



PROTECTED AREAS AND HUMAN LIVELIHOODS

Edited by Kent H. Redford and Eva Fearn

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Kent Redford
WCS Institute
Wildlife Conservation Society
2300 Southern Blvd.
Bronx, NY 10460
(718) 220-5889
kredford@wcs.org



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INTRODUCTION

Protected Areas and Human Livelihoods: Experiences from the Wildlife Conservation Society

Kent H. Redford⁺, David S. Wilkie^{*}, and Eva Fearn⁺

⁺Wildlife Conservation Society—WCS Institute, ^{*}Wildlife Conservation Society—Living Landscapes Program

The creation of the global protected area estate is a contested process. It has been called both the greatest biodiversity conservation planning exercise and the largest illegitimate taking of private property and resources in the history of the world. The global protected area network now exceeds 100,000 sites and covers 12% of the world's land surface. These sites range from fully protected national parks and wilderness areas (IUCN I and II), to multi-use reserves (IUCN IV-VI) designated primarily to protect the resource rights of local people. Though wholly protected parks were historically predominant, today, multi-use reserves are expanding fastest and now represent about 90% of all terrestrial protected areas (Naughton-Treves et al. 2005). Yet despite, or perhaps because of, the apparent success of creating parks and reserves to protect biodiversity, their future is not assured. Myriad problems militate against the successful protection of biodiversity in protected areas. These include inadequate gazetting, ineffective management, rising expectations, and, most importantly, lack of public support at all levels.

One of the most vexing problems facing protected areas is their expanding remit. Originally established with the relatively limited scope of providing a place for recreation and to protect some component of nature, the protected area estate today is also expected to provide an increasing range of benefits to an increasing range of people. Parks are no longer allowed to simply “protect” but are charged with providing ecosystem services and facilitating poverty reduction via local development, ecotourism, and sustainable resource use. And, though often established for the benefit of people living at a distance from the area (regional, national, or international), they are now expected to provide increased direct benefits to people living in and adjacent to the protected areas themselves.

Tension over historical injustices of establishment of protected areas, the costs of enforcing their management regulations, and rising expectations for economic benefit provision have combined to slacken broad scale support for protected areas. This has been compounded by much recent rhetorical discussion in the social science literature about protected areas and the purported return to an emphasis on strict protection. These claims ignore the overwhelming push on protected areas in the other direction—towards much greater integration with the human communities in and adjacent to them—and further diminish support for protected areas as an essential tool for conservation of biodiversity.

These complicated currents confront many of the Wildlife Conservation Society's (WCS) field programs at sites where we work and in national and international discussions about the role and effectiveness of protected areas. As part of our on-going commitment to conserving wild places, WCS, in col-

laboration with the White Oak Conservation Center, is conducting a set of three workshops to address the constraining broader support for protected areas. The overall theme for the meetings is “The future of protected areas in changing social contexts.” The first meeting, held in 2006, was on “Protected areas and human displacement” (Redford and Fearn 2007). The second meeting, on which this WCS Working Paper reports, was on “Protected areas and human livelihoods,” and examined the ways, positive and negative, that protected areas influence the human communities that once relied or still rely on natural resources within protected areas. The final meeting will be on the topic of “Protected areas, ecological scale and governance.”

To bolster support for biodiversity conservation it is vital to produce a more nuanced approach to the interaction between protected areas and local people. It is clear that in some cases protected areas have been responsible for diminishing the livelihood prospects of people living in and near them. Left largely unexamined, however, are the benefits that protected areas may provide for these same people. Sprinkled throughout the literature are references to protected areas and the organizations that work to sustain them being sources of support for local development, democratization, land titling and sustainable resource planning. There are additional examples where protected areas were created with the significant purpose being support for local empowerment (e.g., Redford and Painter 2006; Alcorn et al. 2006) and even cultural protection and the protection of the rights of people as of yet uncontacted (e.g., Tagaeri and Taromenane in the Yasuni Intangible Zone of Ecuador; and the Ayorea in Kaa Iya National Park, Bolivia).

To address the complexity of conservation implementation in the context of protected areas and livelihoods, with the specific aim of examining both costs and benefits of creating and managing parks and reserves, we present case studies from WCS field conservationists working at 12 sites on four continents. These are complemented with six contributions from experts outside WCS that explore such diverse dimensions of the livelihood-protected area debate as the roles of agricultural development, economic policy, and wildlife (zoonotic) disease. All were selected to explore two primary questions: 1) When and how are local livelihoods influenced by the ecological parameters of a protected area? and 2) When and how can markets be used to achieve sustainable livelihoods and conservation? Together these varied case studies demonstrate the fallacy of facile generalizations too commonly found in the current literature. Instead they document the richness and complexity found in the real world and the importance of considering a diversity of individual cases, the nuances and experience that informs effective conservation and poverty alleviation, when drawing conclusions about the costs and benefits of protected areas.

Grouped regionally, these cases provide some commonality when considering the relationship between protected areas and human livelihoods. For WCS work in Asia, the way in which conservation detracts from livelihood potential is similar across the case studies from Indonesia, Malaysia, and Afghanistan. Livelihoods of local people are constrained by management activities designed to protect target species, such as patrols and limits on grazing and resource harvesting. At the same time, livelihoods, or the foundations for better livelihoods, are supported by conservation projects by institution-building, training, and improvement of representation. At all three sites, conservation organizations provide support for agricultural improvement. In areas where there is nascent eco-tourism, local people benefit via job creation or direct revenue. Additional livelihood-enhancing projects include formal education for indigenous people

living within a national park in Sarawak, Malaysia, and a proposed microfinance program for poor farmers on the fringes of a national park in Sumatra, Indonesia.

In the Latin American cases, Mamiraua (Brazil), Kaa-Iya (Peru), and Madidi-Tacana (Bolivia) were all created, in part, to protect indigenous peoples' rights from being usurped by outsiders—in these cases, commercial fishers, farmers and colonizers, and a natural gas company. In Mamiraua, by securing fishing rights solely for local people, valuable but over-exploited fish stocks were able to recover and today provide significantly improved incomes for resident fishers. Though the protected areas have helped local people to avoid a taking of their present nature resource access and use rights, they come at the cost of accepting some resource use proscriptions (e.g., not hunting endangered species) and foregoing some future rights (e.g., setting aside in perpetuity some of their land for conservation). To offset these costs, conservation work focuses on strengthening the capacity of local institutions to enforce their rights, and helping to establish profitable and wildlife-friendly enterprises.

In the African cases, much like elsewhere, conservation activities both impinge on and support local livelihoods. In Madagascar, conservation restricts expansion of rice cultivation and other market crops, but compensates for these losses through payments for forest protection financed through a voluntary carbon-offset market. In Tanzania, conservation work has helped secure land claims of local people, an important first step in their generating income from wildlife tourism and trophy hunting. Simultaneously, conservation work has resulted in the ousting of non-resident pastoralists from a wetland grazing area, which has helped increase river flows to the benefit of all users of the great Ruaha river. In Kenya, Marine Protected Areas exclude fishers from parts of the reef, but recovery of fish stocks increase catch outside the MPAs and generate tourism revenues.

In the North American example of the Adirondack Park, conservation regulations limit timber, mining, and development, even on private property. However, New York state compensates residents for land development restrictions and municipalities for lost property taxes by subsidizing schools and other social services. In addition, investment in the park created many government and tourism jobs.

Conservation activity is associated, in all cases, with both benefits and costs to local people. The mix of these two depends on many factors, including the social, ecological, and conservation circumstances of each area and what sorts of other organizations (local, national, international) are working with WCS to provide benefits to local peoples. In most circumstances, in most places, there are trade-offs between conservation and local livelihoods but across a broad range of currencies and over differing time frames. No simple calculations can be made about winners and losers.

Discussion across case studies, and from broader experience, reached two overall conclusions: First, in all of the systems examined, there were ecological limits to achieving sustainable livelihoods from natural systems. Too often, unfettered access to natural systems is assumed to be able to ensure improvements in local livelihoods, and denial of such access is viewed as responsible for local suffering. Natural systems can improve livelihoods in some cases but not in all, and the returns may be short-lived if the systems are used non-sustainably. Second markets were not a panacea for achieving twin goals of sustainable livelihoods and conservation of protected areas. Unfettered access to markets is also often thought to be the solution to local deprivation. Although sometimes

the source of durable solutions, market access is likewise only a partial solution that works in some cases and not others. These two conclusions are important when assessing under what conditions the livelihoods of local peoples suffer or benefit from the establishment of protected areas.

Conclusion

The last centuries have seen massive changes in human population in terms of demography and distribution. Human population has increased many-fold, people are living longer, and for the first time in the history of the planet are predominantly urban. Population growth, combined with strife, natural disasters, land-use changes, and political change, have altered and realtered where people live. In the countryside, not only have many people left, but massive land-use changes have forever altered the landscape, now composed of industrial forestry, agriculture at large scales on almost all suitable land, logging in most forests, diversion or damming of many rivers, grazing across vast swaths of grassland, disease increasing in some areas and decreasing in others with concomitant land-use changes, and greatly increased settlement along coasts. It is against these massive changes in land use and human population movements that the impact on local peoples of protected area establishment must be judged. This makes it extremely difficult to assign responsibility for changes in human livelihoods to single factors.

Taken collectively, the contributions in this volume reject the essentialist arguments that prevail in the policy literature: Protected areas are not necessarily bound in any predetermined relationship to poverty or to wealth. Conservation is not necessarily good for local people, nor is it necessarily bad (Fisher 2006). The particularities of place—ecology, biology, productivity, social history, governance structures, protected area management, and other factors—are powerful determinants of the interaction between protected areas and livelihoods. But we are not yet at a point to be able to build predictive models.

There is a broadly developing understanding that protected areas must be integrated into the surrounding land and with the neighboring human populations. The recent rise in appreciation for the value of ecosystem services and the fragility of the ecosystems that provide them has highlighted the interactions between protected and non-protected parts of the landscape. This joins an earlier understanding that parks cannot survive as islands, but rely on flows with non-protected parts of the landscape. It comes as no surprise then that protected areas, because they are protected and therefore subject to a different set of pressures than surrounding land uses, provide both benefits and costs to neighboring peoples. In fact the World Commission of Protected Areas established a task force on protected areas, equity, and livelihoods that is in the process of completing a three-continent set of meetings. This working paper offers to this broader discussion the experiences of the Wildlife Conservation Society—including the Tranlinks project dedicated to the question of conservation and livelihoods—that emphasize the importance of a balanced approach to the question, one not based on the soaring rhetoric so dominant today, but rooted in decades of implementation and local experience.

1.2 Livelihoods and Protected Areas in the Ruaha Landscape: A Preliminary Review

Pete Coppolillo⁺ and Amy Dickman^{*}

⁺Wildlife Conservation Society—Ruaha Landscape Program, ^{*}Zoological Society of London

Ecological Setting

The Ruaha Landscape covers an area of approximately 50,000 km² in central Tanzania. The landscape is a mosaic of habitat types straddling the southern limit of the Sudano-sahelian “*Acacia*-thorn savannas” and the northern end of the *miombo* woodlands. The landscape changes along edaphic, elevational, and rainfall gradients, with the drier (<200 mm rainfall) lower-elevation (~700 m) and richer soils in the Rift Valley giving way to wetter (up to 1,500 mm rainfall), higher elevation *miombo* woodland and *Drypetes* forest. The landscape’s physiognomic diversity is reflected in Ruaha National Park’s diverse bird community—529 species recorded—and the large mammal community, which includes the southernmost population of Grants gazelle and lesser kudu, and roan, sable and greater kudu.

Cultural Setting

The Ruaha Landscape’s location in the Great Rift Valley suggests that some human settlement has been present for as long as anatomically-modern humans have existed. Rock art can be found at Kondoa, just east of the Ruaha Landscape, and there are colonial accounts of rock art present in Ruaha National Park and Rungwa Game Reserve. More recent cultural history reveals a diverse ethnographic landscape. Bantu horticultural groups inhabit wetter areas and places where traditional irrigation is possible, and Nilotic pastoralists from Barabaig and Maasai ethnic groups have moved into the area in the last 50-70 years.

Also significant is Tanzania’s history of *Ujamaa* or “villagization,” where, in the mid-1970s, scattered settlements were relocated into nucleated villages and communal and managed village farms were established. This phenomenon had lasting effects on Tanzanian society, but two are particularly significant for conservation. First, nucleating villages created a pattern of human development that concentrated human impacts in villages and left large unsettled tracts for wildlife. Second, the process validated the idea of government-sponsored resettlement in the minds of many Tanzanians.

History of Protected Areas Establishment

Colonial Period: Saba Reserve

The earliest conservation efforts in the area were consistent with the general history of conservation in Tanzania: dry season aggregations were protected as colonial hunting reserves. The Saba Reserve was established by the German colonial government and covered most of what is today recognized as the Ruaha Landscape. During this period, there was relatively little permanent settlement in the landscape, but over 40 named places are still recognized in the protected portions of the landscape, suggesting that the area was used seasonally and was relatively well-known.

Post-Colonial: Rungwa-Ruaha

Just after independence (and with support from the New York Zoological Society) Ruaha National Park was established to cover 10,800 km² between the Great Ruaha and Mzombe Rivers. From the beginning, no consumptive use was allowed in Tanzanian national parks, which represented a step back from the consumptive use allowed in the Saba Reserve. The areas in present-day Rungwa, Kizigo, and Muhezi Game Reserves receiving game reserve status between 1974 and 1984 and continued to be hunted. Usangu Game Reserve was established in 1996 by upgrading the Utengule Swamp hunting block in response to an influx of Sukuma and Maasai pastoralists, many of whom had left northern Tanzania in search of better grazing lands. Those already settled in Usangu were compensated and left, but unfortunately there was little enforcement of the new regulations, and many returned almost immediately.

The final protected area in the Ruaha Landscape is Pawaga-Idodi Wildlife Management Area (PI-WMA), which was officially designated in March 2007. This 750 km² strip south of Ruaha National Park is village land. In 1995, a UK Department for International Development (DFID)-Funded program began buffer-zone management activities in this area. This process coincided with Tanzania's establishment of "Wildlife Management Areas" legislation, which (for the first time) allows local people to manage wildlife on their village land. With the exception of management staff and tour operators, none of these protected areas has human settlement within its boundaries. For PI-WMA, a consortium of 21 villages is about to receive User Rights to manage the area.

Current Situation

During the 2006 dry season the drying of the Great Ruaha River forced the Mtera Hydroelectric plant to close and reduced the Kidatu Hydroelectric Plant's production by 50%. A major driver of the river-drying was degradation of the Ihefu Swamp in Usangu Game Reserve, where around 170,000 livestock were grazing. In response to the power crisis, the Government of Tanzania expanded Usangu Game Reserve's boundaries and upgraded it to national park status. Grazing in the game reserve was already illegal, but numbers of livestock had increased steadily since the initial evictions, so Usangu was placed under the Tanzania National Parks Authority (TANAPA), which is relatively better funded and in general is more effective at enforcement. At present the area is slated to be annexed to Ruaha National Park, making it the largest Park in Africa, at just over 20,000 km². The boundaries of the expanded area are not yet final.

In keeping with its policy of no settlement in protected areas, at least three villages will be resettled as part of this process. At this stage (actual movement has not started), most of the affected people are cooperative, which may reflect Tanzania's recent history of resettlement. Present conflicts surrounding the resettlement process focus on compensation amounts and who is eligible, rather than whether or not resettlement should occur.

Resource Use and Governance

National parks allow no consumptive use, while game reserves allow low-volume trophy hunting by (mostly expatriate) tourist hunters. Pawaga-Idodi WMA will be managed with both photographic (non-consumptive) and hunting zones (81% and 19% of the area respectively).

One exception to these rules is Muhezi Game Reserve, which, in an effort to demonstrate "tangible benefits" to adjacent communities, was designated a "multiple use" game reserve in 1995. The result is that two extractive uses—

beekeeping and artisanal gold mining—are allowed. Beyond honey, gold mining, and trophy hunting, there are no consumptive uses in the protected portion of the landscape. Neither honey nor gold from the protected area have a special market associated with them.

The “tangible benefits” of honey production and artisanal mining may be more appropriately labeled “visible benefits.” The Rungwa-Kizigo-Muhezi complex of reserves (the only management unit for which revenue data are available) generates over \$850,000 per year. These revenues go into Tanzania’s central treasury, so they do in fact produce tangible monetary benefits, but only as part of the national budget. This revenue is effectively invisible in the local context, so the need for *visible* benefits contributed to the decision to allow honey and gold mining in the Muhezi Game Reserve. It is not clear whether this was perceived or presented as livelihood improvement or mitigation of lost access.

Resource use outside protected areas is managed by village and district government. As part of the Village Land Act, villages must establish land use plans which are enforced through village by-laws. In general, village by-laws only apply to land uses like cultivation, grazing, or settlement. Permits for wood cutting and hunting are issued by forestry and wildlife officers, who are part of district councils but administratively are part of the Ministry of Natural Resources and Tourism.

Resource Use and Conservation Targets

It is generally accepted that in Tanzanian savannas, sanctioned use of natural resources have far less impact than illegal uses. For example, assessments of tourist hunting quotas show that with the exception of big cats, quotas tend to be low (<2%) and are not generally considered to be a threat to wildlife populations. But illegal hunting outside reserves and in boundary areas is known to have significant effects, even leading to local extinctions. For this reason, most research and monitoring in the Ruaha Landscape has focused on illegal uses and not systematically assessing the direct effects of legal consumptive uses. Nevertheless, it is possible to paint a preliminary picture of the effects of mining and beekeeping.

Honey is collected from wild baobab trees or from artisanal hives made from hollowed logs. The direct effects of honey collecting are minimal, but the indirect effects—fire and associated hunting—can be significant. Illegal hunting associated with honey gathering is difficult to assess quantitatively for a number of reasons. First, it is likely that a significant proportion—if not most—hunting associated with honey gathering goes unnoticed because detection rates are low, particularly in the dense *miombo* woodlands and *Itigi* Thicket of Muhezi Game Reserve. Second, only arrests are recorded, so there is no mechanism to capture encounters that do not lead to an arrest. Furthermore, no centralized record remains after arrests are moved (administratively) to the legal realm, so retrospective analyses are impossible. Management and enforcement personnel point out that honey collecting provides an excuse for people to enter the reserve, so an individual’s presence in the reserve may not necessarily be illegal, even if his intentions are to hunt illegally. This “cover” for illegal hunters who have no intention to collect honey is the primary concern voiced by management personnel. Despite—or possibly because of—these difficulties in measuring honey-related hunting, managers and rangers complain that the proportion of genuine honey gatherers to disingenuous ones attempting to gain access is quite low.

Fires, the second effect associated with honey gathering, are more easily measured. Fires are common throughout the dry season, from the time grasslands dry in May until the rains begin, usually in November. Because “dry lightning” is not common in the Ruaha Landscape, virtually all fires can be attributed to people. As a honey hunter opens a hive, the smoldering stick used to subdue the bees is cast aside, often starting a fire. Fires are also intentionally set to facilitate safer travel through the bush (to make snakes and large mammals more visible), or to divert enforcement personnel because they are also responsible for extinguishing fires.

The effects of artisanal mining are not dissimilar to those of honey hunting: The direct disturbance from digging is minimal, but the human presence in the reserve is much more significant. Again, by providing a legitimate excuse to enter the reserve, mining creates an opportunity for illicit resource users to enter under the guise of sanctioned use. Poor regulation of permits also means that while only 12 initial miners were authorized to remain in the reserve, literally hundreds of individuals claim access as one of the original 12. Miners—unlike honey hunters who enter the reserve, collect honey, and leave—are inclined to stay for long periods. This increases the probability that they themselves will hunt for the pot while in the reserve.

The “effects” of honey hunting and mining described above are focused primarily on illegal hunting and fires as potential threats to wildlife. But what effects are visible through ecological outcomes like the decline of a species? To address this question, we examined the available data on buffalo, as they are a useful lens because they are affected by both threats and because they are economically valuable. Their abundance relative to the other highly-prized trophy species (like lion and leopard) and the cost of a buffalo hunt (\$27,000 for a one-week hunt) make buffalo the cornerstone of the tourist hunting industry.

Using buffalo as an indicator of overall ecosystem health, it is clear that the decision to incorporate extractive use has affected Muhezi Game Reserve. Ecosystem-wide, numbers of buffalo appear stable, but a closer look at the sub-units of the landscape reveals a different story. Parts of the Ruaha Landscape have seen a marked decline in buffalo (up to 70%). Poor nutrition may be driving or at least exacerbating this trend. Muhezi Game Reserve has the lowest density of buffalo when compared to the adjacent reserves and Ruaha National Park. While it would be inaccurate to attribute the decline of buffalo simply to fires from honey collecting, the fires are an important contributing factor. Fires affect all grazing species.

As far as hunting is concerned, other species may be facing more significant threats than buffalo because buffalo are large and dangerous, and are avoided by many subsistence hunters. Furthermore, buffalo use open habitats and are in large herds, making them more difficult to hunt at close range, which is a necessity when using homemade muzzle-loaders (the most common method of illegal hunting).

In summary, very little consumptive use is allowed within the protected areas of the Ruaha Landscape: Honey hunting and artisanal mining are the only uses allowed, and these are practiced in Muhezi Game Reserve, which covers just over 9% of the landscape. The direct effects of these sanctioned uses are relatively small when compared to those of their indirect effects, hunting and fire. While high quality data are not available, a preliminary assessment of the effects of fire on buffalo suggests that it has significant local effects.

Displacement of Use

Excluding tourist lodges, reserve management, and hunting camps, there are no human settlements in these protected areas. Therefore, the effects of protection on local use, or “displacement,” are only visible in adjacent areas.

As mentioned above, the human population adjacent to protected areas is split between horticulturalists and pastoralists. Because pastoralism is spatially extensive, and because pastoralists are politically marginalized, they are the most likely sub-population to suffer the effects of “economic displacement.” Because pastoralists live closest to the protected areas of the Ruaha Landscape and because their livestock share many resources with wildlife, their interactions with the protected areas are stronger than those of horticulturalists. For this reason, and because more data are available for pastoralists, we limit our analysis of displacement to pastoral households.

To examine whether pastoralists are experiencing economic displacement, we examined whether their access to grazing land was affected by the presence of protected areas. To do so, we tracked 35 groups of cattle as they were herded from their households, and analyzed whether living closer to protected areas affected the distance that herds needed to travel—the “herding radius.” Economic displacement could increase the herding radius—by forcing herds to travel farther to find other grazing areas to substitute for protected rangelands—or decrease the herding radius—if the spatial constraint imposed by protection made it impossible to travel farther.

We found no evidence for either type of displacement. Distance from protected area boundary was not correlated with herding radius, and households living between village centers and the protected area traveled no further than households that lived on the opposite side of the village from the protected area.

It is possible that displacement may be uniformly affecting all households within the area. In that case, variation would only be apparent at larger spatial scales. However, this seems unlikely in light of the following observations: First, herding radii are short, relative to the overall size of villages. Because households are only using small areas, there is local variation in the density of livestock and in grazing pressure; in other words, entire villages are not experiencing a uniform shadow of displacement. Furthermore, large, unsettled and more lightly-grazed areas exist between villages, suggesting that grazing resources are not uniformly exhausted. Given the long time since park establishment, one would expect that if displacement were significant, resource use would shift and these areas would be more uniformly exploited. Finally, in the villages examined, resettlements occurred during the colonial period, at protected area establishment, during villagization, and nearby villages were resettled after establishment of a dam for hydroelectric power. That resettlement affects land use is undeniable, but the protected areas would be unclear. This preliminary analysis suggests that livestock herding is not spatially constrained by protected areas. But the spatial aspect of herding is only one component of pastoral livelihoods.

Conservation and Livelihoods in Ruaha

Livelihoods may still be significantly affected by protected areas. The costs of living near a protected area include livestock depredation by carnivores, crop raiding by elephant and hippo, and the potential for disease transmission between wildlife/livestock/human interfaces. Benefits may include employment (by protected area authorities, tour operators, and lodges or by conservation

organizations), growth in reserve-adjacent village economies, or through services like veterinary extension benefit sharing programs or land/resource-use planning undertaken as part of reserve establishment or management.

Costs of Living with Wildlife in Ruaha

The costs of living with wildlife for pastoralists in the Ruaha Landscape are that most pastoral households reported losses to carnivores. Reports varied from 0 to 12 cattle, but households averaged 0.34 animals lost during the year preceding the study. (Animals stolen or dying from disease and starvation were also recorded.) **Table 1** shows the numbers of animals reported lost to these factors, and their ratios. The economic cost of human-carnivore conflict (HCC) can be calculated using animals’ market price, but since only a small percentage of animals are sold, the more common losses are in terms of household productivity. No human deaths have been attributed to carnivores over the last four years, but one herder was injured by a leopard while defending livestock. Whether this should be “counted” as a cost is unclear because the livestock were being herded illegally within a protected area.

Table 1: Average livestock losses per household

	Mean # of each class of livestock killed by predators	Mean # stolen	Ratio of stolen: predated	Mean # dying from disease and Starvation	Ratio of diseased or starved: predated upon	Ratio of non-carnivore deaths to carnivore predation
Cattle	0.34	1.27	3.75	1.93	5.70	9.45
Small stock	0.93	1.54	1.66	2.96	3.20	4.86

Quantifying the costs of disease is more difficult. Disease and starvation often go together, and many herd owners were reluctant to attribute deaths to one or the other, so these two categories were aggregated. Reported losses to disease and starvation are much greater than the losses to carnivores: 3 to 1 for small stock and 5 to 1 for cattle. But the proportion of these losses to attribute to wildlife is unclear. We examined households’ reported losses to disease in relation to their distance to the protected area boundary and the densities of other households and livestock. Reported losses to disease were most strongly correlated to cattle density. Distance to the nearest protected area boundary was not correlated to disease losses. Taken together, these results suggest that livestock are a more significant reservoir for their own diseases than are wildlife. Because disease and starvation were lumped, it is difficult to say which process drives this result more strongly, but direct sampling of zoonotic diseases in livestock is underway.

Benefits of Living with Wildlife in Ruaha¹

Pastoral communities have also benefited from living near protected areas. During the last five years, five tourist lodges have opened in the area, and three more are under construction. In addition to the lodges, many of the families of Ruaha National Park (RUNAPA) staff choose to live outside the park, where goods and services are more available, cultivation is possible, and regular transportation to Iringa (the district center) is available. While the RUNAPA families outside the park are uncounted, the economic effects of their salaries are apparent in Tungamalenga, the closest village to the park entrance. In addition

to growing rapidly, having more stores and a wider selection of goods for sale, Tungamalenga is also the only one of the nine villages in Idodi Division that has guest houses (in addition to the eight wildlife-tourism camps).²

Another benefit of living next to a protected area comes in the form of HCC mitigation. There has been research to understand and outreach to reduce livestock depredation, primarily in an effort to protect Ruaha's intact carnivore guild (it harbors the third largest population of wild dogs in Africa). One could argue that without the protected area there would be no carnivores and no conflict, but this would be an overstatement, as hyenas often persist in human-dominated landscapes. Rural areas without protected areas may still have carnivore depredation without the benefit of mitigation efforts.

Pastoralists and tour operators also joined forces last year when an increase in snaring killed two giraffe and a handful of pastoralists' cattle. The Pastoral Association raised the issue and pointed out that snaring was affecting livestock in addition to wildlife. As the pastoralists began collecting snares in the bush, the tour operators, with greater political standing and access to village government, demanded an investigation and an increase in enforcement (two suspects were arrested and remain in custody).

Tourism development may not benefit pastoralists forever. It is conceivable that tourism could expand to fill all the available wildlife-only area, and tour operators could push for more area to be designated as wildlife only. However, this seems unlikely since only about 5% of Ruaha National Park is developed for tourism. Furthermore, traditional pastoralism is well integrated with wildlife conservation in northern Tanzania, where wildlife and cultural tourism go hand in hand. Many pastoral groups have developed lucrative "cultural bomas" to capture a share of tourist revenues. Therefore, it seems unlikely that Ruaha's tourism and pastoralism will come into conflict in the near future.

Other activities to protect wildlife also indirectly benefit local people. For example, during heavy El Niño rains in early 2007, small stock began dying in great numbers. Initially, authorities speculated contagious caprine pleuropneumonia (CCPP). A Sokoine University veterinarian working on wildlife-livestock disease interactions noticed cattle abortions and sheep deaths, signs of Rift Valley Fever rather than CCPP. Early detection and action may have been significant in helping Iringa District limit human cases of Rift Valley Fever to four, while the adjacent regions of Morogoro and Dodoma endured 50 and 156 cases respectively. WCS and the Danish International Development Agency (DANIDA) District Agricultural Development Support (DADS) Program have worked together on water development in places where water shortages force pastoral livestock into contact with wildlife at shared water sources. This may help mitigate elephant conflicts, because elephants invade irrigated fields as a water source, and trample crops.

Another—perhaps the most significant—benefit for pastoralists provided by protected areas is land-use planning. Tanzania's Wildlife Management Areas legislation requires that every village seeking authority to manage wildlife on its land must complete a land use plan. During the establishment of Pawaga-Idodi Wildlife Management Area, WCS, WWF, and RUNAPA all contributed to the land-use planning process. This support sped up the process and significantly expanded the number of stakeholders that were able to participate, which both improved the plans' content and increased buy-in from those involved. Land-use planning is particularly significant for pastoralists because their movements and absence from some grazing areas during the year makes some non-pastoral people think that grazing areas are unused or unwanted. By establishing

unequivocal zonation, the land-use planning process has strengthened pastoral land tenure. Now every village recognizes and designates grazing zones within its boundaries.

These benefits are not evenly distributed throughout the landscape. Tungamalenga is the nearest village to Ruaha’s only entry point. By virtue of its location, it enjoys the lion’s share of tourism benefits and the economic activity from RUNAPA’s employees. Other villages sit directly on the boundary of Ruaha, where they endure crop raiding and livestock depredation, but because there is no entry gate nearby, they capture few of the benefits to offset these costs. Table 2 summarizes some of the livelihood-related costs and benefits for pastoral people living in the Ruaha Landscape.

Table 2: Summary of protected areas effects on pastoral livelihoods

Effect	Positive	Negative
Carnivore Depredation	<ul style="list-style-type: none"> • Assistance in decreasing livestock depredation 	<ul style="list-style-type: none"> • Losses to carnivores
Disease	<ul style="list-style-type: none"> • Additional livestock extension available through wildlife conservation efforts • Water development to increase productivity and decrease wildlife-livestock interactions 	<ul style="list-style-type: none"> • Some diseases may be present or more prevalent as a result of wildlife (but overall data suggest livestock as the primary reservoir)
Tourism development	<ul style="list-style-type: none"> • Opportunities for employment (8 lodges) • Opportunities for cultural tourism (Boma visits) • General increases in economic activity 	<ul style="list-style-type: none"> • Possibly more pressure to increase protected land (where no grazing occurs)
Access to land	<ul style="list-style-type: none"> • Land use planning and land conflict resolution from conservation NGOs 	<ul style="list-style-type: none"> • Land use planning and land conflict resolution from conservation NGOs

Current Relations between the Protected Area and Local Peoples

Relative to other parts of the world, people-park relations are good in the Ruaha Landscape. That is not to say that the area is free from conflicts, but the conflicts are intermittent and are almost never violent. The establishment of Pawaga-Idodi WMA has essentially given 21 villages their own protected area. Conflicts centered on PI-WMA generally focus on management decisions or ways to maximize benefits, rather than whether or not it should exist. Pastoralists do request access to the reserves in difficult dry seasons, but these are only requests, not calls to dissolve the WMA. RUNAPA, like all of Tanzania’s national parks, practices “Support for Community-Initiated Programs” (SCIP). Budgets for SCIP are around \$3-400,000/year and many communities are quick to mention these projects as a benefit of conservation and protected areas. One benefit of SCIP projects is that they tend to focus on infrastructure, which remains as testimony of the support. The overseeing authority for PI-WMA (MBOMIPA) also provides financial support directly to village governments, but these funds are less than what comes from RUNAPA, are less visible, and so are easily forgotten.

Conclusions

Generalizations are difficult for a landscape as large and diverse as Ruaha, but a number of salient points emerge.

Political resettlements and natural migration make the effects of protected areas difficult to isolate.

Many of the places from which pastoralists emigrated are badly degraded, so when conversation turns to land degradation, access, or land shortage, few people mention these other, earlier drivers of change; instead, most mention protected areas, which are nearby and remain tantalizingly intact. For this reason, initial impressions suggest that protected areas are the major drivers of land shortage. But protected area establishment, villagization, resettlement for a hydropower reservoir, and influxes of pastoralists from other parts of the country have all affected the patterns of settlement, livestock numbers, and resource availability in the Ruaha Landscape. Because these processes happened over decades, and because people continue to move within Tanzania, it is exceedingly difficult to attribute aspects of current land uses to any one of these drivers. In examining livelihoods in Ruaha, it is important to go beyond initial impressions, which might inflate the role of protected areas in shaping current land uses and current livelihoods.

Perceived lack of “tangible benefits” is actually a lack of visible benefits.

Another common misperception is that the protected areas of the Ruaha Landscape “lock up” resources. Closer examination reveals that these areas hold tremendous economic potential and that the perceived lack of benefits actually reflects a structural problem: the diversion of conservation revenues to central government and private entrepreneurs. It is understandable for local people to think there are no financial benefits from conservation because they are quickly whisked out of the landscape and disappear into the central treasury or offshore bank accounts. This is an important distinction because it means that protected areas and conservation have the potential to contribute to local livelihoods, but at present they are not doing so.

Extractive uses have significant negative effects on the “engines” of revenue generation.

The perception that protected areas were not producing anything of economic value has created pressure for extractive use. For example, Muhezi Game Reserve was designated a multiple-use reserve, allowing beekeeping and artisanal mining. The revenues from these two enterprises have been small and erratic, but the ecological costs in terms of fires, illegal hunting, and mercury pollution from gold mining have been large.

The Muhezi experience suggests that extractive use is not an appropriate method for integrating communities and protected areas or improving livelihoods. This strategy is akin to the owner of a productive factory choosing not to pay her workers reasonable salaries, but instead allowing them to take home pieces of the factory machinery to sell. Bits of machinery are of little value, and eventually the factory will break down. That breakdown is apparent in Muhezi, with an overabundance of fire (associated with illegal activities) and the lowest large mammal biomasses in the landscape.

Villages must be integrated economically, rather than ecologically.

The example from Muhezi highlights the difficulties of integrating communities ecologically through direct exploitation of resources. A more viable strategy is economic integration. Tungamalenga village is positioned as the sole gateway to Ruaha National Park. The village itself is thriving: economic activity is significantly greater than in other villages, the village is attracting investment in tourism enterprises, propagating benefits through the village economy. Tungamalenga runs the risk of getting too expansive, while other villages are not enjoying these benefits even though they also sit on the boundary of Ruaha.

An obvious solution is to help other villages become economically integrated with Ruaha National Park. Simply adding a second gate would decrease the pressure on Tungamalenga, protect the value of the existing investments there, and create new potential for investment and economic value in other villages. Given the difficulties with extractive use, this seems the most appropriate method for the protected area to integrate communities and improve livelihoods.

The Balance of Costs and Benefits

The costs and benefits of living with wildlife and protected areas are evident in the Ruaha Landscape, highlighting both the difficulties and the more fruitful prospects for improving rural livelihoods through conservation. Revenue from Tanzania's tourism industry will soon exceed one billion dollars per year, and local communities that pay the costs of living with wildlife deserve their share of this national resource. Such a strategy makes sense from ethical as well as practical points of view.

Academic discourse often presents local communities as passive victims, impoverished by protected area establishment. A deeper examination of resettlement and the development process in the Ruaha Landscape suggests a much more complex history and that local people may be poor *in spite of* protected area establishment, rather than because of it. Conservation in Tanzania benefits tremendously from the fact that wildlife has enormous economic value. Conservation managers should address the structural problems that effectively hide conservation revenues from local people, rather than trying to wring more benefits from protected areas through extractive use.

¹ We only consider local benefits here, but it is worth noting that at the national level, the Great Ruaha River supports central Tanzania's most significant fishery, and generates over 70% of Tanzania's electricity.

² An economic analysis of Tungamalenga's and other villages' economies is underway by M. Masozera.

BIBLIOGRAPHIES

INTRODUCTION: PROTECTED AREAS AND HUMAN LIVELIHOODS: EXPERIENCES FROM THE WILDLIFE CONSERVATION SOCIETY

Alcorn, J.B., C. Carlo, J. Rojas, D. Rothschild, A. Wali, and A. Zarzycki. 2006. Heritage, poverty and landscape-scale biodiversity conservation: an alternative perspective from the Amazonian frontier. *Policy Matters* 14: 272-285.

Fisher, B. 2006. Poverty and biodiversity conservation. *Policy Matters* 14: 48-52.

Naughton-Treves, L., M.B. Holland, and K. Brandon. 2005. The role of protected areas in conserving biodiversity and sustaining local livelihoods. *Annu. Rev. Environ. Resour.* 30: 219-252.

Redford, K. H., and E. Fearn, eds. 2007. Protected areas and human displacement: A conservation perspective. WCS Working Paper No. 29.

Redford, K.H., and M. Painter. 2006. Natural alliances between conservationists and indigenous peoples. WCS Working Paper No. 25.

PART 1: WCS CASE STUDIES – AFRICA

1.1 Linking Livelihoods, Land Stewardship, and Resource Conservation in the Antongil Bay Landscape, Madagascar

Dokolahy, R.J. 2004. Rapport preliminaire de mission etude de l'exploitation miniere dans le Site de Conservation de Makira.

Ferraro, P. 1994. Natural resource use in the rainforests of southeastern Madagascar and the local impacts of establishing Ranomafana National Park. Masters Thesis. Duke University, Durham, NC.

Golden, C.D. 2005. Eaten to endangerment: mammal hunting and the bushmeat trade in Madagascar's Makira forest. Thesis presented to the Committee on Degrees in Special Concentrations. Harvard College.

Groupe d'Etude et Recherche sur les Primates de Madagascar (GERP). 2006. Rapport annuel: mise en place d'un cadre de plan de conservation et de suivi ecologique pour les lemuriens du plateau de Makira, Region de Maroantsetra, Madagascar.

Hawkins, C.E., and P.A. Racey. 2005. Low population density of a tropical forest carnivore, *Cryptoprocta ferox*: implications for protected area management. *Oryx* 39: 1-9.

Kremen et al. 1999. Designing the Masoala National Park in Madagascar based on biological and socioeconomic data. *Conservation Biology* 13: 1055-1068.

Meyers, D. 2001. Makira Forest Project, Madagascar. Report to the Ministry of Environment. MEF-IRG/PAGE-USAID.

Monographie de la région de Toamasina. 2003. Ministere de L'Agriculture, de L'Elevage et de La Peche.

Ramanandriana, I. 2006. Diagnostic villageois des zone a haute intensite de pression de Makira et Masoala. Rapport Final

Wilson, M. 2005. Non timber forest products: Projects in the Commune of Ambinantelo, Madagascar. Report to the Wildlife Conservation Society, Makira Project.

1.3 The Evolution of Management and Impacts on Communities Adjacent to the Mombasa Marine Protected Area, Kenya

Bess, M. 1992. Final Report: KWS Mombasa National Marine Park and Reserve Workshop, 26th -28th May 1992. Bess Associates Ltd. Nairobi, 57pp.

- Bryceson, I. 1982. Seasonality of oceanographic conditions and phytoplankton in Dar-es-Salaam waters. *University Science Journal* (Dar University) 8: 66-76.
- Cesar, H.S.J., ed. 2000. *Collected Essays on the Economics of Coral Reefs*. Kalmar, Sweden: CORDIO.
- Coast Development Authority. 1996. *Towards Integrated Management and Sustainable Development of Kenya's Coast*. Mombasa.
- Cooper, F. 2000. Colonial history. Pp. 115 -128 in J. Hoorweg, D. Foeken, and R. Obudho, eds. *Kenya Coast Handbook: Culture, Resources, and Development in the East African Littoral*. Hamburg: Lit Verlag.
- Cinner, J.E., T.R. McClanahan, C. Abunge, and A.W. Wamukota. 2007. A baseline socioeconomic assessment of fishing communities along the north coast of Kenya. In J. Hoorweg and N.A. Muthiga. *Proceedings of the Coastal Ecology Conference IV, Mombasa* (in review).
- Glaesel, H. 1997. *Fishers, Parks, and Power: The Socio-environmental Dimensions of Marine Resource Decline and Protection on the Kenya Coast*. University of Wisconsin, Madison.
- Kenya Human Rights Commission (KHRC). 1997. *Kayas of Deprivation, Kayas of Blood: Violence, Ethnicity and the State of Coastal Kenya*. Nairobi.
- King, A. 2000. *Managing Institutions: The Role of Communication Networks in Governing Resource Access and Control*. PhD. University of Warwick. 251pp.
- Malleret-King, D. 2000. *A Food Security Approach to Marine Protected Area Impacts on Surrounding Fishing Communities: The Case of Kisite Marine National Park in Kenya*. PhD. University of Warwick. 298pp.
- McClanahan, T.R. 1988. Seasonality in East Africa's coastal waters. *Marine Ecology Progress Series* 44: 191-199.
- McClanahan, T.R. 2000. Recovery of the coral reef keystone predator, *Balistapus undulatus*, in east African marine parks. *Biological Conservation* 94: 191-198.
- McClanahan, T.R., and J.C. Mutere. 1994. Coral and sea urchin assemblage structure and interrelationships in Kenyan reef lagoons. *Hydrobiologia* 286: 109-124.
- McClanahan, T.R., and B. Kaunda-Arara. 1996. Fishery recovery in a coral-reef marine park and its effect on the adjacent fishery. *Conservation Biology* 10: 1187-1199.
- McClanahan, T.R., and S.H. Shafir. 1990. Causes and consequences of sea urchin abundance and diversity in Kenyan coral reef lagoons. *Oecologia* 83: 362-370.
- McClanahan, T.R., and L. Pet-Soede. 2000. Kenyan coral reef fish, fisheries and economics – trends and status after the 1998 coral mortality. In S. Westmacott, H. Cesar, and L. Pet-Soede, eds. *Institute of Environmental Studies, Free University, Amsterdam*.
- McClanahan, T.R., and S. Mangi. 2001. The effect of closed area and beach seine exclusion on coral reef fish catches. *Fisheries Management and Ecology* 8: 107-121.
- McClanahan, T.R., N.A. Muthiga, and S. Mangi. 2001. Coral and algal changes after the 1998 coral bleaching: Interaction with reef management and herbivores on Kenyan reefs. *Coral Reefs* 19: 380-391.
- McClanahan, T.R., J. Maina, and J. Davies. 2005. Perceptions of resource users and managers towards fisheries management options in Kenyan coral reefs. *Fisheries Management and Ecology* 12: 105-112.
- McClanahan, T.R., N.A. Muthiga, M.J. Rodrigues, and S. Mangi. 1998. Status of the coral reef habitats of Kenya's Marine Parks and Reserves: Results of a ten-year monitoring program (1987 - 1997). *Coral Reef Conservation Report No. 6*.
- Middleton, J. 2000. The peoples. Pp. 101-114 in J. Hoorweg, D. Foeken, and R. Obudho, eds. *Kenya Coast Handbook: Culture, Resources, and Development in the East African Littoral*. Hamburg: Lit Verlag.
- Muthiga, N.A. 2006. Assessing the effectiveness of management in marine protected areas in Kenya: Experiences from the Mombasa Marine Park and Reserve. *Proc.10th Int. Coral Reef Symp.*: 1231-1242.

Muthiga, N.A. 1998. National perspectives of marine protected areas in Kenya. Pp. 28-32 in R. Salm and Y. Tessema, eds. *Partnership for Conservation: Report of the Regional Workshop on Marine Protected Areas, Tourism and Communities*.

Muthiga, N.A., and S. Ndirangu. 2000. Village based larviculture and stock enhancement of sea cucumbers (Echinodermata: Holothuroidea) on the Kenyan coast. Biodiversity Support Fund Report No. 422000.

Mwangi, S., D. Kirugara, M. Osore, J. Njoya, A. Yobe, and T. Dzeha. 2001. Status of marine pollution in Mombasa Marine National Park Marine Reserve and Mtwapa Creek, Kenya.

Norton-Griffiths, M. 1998. The economics of wildlife conservation policy in Kenya. Pp. 279-293 in E.J. Milner-Gullard and R. Mace, eds. *Conservation of Biological Resources*. London: Blackwell Science.

Republic of Kenya. 2003. Statistical abstracts. Central Bureau of Standards. Ministry of Planning and National Development.

Rubens, J. 1996. An analysis of the benefits and costs of marine reserve regulations at Diani, Kenya: The socio-economic context of a resource conflict between fishing communities and wildlife authorities. University of New Castle upon Tyne.

Seys, J., G. Moragwa, P. Boera, and M. Ngoa. 1995. Distribution and abundance of birds in tidal creeks and estuaries of the Kenyan coastal between the Sabaki River and Gazi Bay. *Scopus* 19: 47-60.

Sperling, D.C. 2000. Religion and society. Pp. 101-114 in J. Hoorweg, D. Foeken, and R. Obudho, eds. *Kenya Coast Handbook: Culture, Resources, and Development in the East African Littoral*. Hamburg: Lit Verlag.

Wakajummah, J.O. 2000. Population dynamics. Pp. 73-84 in J. Hoorweg, D. Foeken, and R. Obudho, eds. *Kenya Coast Handbook: Culture, Resources, and Development in the East African Littoral*. Hamburg: Lit Verlag.

Wamukoya, G.M., J.M. Mirangi, and W.K. Ottichillo. 1996. Marine aerial survey, marine mammals, sea turtles, sharks and rays. Kenya Wildlife Service, Nairobi.

Wells, S. 2004. Assessment of management effectiveness in selected Marine Protected Areas in the Western Indian Ocean. Nairobi, Kenya.

Weru, S., G.M. Amboga, E. Verheij, A.O. Koyo, N. Muthiga, B.K. Kavuu, J.K. Kareko, and M. Litoro. 2001. Management plan. Mombasa Marine National Park and Reserve. Kenya Wildlife Service, Mombasa.

Wolf, T.P. 2000. Contemporary politics. Pp. 129-155 in J. Hoorweg, D. Foeken, and R. Obudho, eds. *Kenya Coast Handbook: Culture, Resources, and Development in the East African Littoral*. Hamburg: Lit Verlag.

1.4 Opportunities and Constraints for Protected Area Management through Increased Connectivity to Local Livelihood Needs in Surrounding Border Areas: Lessons from Luangwa Valley, Zambia

Lewis, D., and A. Travis. 2006. The COMACO Model for Poverty Reduction and Sustainable Conservation in the Luangwa Valley, Zambia. COMACO Grey Paper publication.

Lewis, D., N. Tembo, and P. Nyirenda. 2000. Baseline Analysis of Rural Household Incomes Luangwa Valley. Unpublished report.

Lewis, D., N. Tembo, and P. Nyirenda. 2000. Preliminary Report on Luangwa Valley GMA Baseline Survey: Summary on Food Security and Wildlife Depletion Rates.

Lewis, D., N. Tembo, and P. Nyirenda. 2001. Rural Economy and Local Hunters: Lessons for Wildlife Conservation. A contribution to the development of improved policies and programmes of the Zambia Wildlife Authority. Unpublished report.

PART 2: WCS CASE STUDIES – ASIA

2.1 Batang Ai National Park: The Different Conditions under which Local People Benefit or Do Not Benefit from Protected Areas in Malaysia

- Bennett, E. 1992. A Wildlife Survey of Sarawak. Wildlife Conservation International and WWF Malaysia.
- Borneo Post Online. 2007. "Taib: Be wary of people out to destroy State's forests." 2 July. Accessible from <http://www.theborneopost.com/?p=20720>.
- Braken, O. 2004. Conservation and Tourism: A Case Study of Longhouses Communities in and adjacent to Batang Ai National Park, Sarawak, Malaysia. Unpublished MSc thesis, Lincoln University, N.Z.
- Gumal, M. 1995. Batang Ai National Park – Integrated Conservation and Development Project. Unpublished.
- Gumal, M.T., E.L. Bennett, J.G. Robinson, and O.B. Tisen. 2007. A master plan for Wildlife in Sarawak: preparation, implementation and implications for conservation. Pp. 36-52 in N.S. Sodhi, G. Acciaoli, M. Erb, and A.K. Tan, eds. *Biodiversity and Human Livelihoods in Protected Areas: Case Studies from the Malay Archipelago*. UK: Cambridge University Press.
- Gumal, M., and R. Rubis, in prep. Final report on orang utans in Batang Ai NP and Lanjak-Entimau Wildlife Sanctuary. Report to be submitted to USFWS.
- Horowitz, S.L. 1998. Integrating indigenous resource management with wildlife conservation: A case study of Batang Ai National Park, Sarawak, Malaysia. *Human Ecology* 26(3): 371-403.
- Meredith, M.E. 1993. A fauna survey of Batang Ai National Park, Sarawak, Malaysia. Unpublished Report. New York: Wildlife Conservation Society.
- Nayoi, A.J. 2001. Does nature tourism reduce hunting pressure in tropical forests in Sarawak? Unpublished.
- The New Straits Times Online. 2007. "Gangsters behind illegal logging, says CM." 30 June.
- Robinson, J.G., and E.L. Bennett. 2000. Carrying capacity limits to sustainable hunting in tropical forests. Pp. 13-30 in J.G. Robinson and E.L. Bennett, eds. *Hunting for Sustainability in Tropical Forests*. New York: Columbia University Press.
- Saccess, Sadia, and Ideal. 2007. An alternative view on Native Customary Laws and Native Customary Rights over lands in Sarawak. Saccess, Sadia, and Ideal. Sarawak.
- Schaller, G. 1961. The orang utan in Sarawak. *Zoologica* 46(2): 73-82.
- Sochaczewski, S.W. 1993. How Borneo's Ibans came to work with the park. *International Herald Tribune*, June 3rd.
- The Star Online. 2005. "Animals seized from smugglers." 24 May.
- Thien, T. 2004. Victorious Rh Nor land case: Appeal Court defers judgment, Malaysiakini, 25 March.

2.3 Are Efforts to Conserve Biodiversity in Conflict with Those to Reduce Poverty? A Case Study from Bukit Barisan Selatan National Park, Sumatra

- Adams, W.M., R. Aveling, D. Brockington, B. Dickson, J. Elliot, J. Mutton, D. Roe, B. Vira, and W. Wolmer. 2004. Biodiversity conservation and the eradication of poverty. *Science* 306(5699): 1146-1149.
- Benoit, D., P. Levang, M. Pain, and O. Sevin. 1989. Transmigration et migrations spontanées en Indonésie: Propinsi Lampung. Departemen Transmigrasi, Jakarta, Indonesia, and ORSTOM, Bondy, France.
- Danzer, E. 2006. Certification, coffee and Sumatra's national parks. Report of the Wildlife Conservation Society-Indonesia Program.
- FWI/GFW. 2002. The state of the forest: Indonesia. Forest Watch Indonesia and Washington, DC: Global Forest Watch, Bogor, Indonesia.

Gaveau, D. L.A., and H. Wandono. 200. Land-use types in the encroachments of Bukit Barisan Selatan National Park: a field inventory. Final technical report to the Illegal Logging Response Centre of the European Union.

Gaveau, D. L.A., H. Wandono, and F. Setiabudi. 2007. Three decades of deforestation in southwest Sumatra: have protected areas halted forest loss and logging, and promoted re-growth? *Biological Conservation* 134: 495-504.

Hulme, D., and M.W. Murphree. 2001. The Promise and Performance of Community Conservation Eds., African Wildlife and Livelihoods. Currey, Oxford.

IUCN. 2002. Beyond Rhetoric: Putting Conservation to Work for the Poor. Gland, Switzerland: IUCN.

Kusters, K., H. de Foresta, and A.H. Ekadinata. 2007. Towards solutions for state vs. local communities conflict over forestland: the impact of formal recognition of user rights in Krui, Sumatra, Indonesia. *Human Ecology* 35(4): 427-438.

Kusworo, A. 2000. Perambah hutan atau kambing hitam? Potret sengketa kawasan hutan di Lampung. Pustaka Latin, Bogor.

Michon, G., and H. de Foresta. 1992. Complex agroforestry systems and conservation of biological diversity. Agroforestry in Indonesia: a link between two worlds. In harmony with nature: an international conference on the conservation of tropical biodiversity. In Y.S. Kheong and L. S. Win, eds. *The Malayan Nature Journal* (golden Jubilee issue), Kuala Lumpur, Malaysia.

O'Brien, T.G., and M.F. Kinnaird. 1996. Birds and mammals of the Bukit Barisan Selatan National Park, Sumatra. Indonesia. *Oryx* 30: 207-217.

Pretzsch, J. 2005. Forest related rural livelihood strategies in national and global development. *Forests, Trees and Livelihoods* 15: 115-127.

Reardon, T., and S.A. Vosti. 1995. Links between rural poverty and the environment in developing countries: asset categories and investment poverty. *World Development* 23(9): 1495-1506.

Suyanto, S., R.P. Permana, N. Khususiyah, and L. Joshi. 2004. Land tenure, agroforestry adoption, and reduction of fire hazard in a forest zone: A case study from Lampung, Sumatra, Indonesia. *Agroforestry Systems* 00: 1-11.

Thiollay, J.M., 1995. The role of traditional agroforests in the conservation of rain forest bird diversity in Sumatra. *Conservation Biology* 9(2): 335-253.

Verbist, B., A. Ekadinata, and S. Budidarsono. 2005. Factors driving land use change: effects on watershed functions in a coffee agroforestry system in Lampung, Sumatra. *Agricultural Systems* 85: 254-270.

WWF. 2007. Gone in an instant. Report.

PART 3: WCS CASE STUDIES – LATIN AMERICA

3.1 The Kaa-Iya del Gran Chaco National Park, Bolivia

Barahona, Z., C. Arambiza, F. Leños, y V. Calderón. 2005. Estudio ganadero en el Alto y Bajo Isoso: año 2004. Informe Técnico #128. Santa Cruz: CABI-WCS.

Beneria-Surkin, J. 1998. Socio-economic study of five Izoceño communities. Informe Técnico #6. Proyecto Kaa-Iya, RRNN, Santa Cruz.

Beneria-Surkin, J. 2003. Decentralization questioned: the structuring and articulation of Guaraní participation in conservation and development in Izozog, Bolivia. PhD thesis. Los Angeles: UCLA.

Castillo, O. 2007. Multiethnic dynamics, protected areas, and human displacement within the Kaa-Iya Greater Landscape, Bolivia: indigenous peoples, building alliances, and governing and managing protected areas. Pp. 34-41 in K.H. Redford and E. Fearn, eds. Protected areas and human displacement: a conservation perspective. WCS Working Paper No. 29. New York: Wildlife Conservation Society.

- Castillo, O., C. Clark, P. Coppolillo, H. Kretser, R. McNab, A. Noss, H. Quieroz, Y. Tessema, A. Vedder, R. Wallace, J. Walston, and D. Wilkie. 2006. Casting for conservation actors: people, partnerships and wildlife. WCS Working Paper No. 28. New York: Wildlife Conservation Society.
- Combès, I. 1999. Arakae: Historia de las comunidades Izocéñas. Kaa-Iya Project (CABI/WCS), Santa Cruz.
- Combès, I., N. Justiniano, I. Segundo, D. Vaca, R. Vaca, A. Yandura, y J. Yandura. 1998. Kaa-Iya reta: dueños del monte. Informe Técnico #40. Proyecto Kaa-Iya, Santa Cruz.
- Kaa-Iya Project. 2001. Plan de manejo: Parque Nacional y Área Natural de Manejo Integrado Kaa-Iya del Gran Chaco. SERNAP, CABI, WCS, Santa Cruz.
- Linzer, A.K. 1998. Caracterización de los sistemas de producción de las propiedades privadas ubicadas en el área de influencia del Parque Nacional Kaa-Iya. Informe Técnico #42. Proyecto Kaa-Iya, PM, Santa Cruz.
- Martínez, J. 1998. Pueblos indígenas Chiquitanos y Ayoreodes en el área de influencia del Parque Nacional y Área Natural de Manejo Integrado Kaa-Iya del Gran Chaco. Informe Técnico #38. Proyecto Kaa-Iya, PM, Santa Cruz.
- Nostas, M. 1998. Informe socioeconómico para el plan de manejo del Parque Nacional Kaa-Iya. Informe Técnico #37. Proyecto Kaa-Iya, PM, Santa Cruz.
- Oehlerich, A., P. Rebolledo, y J. Yandura. 2002. Yande yari – nuestra abuela: la relación entre el río, la pesca y las mujeres guaraníes en el Isoso. Proyecto Kaa-Iya, Santa Cruz.
- Redford, K.H., and M. Painter. 2006. Natural alliances between conservationists and indigenous peoples. WCS Working Paper No. 25. New York: Wildlife Conservation Society.
- Taber, A., G. Navarro, and M. A. Arribas. 1997. A new park in the Bolivian Gran Chaco—an advance in tropical dry forest conservation and community-based management. *Oryx* 31(3): 189-198.
- Testino, M.G., y A.-K. Linzer. 1998. Evaluación económica de oportunidades productivas en el área de influencia (Parque Nacional Kaa-Iya del Gran Chaco). Informe Técnico #120. Santa Cruz: Proyecto Kaa-Iya (CABI-WCS).
- Villaseñor, V. 2007. The challenge of cattle ranching to common property: a case study in the Isoso, Bolivia. M.A. thesis, University of Florida, Gainesville.
- Wildlife Conservation Society (WCS), The Nature Conservancy, Fundación DeSdelChaco, Fundación Vida Silvestre Argentina. 2005. Evaluación Ecorregional del Gran Chaco Americano. Buenos Aires: WCS, TNC, F. DeSdelChaco, FVSA.
- Winer, N. 2003a. Co-management of protected areas, the oil and gas industry and indigenous empowerment—the experience of Bolivia’s Kaa-Iya del Gran Chaco. *Policy Matters* 12: 181-91.
- Winer, N. 2003b. Review and strategic planning consultancy: Kaa-Iya del Gran Chaco Project. Technical Report #132. Santa Cruz: Kaa-Iya Project (WCS-CABI).

3.3 Costs and Benefits of Madidi Protected Area for Local Human Livelihoods

- CIPTA, WCS. 2001. Estrategia de Desarrollo Sostenible de la TCO Tacana con Base en el Manejo de los Recursos Naturales. La Paz, Bolivia.
- Fleck, L.C., M. Amend, L. Painter, and J Reid. 2006. Regional Economic Benefits from Conservation: The Case of Madidi. Conservation Strategy Fund, Technical Series No.5, May 2006. 79pp.
- Hennessey, A.B. 2007. Aves del bosque seco interandino en los valles de los ríos Tuichi y Machariapo, Parque Nacional Madidi, Departamento La Paz, Bolivia. *Ornitología Neotropical*, in press.
- Kremen, C., J. Niles, M. Dalton, G. Dailu, P. Ehrlich, P. Fay, D. Grewal, and R. Guillery. 2000. Economic incentives for rain forest conservation across scales. *Science* 288: 1828-1832.
- Lehm, Z., H. Salas, E. Salinas, I. Gómez, and K. Lara. 2002. Diagnóstico de actores sociales PN ANMI Madidi. SERNAP, CARE y WCS. La Paz, Bolivia.

- Mittermeier, R.A., N. Myers, P. Robles Gil, and C.G. Mittermeier, eds. 1999. Hotspots: Earth's biologically richest and most endangered terrestrial ecoregions. CEMEX, Mexico.
- Olson, D.M., and E. Dinerstein. 1998. The Global 200: A representation approach to conserving the earth's most biologically valuable ecoregions. *Conservation Biology* 12(3): 502–515.
- Rios-Uzeda, B., H. Gomez, and R.B. Wallace. 2006. Habitat preferences of the Andean bear (*Tremarctos ornatus*) in the Bolivian Andes. *Journal of Zoology* 268: 271-278.
- Rios-Uzeda, B., and R.B. Wallace. 2007. Estimating the size of the Andean Condor population in the Apolobamba Mountains of Bolivia. *J. Field Ornithol.* 78(2):170–175.
- Saignes, T. 1985. Los Andes Orientales: Historia de un olvido. IFEAS y CERES. Cochabamba, Bolivia.
- Salinas, E. 2007. Manejo de Conflictos Ambientales en el Sistema Nacional de Áreas Protegidas. Unpublished report. Wildlife Conservation Society.
- SERNAP, WCS. 2005. Plan de Manejo Parque Nacional y Area Natural de Manejo Integrado Madidi. La Paz, Bolivia.
- Silva, R., D. Robison, S. Mc Kean, y P. Alvarez. 2002. La historia de la ocupación del espacio y el uso de los recursos en el PNANMI Madidi y su zona de influencia. Agro ecología Sierra y Selva, CARE, WCS, SERNAP. La Paz, Bolivia.
- Silver, S.C., L.E.T. Ostro, L.K. Marsh, L. Maffei, A.J. Noss, M.J. Kelly, R.B. Wallace, H. Gómez, and G. Ayala. 2004. The use of camera traps for estimating jaguar (*Panthera onca*) abundance and density using capture/recapture analysis. *Oryx* 38: 145-154.
- Soux, M.L., M. Quiroga, R. Jiménez, A. Cardenas, y R. Milan. 1991. Historia de una región paceña, Prefectura del Departamento de La Paz y Universidad Mayor de San Andres. La Paz.
- Wallace, R.B., H. Gómez, G. Ayala, and F. Espinoza. 2003. Camera trapping capture frequencies for jaguar (*Panthera onca*) in the Tuichi valley, Bolivia. *Mastozoologia Neotropical* 10(1):1 33-139.

PART 4: WCS CASE STUDIES – NORTH AMERICA

4.1 How Landscape and Socio-economic Transitions Impact Human Livelihoods within a Mosaic of Wilderness and Communities

- Adirondack Park Agency. 1989. Adirondack Park State Land Master Plan.
- Adirondack Park Agency. 1982. Adirondack Park Agency's Citizen's Guide to Adirondack Park Agency Land-Use Regulations.
- Appalachian Mountain Club. 2007. Ozone in the White Mountains. Accessible from <http://www.outdoors.org/conservation/airwater/airwater-ozone.cfm>.
- Glennon, M.J., and H.E. Kretser. 2005. Impacts to wildlife from low density, exurban development: Information and considerations for the Adirondack Park. WCS' Adirondack Communities and Conservation Program Technical Paper No. 3. Accessible from <http://www.wcs.org/adirondackresearch>.
- Jenkins, J., and A. Keal 2004. *Adirondack Atlas*. Syracuse University Press-The Adirondack Museum. 275p.
- Johnson, G.D., W.P. Erickson, and M.D. Strickland. 2002. Collision mortality of local and migrant birds at a large-scale wind-power development on Buffalo Ridge, Minnesota. *Wildlife Society Bulletin* 30(3): 879-887.
- Keal, A., and D. Wilkie. 2003. Do Public Lands Constrain Economic Development in the Adirondack Park? *Adirondack Journal of Environmental Science* 10(1)
- Keller, J.E. 1980. *Adirondack Wilderness. A Story of Man and Nature*. Syracuse University.
- Kenney, S.M. 1985. *The Adirondack Park Private Land Use and Development Plan: Has There Been a Taking?* Cornell University.
- Kretser, H. 2005. Housing Trends in Franklin and Brighton Townships (Franklin County, NY), 1990-2000. *Adirondack Journal of Environmental Studies* 12(2): 25-36.

New York State Department of Health (NYSDOH). 2007. Bottled Water Program. Accessible from http://www.health.state.ny.us/environmental/water/drinking/bulk_bottle/bottled.htm#I-162.

Omohundro, J. 2002. Expenditures by Nonmotorized Recreationists in the Adirondack Park. *Adirondack Journal of Environmental Studies* 9(1): 27-35.

Rabin, L.A., R.G. Coss, and D.H. Owings. 2006. The effects of wind turbines on antipredator behavior in California ground squirrels (*Spermophilus beecheyi*). *Biological Conservation* 131(3): 410-420.

Merwin Rural Services Institute. 1998. An Analysis of Economic Impact and Overview of the Industry in the Empire State. SUNY Potsdam and New York State Snowmobile Association, Inc. Accessible from <http://www.nyssnowassoc.org/impact.htm>.

Terrie, P.G. 1994. *Forever Wild: A Cultural History of Wilderness in the Adirondacks*. Syracuse University Press.

U.S. Census Bureau. 2000 Census of Population and Housing. Accessible from <http://factfinder.census.gov/servlet/BasicFactsServlet>. Access date: 2 May 2007.

PART 5: WCS CROSS-REGIONAL THEMATIC PERSPECTIVE

5.1 Paying for Results: The WCS Experience with Direct Incentives for Conservation

Agrawal, A., and K.H.Redford. 2006. Poverty, development and biodiversity conservation: Shooting in the dark? Wildlife Conservation Society, Bronx, NY.

Ferraro, P.J. 2001. Global Habitat Protection: Limitations of Development Interventions and a Role for Conservation Performance Payments. *Conservation Biology*: 990-1000.

Ferraro, P.J., and A. Kiss. 2002. Ecology - Direct payments to conserve biodiversity. *Science* 298: 1718-1719.

Ferraro, P.J., and R.D. Simpson. 2002. The cost-effectiveness of conservation payments. *Land Economics* 78: 339-353.

Mayrand, K., and M. Paquin. 2004. Payments for environmental services: a survey and assessment of current schemes., Montreal, Canada.

Newmark, W.D., and J.L. Hough. 2000. Conserving Wildlife In Africa: Integrated Conservation and Development Projects and Beyond. 50: 585.

Pagiola, S., K. von Ritter, and J. Bishop. 2004. How much is an ecosystem worth? Assessing the economic value of conservation. The World Bank, The Nature Conservancy, IUCN, Washington, DC.

Wunder, S. 2005. Payments for environmental services: some nuts and bolts. Center for International Forestry Research, Bogor, Indonesia.

PART 6: PERSPECTIVES FROM OUTSIDE WCS

6.1 Reframing the Protected Areas-Livelihood Debate: Conserving Biodiversity in Populated Agricultural Landscapes

Barry, D., J.Y. Campbell, J. Fahh, H. Mallee, and U. Pradhan. 2003. Achieving significant impact at scale: reflections on the challenge for global community forestry. CIFOR Conference on Rural Livelihoods, Forests, and Biodiversity. Bonn, Germany.

Cincotta, R.P., and R. Engelmann. 2000. *Nature's Place: Human Population and the Future of Biological Diversity*. Washington, DC: Population Action International.

Colfer, C., and Y. Byron, eds. 2001. *People Managing Forests: The Links between Managing Human Well-Being and Sustainability*. Resources for the Future and Center for International Forestry Research (CIFOR). Resources for the Future, Washington, DC.

Conservation International. 2004. <http://conservationfinance.org> (accessed October 18, 2004).

Hassan, R., R. Scholes, and N. Ash, eds. 2005. *Ecosystems and Human Well-being: Current State and Trends, Volume 1*. Washington, DC: Island Press.

McNeely, J.A., and S.J. Scherr. 2003. *Ecoagriculture: Strategies to Feed the World and Save Biodiversity*. Future Harvest and IUCN, Washington, DC: Island Press.

Molnar, A, S. Scherr, and A. Khare. 2004. Who conserves the world's forests? Community-driven strategies to protect forests and respect rights. Washington, DC: Forest Trends and Ecoagriculture Partners.

Molnar, A., S. Scherr, and A. Khare. 2007. Chapter 15: Community Stewardship of Biodiversity. In S. Scherr and J. McNeely, eds. *Farming with Nature: The Science and Practice of Ecoagriculture*. Washington, DC: Island Press.

Nepstad, D.C., S. Schwartzman, B. Bamberger, M. Santilli, D. Ray, P. Schlesinger, P. Lefebvre, A. Alencar, E. Prinz, G. Fiske, and A. Rolla. 2006. Inhibition of Amazon deforestation and fire by parks and indigenous reserves. *Conservation Biology* 20(1): 65–73.

Pfeffer, M.J, J.W. Schelhas, and L.A. Day. 2001. Forest conservation, value conflict and interest formation in a Honduran national park. *Rural Sociology* 66(3): 382-402.

Pfeffer, M.J., J.W. Schelhas, and C. Meola. 2006. Environmental globalization, organizational form and expected benefits from protected areas in Central America. *Rural Sociology* 71(3): 429-430.

Poffenberger, M., ed. 2000. *Communities and Forest Management in Southeast Asia. A Regional Profile of the Working Group on Community Involvement in Forest Management*. Gland, Switzerland: IUCN.

Scherr, S., and J. McNeely. 2007. Chapter 22: Policy Implications and Knowledge. In S. Scherr and J. McNeely, eds. *Farming with Nature: The Science and Practice of Ecoagriculture*. Washington, DC: Island Press.

6.2 Protected Areas, Poverty, and Policy: A Review of Biodiversity and Protected Areas within National Poverty Reduction Strategies

Bojo, J., and R.C. Reddy. 2002. Poverty Reduction Strategies and Environment. Environmental Economic Series No 86. Washington, DC: World Bank.

Emerton, L., J. Bishop, et al. 2006. Sustainable Financing of Protected Areas: A Global Review of Challenges and Opportunities. Gland: IUCN.

Hewitt, A., and A. Gillson. 2003. A Review of the Trade and Poverty Content in PRSPs and Loan-Related Documents. London: Overseas Development Institute.

IUCN. 2005. Benefits Beyond Boundaries: Proceedings of the Vth IUCN World Parks Congress.

Lapham, N., and R. Livermore. 2003. Striking a Balance: Ensuring Conservation's Place on the International Biodiversity Assistance Agenda. Washington, DC: Conservation International.

ODI. 2006. Addressing Environmental Objectives in the Context of Budget Support. London: Overseas Development Institute.

Roe, D. 2004. Poverty reduction and biodiversity conservation: Rebuilding the bridges. *Oryx* 38(2).

Sanderson, S. 2005. Poverty and conservation: The new century's 'peasant question'? *World Development* 33(2): 323-332.

Sanderson, S., and K. Redford. 2003. Contested relationships between biodiversity conservation and poverty alleviation." *Oryx* 37(4): 1-2.

Satterthwaite, D. (ed). 2003. The Millennium Development Goals and Local Processes: Hitting the Target or Missing the Point. London: International Institute for Environment and Development.

Stiglitz, J. 1998. Towards a New Paradigm for Development: Strategies, Policies, and Processes. 1998 Prebisch Lecture. Geneva: UNCTAD.

WWF. Undated. Congo Basin – Overview. <http://www.worldwildlife.org/wildplaces/congo/>. Accessed 07 May 2007.

6.3 Hard Choices: Understanding the Trade-offs between Conservation and Development

Agrawal, A., and K.H. Redford. 2006. Poverty, development and biodiversity conservation: Shooting in the dark? WCS Working Paper No. 26. New York: Wildlife Conservation Society.

Ambler, J. 1999. Attacking Poverty while Improving the Environment: Toward Win-Win Policy Options. Background technical paper. UNDP-EC Poverty and Environment Initiative. New York and Brussels: UNDP. 51pp.

Barrett, C.S., and P. Arcese. 1995. Are integrated conservation and development projects sustainable? On the conservation of large mammals in Sub-Saharan Africa. *World Development* 23: 1073-1084.

Barrett, C.S., K. Brandon, C. Gibson, and H. Gjertsen. 2001. Conserving tropical biodiversity amid weak institutions. *BioScience* 51: 497-502.

Brechin, S., P. Wilshusen, C. Fortwangler, and P. West. 2003. Contested Nature: Promoting International Biodiversity and Social Justice in the Twenty-first Century. Albany: State University of New York Press.

Brockington, D., J. Igoe, and, K. Schmidt-Soltau. 2006. Conservation, human rights and poverty reduction. *Conservation Biology* 20: 424-470.

Brown, K. 2004. Trade-off analysis for integrated conservation and development. Pp. 232-255 in T.O. McShane and M.P. Wells, eds. *Getting Biodiversity Projects Work: Towards More Effective Conservation and Development*. New York: Columbia University Press.

Chatty, D., and M. Colchester, eds. 2002. *Conservation and Mobile Indigenous Peoples: Displacement, Forced Settlement, and Sustainable Development*. Oxford: Berghahn Books.

Christensen, J. 2004. Win-win illusions: Facing the rift between people and protected areas. *Conservation in Practice* 5(1): 12-19.

GEF. 2005. GEF and the Convention on Biological Diversity. Washington, DC: Global Environment Facility.

Jepson, P. 2005. Governance and accountability of environmental NGOs. *Environmental Science and Policy* 8: 515-524.

Kramer, R., C. van Schaik, and J. Johnson, eds. 1997. *Last Stand: Protected Areas and the Defense of Tropical Biodiversity*. Oxford: Oxford University Press.

McShane, T.O., and M.P. Wells, eds. 2004. *Getting Biodiversity Projects Work: Towards More Effective Conservation and Development*. New York: Columbia University Press.

McShane, T.O., and S.A. Newby. 2004. Expecting the unattainable: The assumptions behind ICDPs. Pp. 49-74 in T.O. McShane and M.P. Wells, eds. *Getting Biodiversity Projects Work: Towards More Effective Conservation and Development*. New York: Columbia University Press.

Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-being: Synthesis*. Washington, DC: Island Press.

Oates, J.F. 1999. *Myth and Reality in the Rain Forest: How Conservation Strategies are Failing in West Africa*. Berkeley: University of California Press.

OECD. 1996. Shaping the 21st Century: The Role of Development Co-operation. Paris: OECD.

Robinson, J.G. 1993. The limits to caring: sustainable living and the loss of biodiversity. *Conservation Biology* 7: 20-28.

Robinson, J., and K.H. Redford. 2004. Jack of all trades, master of none: Inherent contradictions among ICDP approaches. Pp. 10-34 in T.O. McShane and M.P. Wells, eds. *Getting Biodiversity Projects Work: Towards More Effective Conservation and Development*. New York: Columbia University Press.

Sayer, J., and B. Campbell. 2004. *The Science of Sustainable Development: Local Livelihoods and the Global Environment*. Cambridge: Cambridge University Press.

Sutherland, W.J., A.S. Pullin, P.M. Dolman, and T.M. Knight. 2004. The needs for evidence-based conservation. *Trends in Ecology and Evolution* 19: 305-308.

Terborgh, J. 1999. *Requiem for Nature*. Washington, DC: Island Press.

Wells, M., and T.O. McShane. 2004. Integrating protected area management with local needs and aspirations. *Ambio* 33: 513-519.

Wilkie, D.S., G.A. Morelli, J. Demmer, M. Starkey, P. Telfer, and M. Steil. 2006. Parks and people: Assessing the human welfare effects of establishing protected areas for biodiversity conservation. *Conservation Biology* 20: 247-249.

Winter, H. 2005. *Trade-offs: An Introduction to Economic Reasoning and Social Issues*. Chicago: University of Chicago Press.

6.4 Deforestation vs. Poverty at Kibale National Park, Uganda: A Ten-year Perspective

Anonymous. 2005. Ancient Medicinal Tree Threatened with Extinction; Tree is leading Remedy for Prostate Disorders Worldwide. Washington, DC, and Nairobi, Kenya: Future Harvest. Available at <http://www.futureharvest.org/news/prunusrelease.shtml>.

Balmford, A., J. Moore, T. Brooks, N. Burgess, L.A. Hansen, P. Williams, and C. Rahbek. 2001. Conservation conflicts across Africa. *Science* 291: 2616-2619.

Chapman C.A., and L.J. Chapman. 1996. Mid-elevation forests: A history of disturbance and regeneration. Pp. 385-400 in T.R. McClanahan and T.P. Young, eds. *East African Ecosystems and Their Conservation*. New York: Oxford University Press.

Chapman C.A., and L.J. Chapman. 2004. Unfavorable successional pathways and the conservation value of logged tropical forest. *Biodiversity and Conservation* 13: 2089-105.

Chapman C.A., L.J. Chapman, L. Kaufman, and A.E. Zanne. 1999. Potential causes of arrested succession in Kibale National Park: Growth and mortality of seedlings. *African Journal of Ecology* 37: 81-92.

Feeny, P. 1998. *Accountable Aid*. London: Oxfam.

Government of Uganda. 2002. 2001 *National housing and rural settlement census*, Census Bureau, Kampala, Uganda.

Hamilton, C.A. 1984. *Deforestation in Uganda*. Nairobi: Oxford University Press.

Kaipiriri, M. 1997. *Local use of non-timber products*. Master's thesis. Makerere University, Kampala.

Kammen, D. 1995. Cookstoves for the developing world. *Scientific American* 273: 72-75.

Kingston B. 1967. *Working plan for the Kibale and Itwara Central Forest Reserves, 2nd edition*. Uganda Government Forest Department, Kampala, Uganda.

Lwanga, J.S. 2003. Forest succession in Kibale National Park, Uganda: Implications for forest restoration and management. *African Journal of Ecology* 41: 9-22.

Mulley, B., and J. Unruh. 2004. The role of off-farm employment in tropical forest conservation: Labor, migration, and smallholder attitudes towards land in western Uganda. *Journal of Environment Management* 71: 193-205.

Naughton-Treves, L. 1999. Whose animals? A history of property rights to wildlife in Toro, western Uganda. *Land Degradation and Development* 10: 311-28.

Naughton-Treves, L., and C. Chapman. 2002. Fuelwood resources on fallow land in East Africa. *Journal of Sustainable Forestry* 14: 19-32.

Osmaston, H.A. 1959. Working plan for the Kibale and Itwara Central Forest Reserves, Toro District, W. Province, Uganda. Forest Department, Uganda Protectorate.

Plumptre, A. 2002. *Extent and Status of Forests in the Albertine Rift*. Wildlife Conservation Society Albertine Rift Program, Bronx, New York.

Rocheleau, D., and D. Edmunds. 1997. Women, men and trees: Gender, power and property in forest and agrarian landscapes. *World Development* 25: 1351-71.

Skorupa J. 1988. *The effect of selective timber harvesting on rain-forest primates in Kibale Forest, Uganda*. Ph.D. Dissertation thesis. University of California, Davis.

Struhsaker, T.T., P.J. Struhsaker, and K.S. Siex. 2005. Conserving Africa's rain forests: Problems in protected areas and possible solutions. *Biological Conservation* 123: 45-54.

Vedeld, P., A. Angelsen, E. Sjaastad, And G.K. Berg. 2004. *Counting on the Environment Forest Incomes and the Rural Poor. Rep. 98* Washington, DC: The World Bank.

World Bank. 1993. *Uganda. Agriculture*. Washington, DC: The World Bank.

6.5 Transfrontier Conservation Areas, Animal Diseases, and Human Livelihoods: Issues of System Health and Sustainability

Campbell, B.M., S. Jeffrey, W. Kozanayi, M. Luckert, M. Mutamba, and C. Zindi. 2002. *Household livelihoods in semi-arid regions: options and constraints*. CIFOR, Jakarta.

Child, B.A. 1988. *The role of wildlife utilisation in the sustainable economic development of semi-arid rangelands in Zimbabwe*. D. Phil. thesis, University of Oxford, Oxford.

Child, G.F.T., and T. Riney. 1987. Tsetse control hunting in Zimbabwe, 1919-1958. *Zambezia* 14: 11-71.

Cumming, D.H.M. 1999a. Living off "biodiversity": whose land, whose resources and where? *Environment and Development Economics* 4: 220-226.

Cumming, D.H.M. 1999b. *Study on the Development of Transboundary Natural Resource Management Areas in Southern Africa, Environmental Context: Natural Resources, Land Use, and Conservation*. Washington, DC: Biodiversity Support Program. (66 pp. + 44 Figs.)

Cumming, D.H.M. 2004. Performance of parks in a century of change. Pp. 105-124 in B. Child, ed. *Parks in Transition: Biodiversity, Development and the Bottom Line*. London: Earthscan.

Cumming, D.H.M., and AHEAD Great Limpopo TFCA Working Group. 2004. Sustaining animal health and cosystem services in large landscapes. 2nd draft. Concept for a programme to address wildlife, livestock and related human and ecosystem health issues in the Greater Limpopo Trans-frontier Conservation Area. 24 pp. Accessible from http://www.wcs-ahead.org/documents/gltfca_cumming.pdf.

Cumming, D.H.M. 2005. Wildlife, livestock and food security in the South East Lowveld of Zimbabwe. Pp 41-46 In S.A. Osofsky, S. Cleveland, W.B. Karesh, M.D. Kock, P.J. Nyhus, L. Starr, and A. Yang, eds. *Conservation and Development Interventions at the Wildlife/Livestock Interface: Implications for Wildlife, Livestock and Human Health*. Gland, Switzerland, and Cambridge, UK: IUCN.

Cumming, D., H. Biggs, M. Kock, N. Shongwe, and S. Osofsky. 2007. The AHEAD (Animal Health for Environment And Development) - Great Limpopo Transfrontier Conservation Area (GLTFCA) Programme: Key questions and conceptual framework revisited. Accessible from http://www.wcs-ahead.org/documents/gltfca_revisited.pdf.

Cumming, D.H.M., and T.J.P. Lynam. 1997. Land use changes, wildlife conservation and utilisation, and the sustainability of agro-ecosystems in the Zambezi Valley: Final technical report. Vols 1-7. European Union Contract B7-5040/93/06. WWF Programme Office, Harare.

Cunliffe, R.N. 2003. PRA and questionnaire survey study in Sengwe-Tchipise Communal Lands. Final Report Part 1: Corridor Analysis. Southern Lowveld Project, CESVI, Harare, Zimbabwe.

Dolan, T.T. 1999. Dogmas and misunderstandings in East Coast fever. *Tropical Medicine and International Health* 4(9): A3-A11.

Eilerts, G.S., and E. Vhurumuka. 1997. Zimbabwe food security and vulnerability assessment 1996/97. USAID Famine Early Warning System (FEWS), Zimbabwe Office, Harare. 51pp.

Gunderson, L.H., and C.S. Holling. 2002 *Panarchy: Understanding Transformations in Human and Natural Systems*. Washington, DC: Island Press.

Holling, C.S., and G.K. Meffe. 1996. Command and control and the pathology of natural resource management. *Conservation Biology* 10: 328-337.

NPWMA. 2007. Gonarezhou National Park Management Plan – draft April 2007. National Parks and Wildlife Management Authority, Harare, Zimbabwe.

Osofsky, S.A., S. Cleveland, W.B. Karesh, M.D. Kock, P.J. Nyhus, L. Starr, and A. Yang, eds. 2005. *Conservation and Development Interventions at the Wildlife/Livestock Interface: Implications for Wildlife, Livestock and Human Health*. Gland, Switzerland, and Cambridge, UK: IUCN.

Ostrom, E., and M.A. Janssen. 2002. Beliefs, multi-level governance, and development. Bloomington, Indiana. Draft. 8/28/02. Prepared for the 2002 Annual Meeting of the American Political Science Association, Boston Massachusetts, August 29 – September 1, 2002. 39pp.

Taylor, R.D., and R.B. Martin. 1987. Effects of veterinary fences on wildlife conservation in Zimbabwe. *Environmental Management* 11: 327-334.

Timberlake, J.R., and S.L. Childes, eds. 2004. Biodiversity of the four corners area: technical reviews. Volumes 1 and 2. Occasional Publications in Biodiversity No. 15, Biodiversity Foundation for Africa, Bulawayo/Zambezi Society, Harare, Zimbabwe. 503pp.

Walker, B.H. 1999. Maximising net benefits through biodiversity as a primary land use. *Environment and Development Economics* 4: 204-214.

Walker, B.H., J.M. Anderies, A.P. Kinzig, and P. Ryan, eds. 2006. *Exploring Resilience in Social-ecological Systems: Comparative Studies and Theory Development*. Collingwood VIC, Australia: CSIRO Publishing.

Windsor, R.S., and A. Wood. 1998. Contagious Bovine Pleuropneumonia: The costs of control in Central/Southern Africa. *Annals of the New York Academy of Sciences* 849: 299-306.

6.6 Securing Protected Areas: Compulsory Land Acquisition in East Africa

Alcorn, J.B., and A.G. Royo. 2007. Conservation's engagement with human rights: Traction, slippage or avoidance? *Policy Matters* 15.

Burke, L., D. Prager, and S. Greenhalgh. 2007. Value of Coral Reefs in Caribbean Islands. Washington, DC: World Resources Institute.

Cernea, M.M., and K. Schmidt-Soltau. 2006. Poverty risks and national parks: Policy issues in conservation and resettlement. *World Development* 34(10): 1808-1830.

Dunning, H.C. 1968. Law and economic development in Africa: The law of eminent domain. *Columbia Law Review* 68(7): 1286-1315.

Ferraro, P.J., and A. Kiss. 2002. Direct payments to conserve biodiversity. *Science* 298: 1718-1719.

Government of Kenya. 2004. *Commission of Inquiry on Illegal and Irregular Allocations of Public Lands (2003-2004)*. Nairobi: Government of Kenya.

Government of Kenya. 1996. The Commissioner for Lands v. Coastal Aquaculture Ltd, Mombasa Court of Appeal, No.252 of 1996. Nairobi: Government of Kenya.

Government of Kenya. 1994. Coastal Aquaculture Limited v. The Commissioner of Lands and Settlement and the Minister of Lands and Settlement, Mombasa HC Misc. Appl., No. 55 of 1994. Nairobi: Government of Kenya.

Government of Tanzania. 2004. *Nyamuma Report*. Commission for Human Rights and Good Governance. Dar es Salaam: Government of Tanzania.

Government of Uganda. 2005. The Republic of Uganda in the High Court of Uganda at Kampala. Advocates Coalition for Development and Environment, Applicants v. Attorney General, Respondent, Misc. Cause No.0100 of 2004. Kampala: Government of Uganda.

Government of Uganda. 2004. Government White Paper on 1. The Report of the Constitution of Inquiry (Constitutional Review), 2. Government Proposal not Addressed by the Report of the Commission of Inquiry (Constitutional Review). Kampala: Government of Uganda.

Hutton, J., W.M. Adams, and J.C. Murombedzi. 2005. Back to the Barriers? Changing Narratives in Biodiversity Conservation. Forum for Development Studies, No.2.

Keregero, K. 2005. Nyamuma Villagers Refer Case to Court of Appeal. *IPP Media*, 2 November, Guardian.

- Klopp, J. 2001. Pilfering the public: The problem of land grabbing in contemporary Kenya. *Africa Today* 47(1).
- Legal and Human Rights Centre. 2003. *Protection of Wildlife and Human Rights on the Balance Sheet: A Case of Serengeti Killings*. Dar es Salaam: Legal and Human Rights Centre.
- Lobulu, B. 1999. Dispossession and land tenure in Tanzania: What hope from the courts? *Cultural Survival Quarterly* 22(4).
- Maluleke, L. 2004. The Makuleke Story. Paper presented to the World Conservation Congress, Bangkok, 17-25 November.
- Manyindo, J. 2003. Conflicting Interests: Land Use Changes in Protected Areas for Private Commercial Benefit. Uganda Wildlife Society, Wildlife Series No.3. Kampala: Uganda Wildlife Society.
- Mchome, S.E. 2002. *Evictions and the Rights of People in Conservation Areas in Tanzania*. Faculty of Law. Dar es Salaam: University of Dar es Salaam.
- Nshala, R. 2004a. Dispossess by Disowning: The Plight of Customary Land Rights Owners in Tanzania's Protected Areas; The Mighty is Right! Dar es Salaam: Lawyers' Environmental Action Team and World Resources Institute.
- Nshala, R. 2004b. Supremacy of Customary Land Rights: Democratizing the Eminent Domain Powers in Tanzania. Dar es Salaam: Lawyers' Environmental Action Team and World Resources Institute.
- Perrault, A., K. Hervertson, and N. Manga. 2005. Establishing Conditions for Success (and Environmental Justice) in Protected Areas: The Public Interest and Prior Informed Consent. Washington, DC: Center for Environmental Law and World Resources Institute.
- Schmidt-Soltan, K., and D. Brockington. 2004. The Social Impacts of Protected Areas. Paper presented at World Conservation Congress, Bangkok, 20 November.
- Sifuna, N. 2005. Using Eminent Domain Powers to Acquire Private Lands for Protected Area Wildlife Conservation: A Survey under Kenyan Law. *Law Environment and Development Journal*, Vol.2/1.
- Sserwanga, M. 2007. Government's new strategy on land. *The Monitor*, 12 February.
- Survival International. 2006. Botswana: Bushmen win landmark legal case. Accesible from: <http://www.survival-international.org/news.php?id=2128>.
- Tenga, R. 1999. Legitimizing dispossession: The Tanzanian High Court's decision on the eviction of Maasai pastoralists from Mkomzai Game Reserve. *Cultural Survival Quarterly*, Vol.22, No.4.
- Tumushabe, G.W. 2003. Trading Natural Wealth for Fiction: A Legal Opinion on the Proposed Degazettement of Pian Upe Wildlife Reserve. Legal Series No.1. Kampala: Uganda Wildlife Society.
- Tumushabe, G.W., and A. Bainomugisha. 2004a. Constitutional Reform and Environmental Legislative Representation in Uganda: A Case Study of Butamira Forest Reserve in Uganda. Policy Research Series, No.10. Kampala: Advocates Coalition for Development and Environment.
- Tumushabe, G.W., and A. Bainomugisha. 2004b. Submission on the Government White Paper on the Constitutional Reform and the Political Transition Process. Memorandum to the Committee on Legal and Parliamentary Affairs, Parliament of the Republic of Uganda. Kampala: Advocates Coalition for Development and Environment.
- Veit, P.G., and C. Benson. 2004. When parks and people collide. Human rights dialogue. *Carnegie Council on Ethics and International Affairs*, Series 2, No.11.
- Wilkie, D.S., G.A. Morelli, J. Demmer, M. Starkey, P. Telfer and M. Steil. 2006. Parks and people: Assessing the human welfare effects of establishing protected areas for biodiversity conservation. *Conservation Biology* 20(1): 247-249.
- World Bank. 2003a. Land Policies for Growth and Poverty Reduction. Policy Research Report. Washington, DC: World Bank.

World Bank. 2003b. Northern Corridor (Kenya) Road Improvement Project: Resettlement Policy Framework. Washington, DC: World Bank.

World Commission on Dams. 2000. *Dams and Development: A New Framework for Decision-Making*. London: Earthscan.

BACKGROUND READINGS

- Amend, M.R., J. Reid, and C. Gascon. 2006. Benefícios economicos locais de áreas protegidas na região de Manaus, Amazonas. *Megadiversidade* 2(1-2): 60-70.
- Arambiza, E., and M. Painter. 2006. Biodiversity conservation and the quality of life of indigenous people in the Bolivian Chaco. *Human Organization* 65(1): 20-34.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora. 2007. Fourteenth meeting of the Conference of the Parties. The Hague (Netherlands), 3-25 June 2007. Interpretation and implementation of the Convention: CITES and livelihoods.
- Corbera, E., N. Kosoy, and M. Martinez Tuna. 2007. Equity implications of marketing ecosystem services in protected areas and rural communities: Case studies from Meso-America. *Global Environmental Change* 17: 365-380.
- Dasgupta, S., U. Deichmann, C. Meisner, and D. Wheeler. 2005. Where is the poverty-environment nexus? Evidence from Cambodia, Lao PDR, and Vietnam. *World Development* 33(4): 617-638.
- Fleco, L.C., M. Amend, L. Painter, and J. Reid. 2006. Regional economic benefits from conservation: The case of Madidi. Conservation Strategy Fund.
- IUCN Commission on Environmental, Economic and Social Policy. 2006. *Policy Matters* Issue 14: Poverty, wealth and conservation. Available at <http://www.iucn.org/themes/ceesp/Publications/newsletter/PM14.pdf>.
- Naidoo, R., and W.L. Adamowicz. 2005. Economic benefits of biodiversity exceed costs of conservation at an African rainforest reserve. *PNAS* 102(46): 16712-16716.
- Naughton-Treves, L., M.B. Holland, and K. Brandon. 2005. The role of protected areas in conserving biodiversity and sustaining local livelihoods. *Annu. Rev. Environ. Resour.* 30: 219-252.
- Redford, K. H., and E. Fearn, eds. 2007. Protected areas and human displacement: A conservation perspective. WCS Working Paper No. 29.
- Redford, K.H., and M. Painter. 2006. Natural alliances between conservationists and indigenous peoples. WCS Working Paper No. 25.
- Scherl, L.M., A. Wilson, R. Wild, J. Blockhus, P. Franks, J.A. McNeely, and T.O. McShane. 2004. Can Protected Areas Contribute to Poverty Reduction? Opportunities and Limitations. Gland, Switzerland, and Cambridge, UK: IUCN.
- Sunderlin, W.D., A. Angelsen, B. Belcher, P. Burgers, R. Nasi, L. Santoso, and S. Wunder. 2005. Livelihoods, forests, and conservation in developing countries: An overview. *World Development* 33(9): 1383-1402.
- Tacconi, L. 2007. Decentralization, forests and livelihoods: Theory and narrative. *Global Environmental Change* 17: 338-348.
- Woodhouse, P. 2002. Natural resource management and chronic poverty in sub-Saharan Africa: An overview paper. CPRC Working Paper 14.
- Wright, S.J., G.A. Sanchez-Azofeifa, C. Portillo-Quintero, and D. Davies. 2007. Poverty and corruption compromise tropical forest reserves. *Ecological Applications* 17(5): 1259-1266.

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Wildlife Conservation Society
2300 Southern Boulevard
Bronx, NY 10460
Tel: 718-220-5100
www.wcs.org

