Policy Paper

Displacement Versus Co-existence in Human-wildlife Conflict Zones: An Overview

Abstract

Wildlife presents both a threat and a resource to humans. Protected areas offer the best protection for conserving biodiversity and ecosystems worldwide. Despite more than half protected areas around the world being established on indigenous land natives are generally prohibited official access. However, protected areas are suffering from encroachment of surrounding population and almost half of all protected areas are heavily used for agriculture. Those in the tropics especially are experiencing serious and increasing degradation from poor management of development projects, agricultural encroachment, and illegal resource use. As a result, human-wildlife conflict is a significant and growing problem around the world. The literature reviewed for this paper has been notable for its polarised assessment of the human-wildlife conflict. On one side are the biological sciences, devoted to understanding the mechanisms of biodiversity loss and its consequences for conservation. On the other side are the social scientists, concerned with livelihood issues in and outside protected areas. Cernea and Schmidt-Soltau claim that these two groups have had an unequal influence on policy, with biological sciences having devoted a “broader, deeper and more systematic research effort than the social sciences” (2003, 3). To avoid some of the bias towards biological sciences present in the literature, this paper will examine the underlying conditions required for co-existence. As such, I developed the ‘human-wildlife interaction model’.

Key words: Human-wildlife conflict, human settlement, displacement, Resettlement, livelihood, co-existence

1. Introduction

Protected areas offer the best protection for conserving biodiversity and ecosystems worldwide. They already comprise over 3% of the Earth’s land surface (Brandon and Wells, 1992) and there is both a desire and need to extend this further (Cernea and

Schmidt-Soltau, 2003). The IUCN defines a protected area to be broadly “land and/or sea especially dedicated to the protection of biological diversity, and of natural and associated cultural resources” (1994, 7), which are further sub-categorised into six types of protected area according to their objectives. Categories I and II are managed for science, wilderness protection, ecosystem protection or recreation, and exclude habitation. About 30% of the total protected area land falls into these categories and has most likely required eviction of the population during their creation. The remaining 70% may have some level of human habitation in co-existence with wildlife (Brockington and Schmidt-Soltau, 2004).

Yellowstone National Park, established in 1872 in the United States, was the world’s first protected area and became the model for park planning worldwide (Brandon and Wells, 1992). The park was created for the benefit of tourism, to whom the “natives were seen as an unfortunate blight” (Poirier and Ostergren, 2002, 333). Consequently, the park was cleared of indigenous occupants who were confined to Indian reserves. This top-down approach of order and discipline was implemented through a policy of eviction, fences and fines (Brandon and Wells, 1992). Since then, over ten million people have been displaced globally by conservation projects, often causing increased poverty (Schmidt-Soltau, 2005). Concern about the impact on human welfare has lead to a new paradigm for protected areas by including projects with social and economic objectives and involving local people (Thomas and Middleton, 2003). State representatives agreed at the IV World Congress on National Parks and Protected Areas that protected areas should aim to reduce and in way exacerbate poverty (Brockington and Schmidt-Soltau, 2004), and as such should no longer be “islands in a sea of development” (IUCN, 1994, 1). The Zaire Resolution on the Protection of Traditional Ways of Life in 1975 was the first resolution calling for governments not to displace indigenous people, and has been followed by the UN Conference on Environment and Development which emphasised the management by indigenous communities (Poirier and Ostergren, 2002). The new paradigm has lead to calls from some social scientists for forced displacement to no longer be a mainstream conservation strategy (Schmidt-Soltau, 2005). This has met with some success, for example in Colombia in the late 1980s, where half its rainforest was assigned to indigenous inhabitants (Redford and Stearman, 1993).

Welfare issues are particularly important because many poorer countries have set aside a greater share of their land than developed countries, for example the U.S.

(4%) compares unfavourably to Botswana (15%) and Costa Rica (12%) (Weber and Rabinowitz, 1996). Similarly, in the future many additional protected areas will be in developing countries, for example the Central African sub-region plan to classify 30% of landmass as protected areas in the next decade, increased from 13% in 2001 (Cernea and Schmidt-Soltau, 2003). Despite more than half protected areas around the world being established on indigenous land (Oviedo, 2005), displaced natives are generally prohibited official access (Poirier and Ostergren, 2002). However, protected areas are suffering from encroachment of surrounding population (Brandon and Wells, 1992) and almost half of all protected areas are heavily used for agriculture (Scherr, 2005). Those in the tropics especially are experiencing serious and increasing degradation from poor management of development projects, agricultural encroachment, and illegal resource use (Poirier and Ostergren, 2002). As a result, human-wildlife conflict is a significant and growing problem around the world (Nyhus et al., 2005).

The literature reviewed for this paper has been notable for its polarised assessment of the human-wildlife conflict. On one side are the biological sciences, devoted to understanding the mechanisms of biodiversity loss and its consequences for conservation. On the other side are the social scientists, concerned with livelihood issues in and outside protected areas. Cernea and Schmidt-Soltau claim that these two groups have had an unequal influence on policy, with biological sciences having devoted a “broader, deeper and more systematic research effort than the social sciences” (2003, 3). This diagnosis can be explained by two factors. Firstly, the benefits of conservation are perceived to be shared globally which generates funding from the developed world. In contrast, social development issues are predominantly grounded in poorer developing countries (Brandon and Wells, 1992). Secondly, the inhabitants of protected areas are sometimes regarded as relics of the past because of their lifestyle and tendency to be in remote areas (Poirier and Ostergren, 2002). Conservation initiatives provide an excuse for the state to resettle and incorporate them into the market economy (Redford and Stearman, 1993).

To avoid some of the bias towards biological sciences present in the literature, this paper will examine the underlying conditions required for co-existence. As such, this author has developed the ‘human-wildlife interaction model’.

2. Human-wildlife interaction model

The fundamental principal of the human-wildlife interaction model is to break down co-existence inside or near protected areas into three dimensions: pressure for human-wildlife interaction when they are exposed to each other, level of exposure that occurs, and potential for interaction to become conflict. The objective of the model is to understand the extent of wildlife reduction due to conflict with humans, in a particular circumstance (‘determinants of interaction’ in the model). Each dimension is inter-related and evolves over time. Conflict can therefore be reduced by a reduction in any of the dimensions. This results in three sustainable practices in a protected area, namely: wildlife depletion (reduced pressure), separation of people (reduced exposure), and co-existence (reduced conflict). Protected area planning and management have several options to influence each dimension to achieve sustainable practice. In the specific case where a protected area encompasses an endangered species, the analysis is the same except the species will be more sensitive to conflict than normal. This paper first examines the factors that influence each dimension (‘determinants of interaction’), and assesses the effectiveness of management options in meeting the goals of protected areas.

2.1 wildlife depletion (reduced pressure), separation of people (reduced exposure), and co-existence (reduced conflict).

Wildlife presents both a threat and a resource to humans. Large carnivores, such as jaguars, can pose a threat to both human life and livestock. However, human activities often exasperate the threat, such as poaching of prey and jaguars becoming injured by rancher shooting. There may also be pressure for people to hunt wildlife for local use or trade, for example, tigers are in demand in high income parts of Asia for use in traditional medicines (Weber and Rabinowitz, 1996). Another resource extraction is local gathering of products, which alters the ecosystem and may reduce habitat. For example, in the Annapurna Conservation Area in Nepal, people have deforestated land to provide fuel for cooking and heating for the ecotourism trade (Brandon and Wells, 1992). Extending agriculture or grazing similarly requires clearance of habitat and has auxiliary effects such as water pollution and fragmentation of wildlife populations (Scherr, 2005).

There are two primary considerations for determining the level of human exposure to wildlife: population density and population distribution. Low population density results in low levels of human-wildlife exposure, such as in hunter-gather communities, for example in Central Africa where the habitat is harvested sustainably for local use as a common pool resource (Nelson and Gami, 2002). However, virtually all indigenous groups are now linked into the market economy through cash or bartering, which opens the possibility of increased pressure to satisfy the external market and in turn may stimulate population growth (Redford and Stearman, 1993). The importance of population distribution has been examined through media reports of tiger attacks in Sumatra by Nyhus and Tilson (1994). Where there is a ‘hard edge’ boundary that separates people from habitat, such as a river or effective forestry guard enforcement, there was little probability of interaction even if tigers were relatively abundant. Where people access multiple use forests there were several cases of conflict, but the greatest number of incidents occurred where human settlements were isolated within habitat. Distribution and choice of livelihood is also important in influencing exposure. For example, in Venezuela, herders can avoid exposure to the Andean bear by moving their livestock down the mountain closer to their village (Goldstein et al., 2006). Alternatively, switching to agriculture would remove this exposure entirely.

The potential that humans will turn to conflict to resolve an interaction depends on the social and economic drivers of behaviour. Most decisions to cause conflict with ecosystems or individual species are based on rational economics. Rural people living alongside a protected area are often the poor and displaced and may have few options other than exploiting wildlife products or expanding the agricultural frontier into the park (Brandon and Wells, 1992). Similarly, when livestock owners lose cattle to the Andean bear they protect their herds by hunting and killing bears until the losses stop (Goldstein et al., 2006). Threats to livelihood and especially human life, may generate a disproportionate human response in fear or revenge. For example, the jaguar is often blamed for livestock losses without justification, and persecuted as a result (Weber and Rabinowitz, 1996). In contrast, some indigenous cultures have beliefs that encourage the preservation of the ecosystem despite wildlife pressure. For example, the Coconucos and Yanaconas of Colombia believe the Purace National Park is the dominion of the spirit being, Jucas, and therefore help protect the park (Redford and Stearman, 1993).

3. Sustainable practices

3.1 Displacement, resettlement and co-existence

Historically, governments have used economic incentives to accelerate the extermination of dangerous animals, such as bounties on the wolf in the U.S. resulting in elimination from 97% of its range (Weber and Rabinowitz, 1996). While bounties are no longer offered, elimination of specific problem animals by protected area authorities may prevent escalation to culls by the affected community. This approach is being attempted in Ecuador and Bolivia to reduce conflict between the Andean bear and livestock owners (Goldstein et al., 2006). Wildlife depletion may be an acceptable solution in specific regions of protected areas, but cannot be the dominant practice in protected areas. The other determinant of pressure identified in section 2 is external market demand. In the case of wildlife products this can be addressed through regulation or trade bans, such as CITES. However, these measures are outside the authority available to protected area managers.

Resettlement has been the dominant historical method for reducing interaction between humans and wildlife. However, as it is currently practiced, involuntary displacement increases poverty of both indigenous people and their new hosts (Cernea and Schmidt-Soltau, 2003) and is therefore inconsistent with the aims of protected areas agreed at the IV World Congress on National Parks and Protected Areas (IUCN, 1994). Cernea's model of 'Impoverishment Risks and Reconstruction' lays out the social impacts of displacement and has been exemplified with analysis from Central Africa. Involuntary displacement results in a 70-90% loss of land, loss of stumpage value typically several times greater than GNP per capita, and loss of common property. There is a loss of income, subsistence and difficulty entering the market economy. For example when displaced from hunting and gathering, people loss 67% of cash income that was previously provided by the rainforest. Homelessness and food insecurity can occur immediately following relocation. In the long-term, social relationships are disrupted, resulting in social disarticulation and marginalisation in culturally distinct communities. These factors lead to increased morbidity and mortality (Cernea and Schmidt-Soltau, 2004).

Resettlement may also have unintended or indirect impacts on the conservation of the protected area. Infield et al. (2008) have detailed the social impacts of the creation of Lake Mburo National Park in Uganda in 1983, which encompasses important populations of plains game and bird species. As part of the park creation, the indigenous Bahima pastoralists were forcibly evicted without compensation. To the Bahima, the land is devoid of meaning unless it is being grazed. This belief prompted active resistance in which the Bahima reinstated themselves in 60% of the park in 1986. Where the Bahima have remained absent from the park, there is now significant bush encroachment which reduces grazing for the plains game the park is there to protect. This transition toward climax species may be due to the loss of active management of the landscape by grazing and burning in the valleys. More generally, displacement is likely to alienate people against the goals of conservation and reduces the incentive for sustainable extract for those able to illegally access it from outside. For example, displaced hunters in Gabon now re-enter protected areas to more intensively hunt to supply the market economy (Cernea and Schmidt-Soltau, 2004).

Social consequences of displacement can be largely avoided where appropriate compensation exists to create voluntary relocation. Estimates for such compensation in the rainforest are $20-30 thousand per person (Brockington and Schmidt-Soltau, 2004) which is considered impractically high by some government officials (Cernea and Schmidt-Soltau, 2004). Creating buffer zones with low-level exploitation around human habitation offers a cheaper alternative to resettlement while still reducing human exposure to wildlife. In practice these are ineffective as they still reduce livelihood and as such are likely to be open to the same adverse social reactions as resettlement (Brandon and Wells, 1992).

Co-existence is a more complex sustainable practice to achieve than ‘wildlife depletion’ and ‘separation of people’, because interaction between wildlife and humans still remains. The essence of this approach is to prevent interaction from becoming conflict by rebalancing rational financial decisions and educating to prevent fear and revenge, where necessary. Projects that focus on rebalancing financials to "link the conservation of biological diversity in protected areas with local social and economic development" are referred to as 'Integrated Conservation-Development Projects' (ICDPs) (Brandon and Wells, 1992, 557). While ICDPs can still include management of 'wildlife depletion' and 'separation of people', they primarily focus on co-existence. ICDPs attempt to break the reliance on exploiting protected area resources by offering compensation, providing substitutes or providing alternative sources of income. This is in exchange for locals relinquishing rights and respecting conservation goals.

Nyhus et al. (2005) have considered the effectiveness of compensation schemes which reimburse families who have suffered loss of assets, injury or death due to wildlife. In theory, this reduces the financial need to cull problem animals and provides an opportunity to discuss conflict prevention, although there is little quantitative evidence for this. In practice the payment process is also complicated to manage. Verifying that the damage is due to a particular predator may not be easy; if the classification scheme is too lenient compensation is open to abuse, if too strict it cannot be relied upon by the victim and will not change behaviour. Payments also need to be timely to prevent revenge and transparent to prevent corruption. Where payments are effective, there may be negative behavioural changes as people lack incentive to reduce interaction; a situation known as 'moral hazard'. Compensation has proved to be successful in the case of wolf reintroduction into Yellowstone National Park, as it shifted financial burden away from ranchers to conservationists. This costs as average payment of $260 per animal killed plus additional management overheads, including that of trained biologists for verification, which poses a significant financial upkeep that may not be affordable in cases where there is greater interaction. Substitutes can be another viable option to reduce resource exploitation, but are only possible where a direct alternative exists, such as setting up woodlots outside park boundaries to discourage fuelwood gathering. Indirect forms of compensation such as community services have also been attempted, but since they are not directly linked to conservation goals, they suffer from a dispersal of local goodwill over time (Brandon and Wells, 1992).

Alternative sources of income are available from two sources: ecotourism and ecosystem performance payments. Ecotourism can convey significant income to local people, for example in Chitwan National Park in Nepal communities get 50% of $0.7 million annually. Benefits that do occur will likely be unequal within the community and biased towards men who can act as guides or local elites (Brandon and Wells, 1992). However, tourism is not viable across all landscapes (Dinerstein et al., 2007), and in Africa most of the time revenue does not even cover the costs of tourist infrastructure (Cernea and Schmidt-Soltau, 2003). The infrastructure can also bring its own environmental problems as noted earlier in the case of deforestation in Annapurna Conservation Area (Brandon and Wells, 1992). Ecosystem performance payments would be conditional on meet wildlife abundance or ecosystem services targets. For example, in Sweden, Sami reindeer herders are paid for each wolverine den present on their land. Performance payments rely upon community social pressure for enforcement and, unlike compensation payments, do not suffer from moral hazard. However, appropriate verification and payment systems are still necessary. Ecosystem performance has the added complication of allocating the payment appropriately amongst community members (Nyhus et al., 2005).

Where indigenous beliefs or management systems encourage the preservation of habitat, it may be possible to 'piggyback' specific conservation strategies within the culture to initiate community conservation. For example, in Rwanda, local farmers value the mountain habitat for controlling their watershed, which can be linked to preservation of the mountain gorilla population with appropriate education (Brandon and Wells, 1992). This can be offered in combination with land rights and political freedom for cultural survival (Redford and Stearman, 1993). Interweaving conservation into local culture may have the additional advantage of being self-enforcing in unstable, war-torn areas where compensation or enforcement would be difficult (Nelson and Gami, 2002). However, expecting indigenous people to retain traditional sustainable practices is also to deny them the right to develop and participate in the modern world. Indigenous groups are non-uniform and there may already be a rift forming between the elders and young who have experienced 'western' education. The opportunities of the modern world seem unlikely to be resisted indefinitely (Redford and Stearman, 1993).

4. Discussion

Brandon and Wells (1992) have considered why, in practice, few ICDP schemes have managed to successfully link development to conservation management. The underlying reason for wildlife threats may be extremely complicated. For example, at Khao Yai in Thailand, brokers controlling village lending would take the villager's land if extortionate repayments were not met. Those who were indebted were then forced into clearing a new plot in the park to make a livelihood. This situation was further reinforced by a high external urban demand for fuelwood and construction material. Participation in conservation schemes helps to identify the local needs, but these are likely to be more concerned with development than conservation and as such may raise unrealistic expectations. Similarly, merely replacing the income previously generated by undesired extraction is not sufficient to cause extraction to desist. People will attempt to maximise their income, so any excess labour available will still undertake resource exploitation, which is especially the case where locals act as guides for an ecotourist trade that is often seasonal. Where incentives are tied directly to conservation it is difficult to assess the correct level of funding. Too little funding won't be sufficient to change behaviour, but too great may cause migration into the region which further increases the human-wildlife interaction and consequently increases funding requirements. These above practical complications mean that ICDP schemes are most applicable in situations where there is a link between conservation and development, the threats to resources are direct and simple, and appropriate alternatives and technology are available.

Limited budgets mean there is a need for protected areas to deliver value for money. This means implementing the cheapest management option that satisfies the project's conservation and development goals. In all cases, some level of enforcement is also necessary, but not sufficient unless the needs of local people are also met (Brandon and Wells, 1992). Where there is significant interaction due to high wildlife pressure and exposure, preventing conflict in a state of co-existence will be expensive. Furthermore, Weber and Radinowitz (1996) consider that for many cases large carnivores it is not possible at all. Resettlement cost will mostly depend on the number of people (Brockington and Schmidt-Soltau, 2004), rather than the form of wildlife, and so is suited to areas with high wildlife pressure (Nyhus et al., 2005). Displacement must be performed in a way so as not to increase poverty, both to comply with international agreements (IUCN, 1994) and to avoid a backlash against conservation. However, there needs to be improved political will, legal frameworks and institutional capacity to achieve this (Cernea and Schmidt-Soltau, 2003). Complying with international agreements will make resettlement more expensive than it is currently, which may in turn spur greater consideration of co-existence ICDP strategies.

Co-existence is both possible and financially preferable in some cases where there is low pressure or pre-existing low exposure. Low pressure occurs in the case of many grazing animals, birds and plants where there is less threat from wildlife or low financial benefit from hunting. Low exposure would already be present in the case of some indigenous populations which have low population densities and for whom conservation objectives might be aligned with religious beliefs (Brandon and Wells, 1992). In reality, protected areas are often sufficiently large that regions within them will have different pressures and exposures. It is this author's opinion that they would therefore benefit from a mosaic of management techniques tailored to each region, including local wildlife depletion, separation of people and co-existence. This approach may be challenging where the dominant stakeholder, often an international NGO (Schmidt-Soltau, 2005), has an approach polarised towards either conservation (leading to displacement) or development (leading to co-existence).

5. Conclusions

Protected areas are crucial for global conservation of ecosystems and endangered species, yet while the world is the beneficiary, local people pay the cost through displacement and deprivation of resources. The human welfare advantages of co-existence have been recognised by international agreements, but due to a history of displacement strategies, co-existence has limited practical or theoretical experience. To conduct a more thorough assessment of the conditions required for co-existence in protected areas, this author has developed the 'human-wildlife interaction model'. This model de-constructs the problem by breaking down human-wildlife conflict into pressure for interaction, human exposure and potential for interaction to become conflict. Conflict can be reduced by minimising each of the three dimensions, which successfully predicts the three possible management options: wildlife depletion, separation of people and co-existence.

Co-existence management strategies require human welfare to be linked to conservation goals, which is not always possible, especially where the links are particularly complex. Displacement may be a more cost-effective approach in cases where pressure for interaction is high, such as with large carnivores that pose a threat to human life and livelihood. However, where either pressure or pre-existing exposure is low, co-existence is likely to offer a cost-effective and viable management option. Examples of such situations include protected areas to protect grazing animals, birds or plants, and where indigenous communities live in low densities or have strong cultural values of preservation.

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