as well as government environment agencies.

- **Communication**

A key element of maintaining and enhancing a connectivity network was to create and maintain a communication system so that disparate members often separated by substantial distances are linked together. This usually required some dedicated resources to run a web site, prepare newsletters, videos, brochures, workshops, meetings and publications.

THE AUSTRALIAN GOVERNMENT'S NATIONAL WILDLIFE CORRIDORS PLAN

In November 2012, the Australian Government released a National Wildlife Corridors Plan (DSEWPC, 2012). This plan provides a framework for landscape scale conservation with a vision for 'diverse, connected, and healthy landscapes that support and sustain biodiversity, communities and wellbeing'. It aims to retain and restore ecological connections and emphasizes a 'new, collaborative, whole of landscape approach to biodiversity conservation...' It states that the role of the Australian Government is to 'enable and coordinate the efforts of all participants' (DSEWPC, 2012, p. 1).

The plan is in two parts, the first describing the guiding principles, objectives and foundations of the corridors Plan and the second how the government will aid the establishment of a national network of wildlife corridors. The plan outlines six corridor initiatives (p. 29) that are 'considered important foundation stones for the network of wildlife corridors': Gondwana Link, the Great Eastern Ranges Initiative, Habitat 141°, NatureLinks, Trans-Australia Eco-Link and Tasmanian Midlandscapes. The plan provides for the establishment of a National Wildlife



Revegetation of woodlands and heathlands in the landscape between Fitzgerald River and Stirling Range National Parks, part of Gondwana Link and a global biodiversity hotspot
© James Fitzsimons

Corridors Council, and a process for nominating existing and new partnerships for inclusion on a National Wildlife Corridors list by the Federal Minister for Environment. They will need to meet a list of scientific and social criteria to be developed by the Council. Listing will assist the government to prioritise funding from a range of existing environmental funding programmes.

The plan suggests that the following features are common in successful projects – accountability, transparency, integrity, efficiency, flexibility, leadership, engagement and social cohesion – although it does not specify the criteria for success. The plan notably did not have any funding for implementation attached to its publication. Nonetheless the geographic regions in which the 'foundation stone' corridors occur have been recently prioritized for financial investment under the Australian Government's 'Caring for our Country' programme and the 'Biodiversity Fund' (Australian Government, 2012). Future Australian Government funding of initiatives that have been listed as National Wildlife Corridors may lead to state governments considering the benefits and commitments to multi-tenure approaches more carefully, especially where strong community support is demonstrated.

However, the push towards a much needed national policy on wildlife corridors may have had an unintended negative consequence for protected area establishment and conservation in Australia. Although the National Wildlife Corridors Plan states that the National Reserve System, Australia's network of public, private and Indigenous protected areas, to be a 'foundation stone' of the future network of National Wildlife Corridors, shortly after its release the Australian Government announced it



Fish River Station, a 180,000 ha property in northern Australia purchased for conservation and a key property in the 'Territory Eco-link' © James Fitzsimons

was ending nearly two decades of dedicated financial support to expand the National Reserve System (Australian Government, 2012). As funding for acquisition of high priority properties was either a key stimulus for the creation of new connectivity initiatives or an important mechanism used to advance the goals of existing initiatives, this decision may slow the advancement of the corridors concept. Perhaps more significantly it will almost certainly slow the progress towards achieving a comprehensive, adequate and representative network of terrestrial protected areas in Australia.

DIRECTIONS FOR FURTHER RESEARCH

As research into multi-tenure connectivity initiatives is still in its infancy in Australia (and internationally), there remains many areas in need of further research. Further investigation of three areas in particular would complement the work undertaken in this project and elsewhere (e.g. Fitzsimons & Wescott, 2007, 2008 a,b,c; Worboys and Pulsford 2011; Wyborn, 2011; Fitzsimons et al., 2013), increase our understanding of networks and connectivity initiatives, and would ultimately lead to an increase in the effectiveness of multi-tenure conservation efforts.

1. Increased research into social dynamics of networks

Further work is needed to understand the social, political and economic dynamics of landscapes and communities. Improved knowledge of the social and demographic characteristics of those landowners participating in connectivity conservation initiatives and those that are not could provide important information and allow approaches to be tailored to attract landowners in the future and to enhance the long-term sustainability of connectivity groups and projects.

2. Longer term changes in network characteristics

Long-term research and analysis of ecological, social, governance and land use attributes would enhance our understanding of the forces that shape multi-tenure conservation initiatives. Of particular interest is the identification of reasons for their persistence or failure. The impact that the failure of an established network may have on landowners involved is of particular interest because disenfranchisement may lead to negative outcomes for biodiversity conservation. Longer-term research would also enable a more thorough evaluation of the contribution of networks to biodiversity

conservation, the ultimate reason for establishing such initiatives.

3. Comparison with other networks in Australia and internationally

Multi-tenure connectivity initiatives are proliferating in Australia, being established at a range of scales and with increased interest by government. Further comparisons between the types of initiatives and the scales they operate at, both in Australia and with international initiatives (e.g. greenline parks, transboundary protected areas, large-scale wildlife corridors), will also provide greater insight into the characteristics of multi-tenure connectivity networks and their role in protecting biodiversity. Ultimately, this will assist in identifying more effective and efficient models for biodiversity conservation across the landscape.

CONCLUSION

Australia is at a developmental phase in experimenting with a range of different approaches to achieving connectivity and landscape-scale conservation, at a range of scales from local, ecosystem-based networks to massive continent crossing linkages. This is an exciting time for conservation tempered by the need to ensure that these initiatives complement – not replace – efforts to halt vegetation loss, establish a comprehensive, adequate and representative reserve system, and address the continuing threat of climate change. Local communities, NGOs and some state governments have led the recent drive for real, on the ground connectivity conservation initiatives. The Australian Government has followed with the National Wildlife Corridors Plan that will provide a guiding national framework which in turn may increase funding and agency support for initiatives from the Australian Government. But such a plan will need bi-partisan long-term (decades not years) political support, and support from state and local governments, if it is to meet its lofty ambitions.

Whilst such national-scale plans (sometimes referred to as ‘natural infrastructure building’) are vital, it is important to note that most of the on the ground initiatives in Australia have developed and evolved in the absence of a national policy framework or direct Australian Government support. Considering the current strong interest in establishing connectivity initiatives, this will continue to pose challenges in balancing demand for support from initiatives in areas which may not be a high priority for conservation at a national level with encouraging the establishment of initiatives in high priority regions but where there is little local interest.

There is an urgent need to support and strengthen governance capacity of initiatives to continue to achieve more efficient and effective conservation outcomes. There is also a need to break down the silos that currently exist between supposed different approaches to connectivity and landscape-scale conservation (e.g. biosphere reserves, wildlife corridors, conservation management networks) and instead take a more holistic view of these multi-tenure conservation initiatives in policy, planning, research and communication.

Whilst governmental support for a framework of corridors is crucial, other sources of funding (from corporate to philanthropic) will be important to provide the continuity and scale of resources required to operationalize these grand visions. Given the likely increase in investment in these initiatives, providing security for the conservation outcomes achieved from that investment (e.g. through conservation covenants and other binding agreements) will be an increasing focus. This is particularly so considering the evolving, and at times fragile, nature of the initiatives. Finally this increase in investment in connectivity conservation initiatives needs to be underpinned by strong monitoring and research frameworks which ensures that best practice is identified (and rewarded) and by an effective communication network which ensures that these findings are dispersed across all projects in the country.

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REFERENCES

- Australian Government (2012). *One Land-Many Stories: Prospectus of Investment 2013–2014*. Canberra: Department of Sustainability, Environment, Water, Population and Communities.
- Bennett, A. (2003). *Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation*. Gland, Switzerland and Cambridge, UK: IUCN.
- Brunckhorst, D.J., Bridgewater, P. and Parker, P. (1997). The UNESCO Biosphere Reserve Program comes of age: learning by doing; landscape models for sustainable conservation and resource use. In P. Hale and D. Lamb (Eds) *Conservation Outside Nature Reserves*. (Eds). Brisbane: Centre for Conservation Biology, University of Queensland. P 176-182.
- Conlan, M. (2012). Parks and Wildlife to receive funding increase. Minister for Parks and Wildlife Media Release, 4 December 2012. Available: <http://newsroom.nt.gov.au/index.cfm?fuseaction=viewRelease&id=10126&d=5> [Accessed 7 December 2012]
- Crooks, K.R. and Sanjayan, M. (eds) (2006). *Connectivity Conservation*. Cambridge, UK: Cambridge University Press.
- DSEWPC (2012). *National Wildlife Corridors Plan: A framework for landscape-scale conservation*. Canberra, Australia: Department of Sustainability, Environment, Water, Population and Communities.
- Fitzsimons, J., Pulsford, I. and Wescott, G. (eds) (2013). *Linking Australia's Landscapes: Lessons and Opportunities from Large-scale Conservation Networks*. Melbourne, Australia: CSIRO Publishing.
- Fitzsimons, J.A. and Wescott, G. (2005). History and attributes of selected Australian multi-tenure reserve networks. *Australian Geographer* 36: 75-93.
- Fitzsimons, J.A. and Wescott, G. (2007). Perceptions and attitudes of land managers in multi-tenure reserve networks and the implications for conservation. *Journal of Environmental Management* 84: 38-48.
- Fitzsimons, J.A. and Wescott, G. (2008a). Evolving governance arrangements in multi-tenure reserve networks. *Environmental Conservation* 35: 5-7.
- Fitzsimons, J.A. and Wescott, G. (2008b). The role of multi-tenure reserve networks in improving reserve design and connectivity. *Landscape and Urban Planning* 85: 163-173.
- Fitzsimons, J.A. and Wescott, G. (2008c). Ecosystem conservation in multi-tenure reserve networks: The contribution of land outside of publicly protected areas. *Pacific Conservation Biology* 14: 250-262.
- HC Coombs Policy Forum (2011). *Natural Resource Management Policy and Planning in Australia. Synthesis of broad issues and opportunities: Document 1*, HC Coombs Policy Forum-Fenner School of Environment and Society NRM initiative. Canberra, Australia: Australian National University.
- Hilty, J.A., Chester, C. and Cross, M. (2012). *Climate and Conservation: Landscape and Seascape Science Planning and Action*. Washington, D.C. USA: Island Press.
- Lindenmayer, D.B. and Fisher, J. (2006). *Habitat Fragmentation and Landscape Change: An Ecological and Conservation Synthesis*. Collingwood, Australia: CSIRO Publishing.
- Mackey, B., Watson, J. and Worboys, G.L. (2010). *Connectivity Conservation and the Great Eastern Ranges Corridor*. Sydney, Australia: ANU Enterprises Pty Ltd.
- Mansergh, I., Cheal, D. and Fitzsimons, J.A. (2008). Future landscapes in south-eastern Australia: the role of protected areas and biolinks in adaptation to climate change. *Biodiversity* 9 (3-4): 59-70.
- Robins, L. and Dovers, S. (2007). Community-based NRM boards of management: are they up to the task? *Australasian Journal of Environmental Management* 14: 111-122.
- Saunders, D.A., Craig, J.L. and Matisse, E.M. (eds) (1996). *Nature Conservation 4: The Role of Networks*. Chipping Norton: Surrey Beatty and Sons.
- Soulé, M.E., Mackey, B.G., Recher, H.F., Williams, J., Woinarski, J., Driscoll, D. and Dennison, W.C. (2004). The role of connectivity in Australian conservation. *Pacific Conservation Biology* 10: 266–279.
- Soulé, M.E. and Terborgh, J. Eds (1999). *Continental Conservation: Scientific Foundations of Regional Reserve Networks*. Washington D.C. USA: Island Press.
- Thiele, K. and Prober, S. (2000). Conservation Management Networks—a model for coordinated protection and management of remnant vegetation. In: *Balancing Conservation and Production in Grassy Landscapes, Proceedings of the Bushcare Grassy Landscapes Conference, Clare, South Australia 19-21 August 1999*. (Eds T. Barlow and R. Thornburn) pp. 58–63. Canberra: Environment Australia.
- UNESCO (1995). *Biosphere Reserves: The Seville Strategy and the Statutory Framework for the World Network*. Paris, France: UNESCO.
- Woodley, S., Bertzky, B., Crawhall, N., Dudley, N., Londoño, J.M., MacKinnon, K., Redford, K. and Sandwith, T. (2012). Meeting Aichi Target 11: What does success look like for protected area systems? *PARKS* 18 (1): 23-36.
- Worboys, G.L., Francis, W. and Lockwood, M. (eds) (2010). *Connectivity Conservation Management: A Global Guide*. London: Earthscan.
- Worboys, G.L. and Pulsford, I. (2011). *Connectivity conservation in Australian landscapes*. Report prepared for the Australian Government Department of Sustainability, Environment, Water, Population and Communities on behalf of the State of the Environment 2011 Committee, Sustainability, Environment, Water, Population and Communities, Canberra.
- Wyborn, C. (2011). Landscape scale ecological connectivity: Australian survey and rehearsals. *Pacific Conservation Biology* 17: 121-131.

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RESUMEN

Australia ha experimentado un rápido crecimiento en la creación de redes de tierras gestionadas para la conservación de la conectividad, a escala de paisaje y subcontinental. Estas redes se denominan de diversas maneras, incluyendo reservas de biosfera, corredores biológicos (*biolinks*), corredores de vida silvestre y redes para la gestión de la conservación. Su establecimiento ha variado desde iniciativas gubernamentales hasta iniciativas promovidas por organizaciones no gubernamentales y propietarios de tierras. Examinamos las iniciativas de conservación existentes a nivel de paisaje para determinar éxitos, fracasos y orientaciones futuras y sintetizamos temas comunes. Estos temas incluyeron escala, importancia de las redes sociales y económicas, liderazgo, gobernanza, financiación, planificación de la conservación, función de las áreas protegidas y comunicación. Examinamos el surgimiento de la política nacional relacionada con los corredores de vida silvestre en Australia y su relación con el compromiso a largo plazo para construir un sistema de parques nacionales integral, adecuado y representativo. Y por último, destacamos áreas para futuras investigaciones para proyectos de conservación de la conectividad en Australia.

RÉSUMÉ

L'Australie a connu une croissance rapide du nombre de réseaux de terres gérées dans l'optique d'une conservation de la connectivité, quels que soient les types de régimes fonciers et l'échelle (par exemple à l'échelle du paysage ou sous-continentale). Ces réseaux peuvent prendre la forme de réserves de biosphère, de bioliens, de couloirs de la vie sauvage et de réseaux de gestion de la conservation. Leur création peut être le fait d'initiatives de l'État ou d'organisations non gouvernementales et de propriétaires intéressés. Nous avons évalué les principales initiatives en faveur de la conservation à l'échelle du paysage, leurs succès, leurs échecs et leurs orientations futures, et avons rassemblé les thèmes communs. Ces thèmes incluent notamment l'échelle, l'importance des réseaux économiques et sociaux, le leadership, la gouvernance, le financement, la planification de la conservation, le rôle des aires protégées et la communication. Nous avons également étudié l'émergence d'une politique nationale relative aux couloirs nationaux de la vie sauvage en Australie, et la relation entre cette politique et l'engagement à long terme portant sur la construction d'un système national de réserves significatif, adéquat et représentatif. Enfin, nous avons souligné les domaines méritant d'être approfondis pour des projets de conservation de la connectivité en Australie.