



# BHADRA VOLUNTARY RELOCATION



## FOREWORD

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During my tenure as Director Project Tiger in the Ministry of Environment and Forests, Govt. of India, I had the privilege of participating in voluntary relocation of villages from Bhadra Tiger Reserve. As nearly two decades have passed, whatever is written below is from my memory only.

Mr Yatish Kumar was the Field Director of Bhadra Tiger Reserve and Mr Gopalakrishne Gowda was the Collector of Chikmagalur District of Karnataka during voluntary relocation in Bhadra Tiger Reserve. This Sanctuary was notified as a Tiger Reserve in the year 1998. After the notification as tiger reserve, it was necessary to relocate the existing villages as the entire population with their cattle were dependent on the Tiger Reserve. The area which I saw in the year 1998 was very rich in flora and fauna. Excellent bamboo forests were available but it had fire hazard too because of the presence of villagers and their cattle. Tiger population was estimated by Dr. Ullas Karanth and his love for this area was due to highly rich biodiversity. Ultimately, resulted in relocation of all the villages from within the reserve.

Dr Karanth, a devoted biologist was a close friend of mine and during his visit to Delhi he proposed relocation of villages. As the Director of Project Tiger, I was looking at voluntary relocation of villages for tribals only from inside Tiger Reserve by de-notifying suitable areas of forests for relocation, but in this case the villagers were to be relocated by purchasing a revenue land which was very expensive. However, I took up this project as a challenge and went to the higher ups in the Ministry of Environment & Forests through Mr S C Sharma, the then Additional DG, Wildlife. The total cost of the land was nearly 13 crores and to get this huge sum we had to approach the Secretary, MOEF.

I went to Chikmagalur and discussed the matter with the Collector and Field Director of Bhadra Tiger Reserve. The land selected for relocation was very fertile with irrigation facilities which was plotted by the field staff of the Forest Department and revenue staff of the Collector. The

proposal was to allot the plots of nearly two hectares each by drawing lottery so that no biasness was shown. I came back to Delhi and discussed the matter with the Secretary MoEF. The proposal was so convincing that he agreed to divert fund from different programme and give the money in two instalments for purchase of revenue land and subsequent shifting of villagers. First instalment was approximately Rs. 9 crores and the same amount was deposited with the Collector Chikmagalur, thus the process of relocation started.

Mr Girish a close associate of Dr Karanth was instrumental in assisting relocation programme and perhaps this would not have happened successfully without close cooperation of Forest Department, Revenue Department, Mr Girish running an NGO in Chikmagalur and finally Dr Ullas Karanth, the then Director of WCS.

By the time I relinquished office, entire relocation process was complete and the Tiger Reserve was blooming with excellent biomass to support large number of big and small ungulates. The tiger population increased considerably and relocation was considered to be the finest in the whole country.

The subject chosen for this workshop will definitely give an over view of the situation and successful implementation showing close cooperation between WCS India, Mr Girish, Mr Gopalakrishne Gowda representing Revenue Department and Mr Yatish Kumar the Field Director, Karnataka Forest Department and MoEF Govt. of India. I wish the people know about it in greater detail and see how successful relocation process can facilitate growth in tiger population.

*P K Sen, IFS (R)*  
*Former Director, Project Tiger*

# Importance of voluntary relocation from core-critical tiger habitats

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*Written by Dr. Rajesh Gopal IFS (R)  
Secretary General, Global Tiger Forum*



Since the inception of Project Tiger, voluntary relocation of settlements from tiger habitats has been an important agenda item, with several guidelines and 100 % central assistance forming part of the Centrally Sponsored scheme of Project Tiger. Over the years, the said guidelines have been revised along with the package. The amendment to the Wildlife (Protection) Act, 1972 during 2006 based on the Tiger Task Force Report, gave a new thrust to the process. For the first time, core –critical tiger habitat and peripheral buffer areas were explained as part of a tiger reserve. More clarity was there on the “exclusive tiger agenda” of core areas, complemented by the equally aggressive “inclusive agenda of co-occurrence” in peripheral buffer. The Project Tiger package was revised soon, and the voluntary relocation package was enhanced from Rs. One lakh per family to ten lakhs, while providing two options –viz. a regular land for land and rehabilitation by the Department or a cash option.

The outcome was encouraging. Several States successfully did voluntary relocation of settlements residing within core –critical tiger habitats (Maharashtra, Madhya Pradesh), and the core habitat was more productive for the tiger. It is very important to mention that the process was and is purely voluntary in nature, with provisions of both special acts, viz. Wildlife (Protection) Act, 1972, read with those of Forest Dweller’s Act.

## **Why do we need relocation from core areas?**

Inviolable space is fundamental for tiger source areas (the core-critical tiger habitat) to make available the habitat with its natural complement of welfare factors ...food, water and space to live and breed. Tiger, being an ecological umbrella species, requires a good prey biomass and the latter requires a habitat free of biotic disturbances to generate a reproductive surplus. Such surpluses are crucial, since relatively abundant, gregarious wild herbivores do not become targets of regulation on account of predation by big cats like the tiger. Undisturbed habitat ensures welfare factors like forage and browse for wild herbivores, while providing ample space for their



foraging, courtship and anti- predator strategies. It also reduces the chances of disease transmission from village livestock.

Furthermore, as a territorial animal advertising its presence, the tiger requires inviolate space. Empirical inference has proved that an inviolate space of 800 to 1200 sq km of productive habitat is required for a viable population of tiger (20 breeding tigresses). Given the source-sink dynamics , internecine relationships of tiger ethology , the sex ratio skewing towards the female ( 1male: 2 females) , post-natal care with 50% neo natal mortality , such a dispensation of 20 tigresses would support a total population of 65 to 70 tigers ( sub adult males waiting for a foothold in the productive habitat , old territorial tigers edged out from prime areas of habitat , prime males thriving as per the sex ratio , tigresses exhibiting site fidelity in select natal areas , philopatry and the like ). Such innate life cycle processes would NOT be possible if the source area is dotted with human settlements, owing to obvious human –tiger / wild herbivore interface conflicts resulting in human / crop depredation and possible revenge killings.

It should be remembered, there can be NO CO-EXISTENCE with a big cat like the tiger or leopard. For want of options, only CO-OCCURRENCE is possible with obvious trade-offs (as being strategized in buffer and corridor at a larger landscape level).

#### **What has relocation done to the habitat?**

A snap shot appraisal of tiger reserves like Kanha , Bandhavgarh , Satpura, Tadoba , Melghat, Sariska ( some portion) would reveal the remarkable habitat recovery at relocated sites , fostering wildlife abundance with no interface issues . It has contributed to the resurrection of the habitat, improved water regime, reduced man made fires, promoted heterogeneous indigenous grass growth with no disease threat. The natural prey –predator cycle has been restored with enhanced relative abundance of tiger, co-predators and prey.

#### **What has relocation done to people?**

The relocated people have also benefitted from the process. Due to sectoral integration, they have gained with more income opportunities, better health and sanitation facilities, apart from other basic amenities like communication, electricity, education and others which were not available to them in the core area (status being a National Park or a Sanctuary). Due to more livelihood options, their forest resource dependency has also reduced. Owing to such reasons, many villagers in Madhya Pradesh have been demanding relocation.

#### **Why such voluntary relocation is important for the future as well?**

Voluntary relocation is crucial for tiger as well as people. It does justice to the Wildlife Protection) Act and the Sustainable Agenda for people (by addressing the three important pillars of the latter, viz. environmental, economic and social). The three basics of post relocation - handholding strategy – resource substitution, income generation and community welfare-emanate from the the sustainability concept. Through innovative dovetailing of ongoing Government Schemes, CSR, off –site mitigation commitments of agencies securing forest land within the tiger landscape the relocated people can benefit more.

Bhadra relocation is a case in point, where village relocation was implemented innovatively with support of GOI, State (especially through the District level portfolio), prior to the said protected area becoming a tiger reserve. The Karnataka Forest Department and its officials deserve all credit for such concerted efforts.

Voluntary relocation is also an INVESTMENT for **adaptation to Climate Change**. The new forest growth at the relocated site “locks up free carbon”. In this regard the effort also qualifies for access to Climate Funds.

Relocation restores and augments “**ecosystem Services**” from tiger source areas ... much of which go un-noticed.

Hence, Voluntary Relocation of people from core areas of tiger reserves needs to be given the top most priority at the present juncture as well as in the coming years for implementing the tiger as well as other wildlife agenda, duly complying with provisions of Wildlife (Protection) Act and the Forest Dweller’s Act. It is the biggest contribution for in-situ tiger conservation.

# Bhadra Voluntary Relocation

## *... the trail to a new life*

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### **Bhadra landscape**

Constituted in 1974 by amalgamating fifteen state forests and two minor forests, the Bhadra Wildlife Sanctuary takes the shape of a letter “E” with ‘limb-like’ extensions that give it a very long perimeter. It was brought under Project Tiger in 1998, to become the 25<sup>th</sup> Tiger Reserve in India. It falls in the Western Ghats, one of the two ecological and biological hotspots in India, and covers an area of 492.30 sq kms across three taluks of Chikmagalur district and one taluk of Shimoga district. It is classified as a tropical moist forest (TMF) in priority category I.

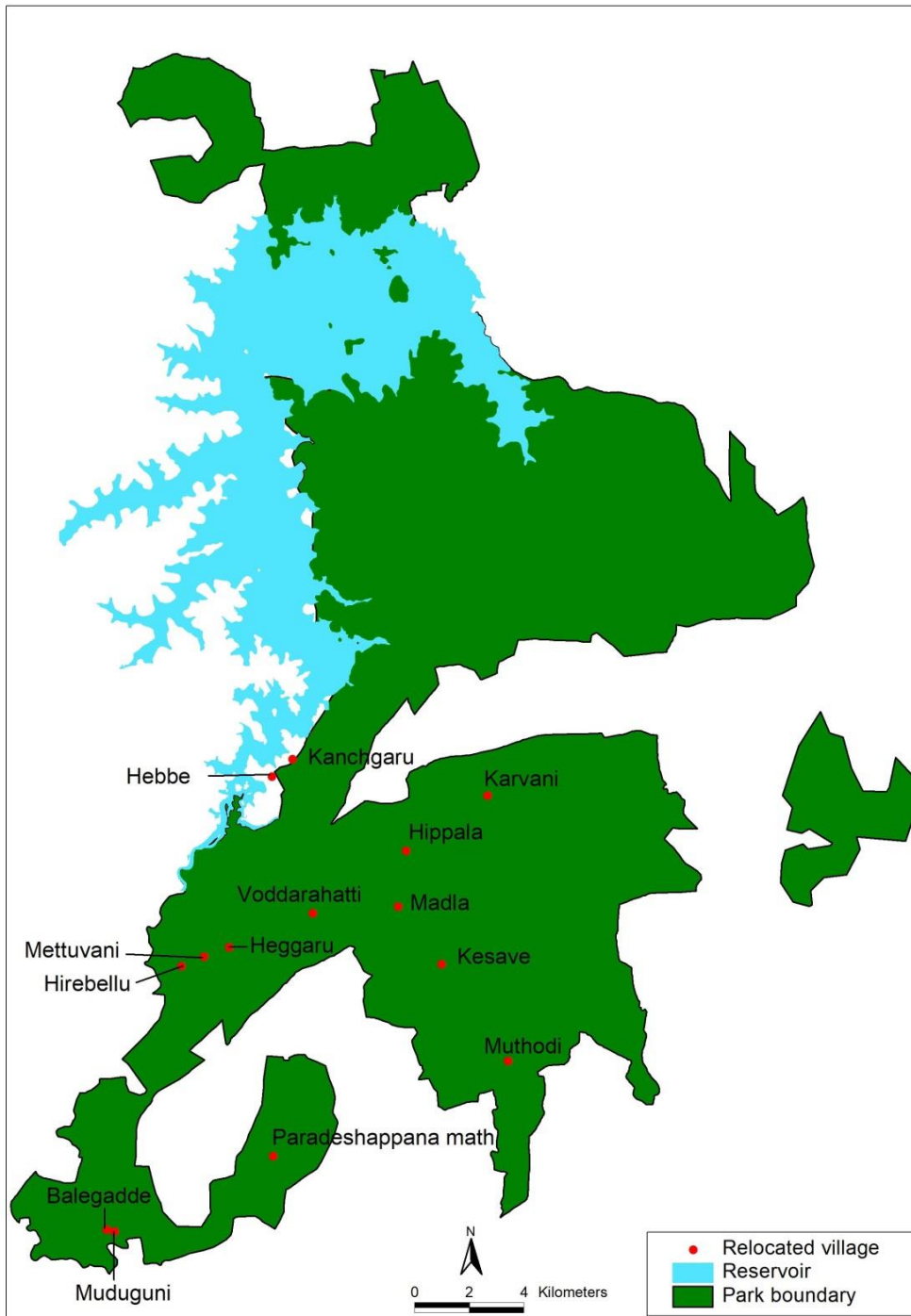
Situated between Northern latitude 75°-15° and 75°-50° Eastern longitude, 13°-25° and 13°-50°, it is a part of the south-western part of the Western Ghats and constitutes a geographic barrier between the coastal areas and the hinterland.

The altitude varies from 650 metres to 1875 meters above M.S.L. The highest peak in the sanctuary is the Kallathigiri peak with a height of 1875 meters while Mullaiangiri, the highest peak in Karnataka with the height of 1914 Mtrs., touches the northern boundary of the sanctuary. The underlying rocks on the hill slopes contain magnetite, haematite, quartzite and iron ores.

The reserve is bisected into two halves by the Bababudan Hills, which encircle the lower half, Jagara Valley (Muthodi Range), almost completely. Within the crescent formed by the hills sits Muthodi, which with the northern half (Lakkavalli Range), forms a hilly terrain made of thick forests, grassy undulating peaks and sholas. The sanctuary is well drained by Bhadra River and its tributaries Somavahini, Thadabehalla, Hiplahalla, Vatehalla, Odirayanahalla, Jenuhalla, Anegundihalla, Shivanehalla, Nayisathahalla, Neerahalla and Mavinahalla.

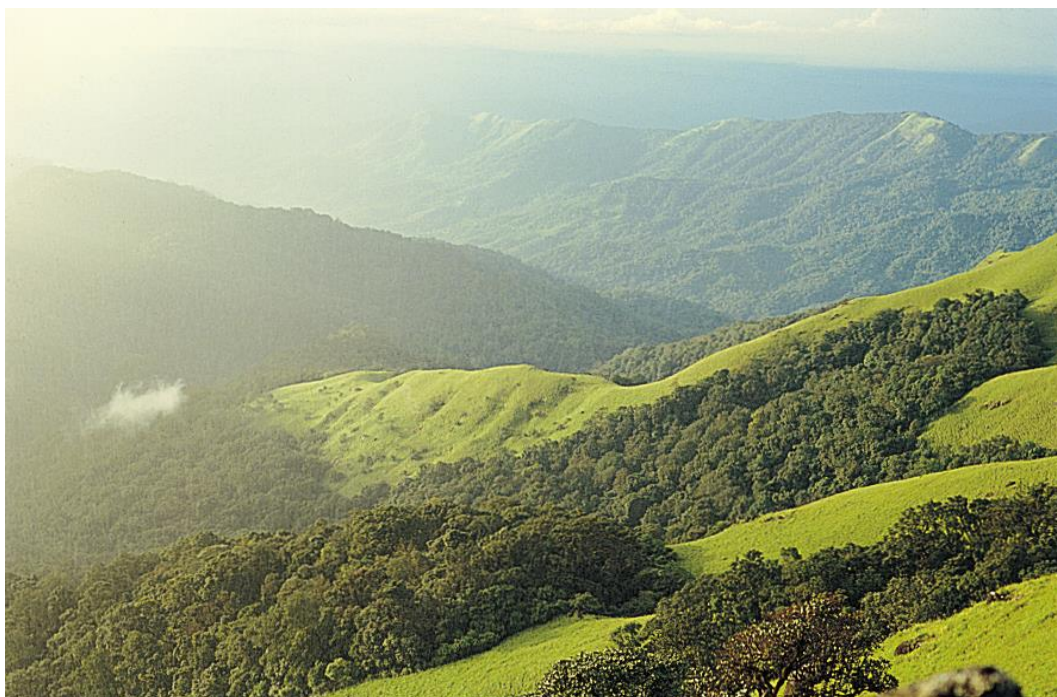
In the 1960s the river was dammed on the north-eastern side near Lakkavalli and the resulting reservoir submerged large parts of the reserve. To the north of the sanctuary is the Bhadra reservoir and the cultivated plains, and in the east and south the coffee estates, with the river on the west. Temperature ranges from 7-36 deg C with the southwest monsoon between June and September bringing between 1000-2500 mm of rainfall.





*A map of Bhadra Tiger Reserve*

## Flora and Fauna



*Bhadra Landscape*

A major portion of the reserve is covered by moist deciduous forests which gradually merge with tropical dry deciduous forests towards the north-eastern Lakkavali side. The inner slopes house the semi-evergreen sholas. According to the forest department there are more than 120 tree species, with the some of the timber species being Teak, Rosewood, etc. There are a variety of figs and then there are the bamboos, both in the Jagara valley, as well as in the Lakkavalli area. *Bambusa arundinacea* occurs widely in the area, especially in wide belts along streams and *nullahs*. About 6% of the area is covered by Forest Department plantations, mainly teak (*Tectona grandis*).

Bhadra also has low-lying marshy glades locally known as '*hadlus*'. These are mostly perennially moist and covered by luxuriant grass growth through the dry seasons and provide food for large ungulates like elephants and gaurs.

In the first status survey of the reserve done, by WWF, its potential as an excellent wildlife habitat, if managed well, was documented.

Besides the omnipresent cicadas whose rising and falling trill resonates through the landscape, there are many species of birds including birds of prey and forest birds. Some of these include hornbills, parakeets, paradise flycatcher, bee-eaters, etc. Estimates put tiger numbers at 30, along with good numbers of leopards, dholes, sloth bears, gaurs, langurs and small carnivores, besides ungulates like sambar, chital, muntjac and wild pigs. Overall, the reserve supports significant number of large mammals, birds, reptiles, amphibians, butterflies and insects.

## Conservation Challenges



*Representative Image: A village inside protected area. Photo credit: Niren Jain*

Back in the 80s, when the first study looked into the problems of the reserve, some of the issues facing the reserve were identified as fires, poaching, cattle grazing, timber and bamboo logging, wildlife tourism, mining, etc. Some of these can be traced back to the beginning of the last century.

Mining in these pristine parts of the Ghats began in the year 1923 when about 738.55 ha of forested area was leased to a public sector company, Vishveshwariah Iron and Steel Limited (VISL), for a period of 40 years to extract the iron ore. This went on till 2007 when mining was stopped, putting an end to the degradation of the shola forests, high-altitude grasslands and the main catchment of the river Bhadra and its tributaries.

Wartime needs also saw railroads make way into the reserve for massive timber extraction. But gradually the deleterious impact on the forests was felt and restrictions imposed.

The Mysore Paper Mills started in 1937 had an arrangement with forest department for an annual supply of 14000 tons of small bamboo which was increased to 20000 tons and then 50000 tons of bamboo. The Medar community members were also allowed to cut bamboo for weaving, their traditional livelihood. Setting fire to the undergrowth to access the bamboo became a practice. In dry parts of the reserve, the forests are especially inflammable. (Extraction of any kind of timber or dead wood was put to a halt since 1997.)

Around this time, the reserve began to face another kind of pressure from the settlers and



plantations. Several incursions extended into the reserve, with erstwhile human habitations, and plantations dipping into it like 'giant fingers.' With plantations encroaching into the hills, the valley was surrounded by estates. In addition, there were 16 villages with about 4000 people and 2000 heads of cattle in the southern half. The low-lying areas were converted to paddy fields, while the cattle began grazing in the reserve.

Not only did the cattle pose a serious competition in fodder for the wild ungulates, but also became a conduit for disease transmission. In 1989, a Rinderpest epidemic of the cattle claimed a large population of the Indian gaur. Bhadra, which was once known for very high gaur densities, is yet to recover.

The people began to exert pressure on the forest by extraction of products like *Acacia sinuata* (*seege*) pods, honey, firewood and bamboo from the reserve. Fuel wood consumption rate varied between 2190 kg per week in the smallest village Karvani and 22140 kg per week in the largest village Madla, according to a survey. A single family required around 20 kgs of firewood daily.

The people started growing paddy even in the *hadlus*. Thus deprived of their natural food source, the wild animals began raiding crops. This loss of crops constituted up to 30 percent of the annual income of households at times.

Considering the rich habitat in Bhadra with excellent availability of grasses, abundant bamboo growth and quite low invasion by weeds, ungulate densities were expected to be high but studies in '98, '99 and 2000 showed low densities. While initially it was suggested that this may be simply because the habitat was not suitable for some species like chital, there has been some evidence in a subsequent study that it could be explained by human presence and pressures of poaching.

Poaching, both using guns and snares, was noted by the department as a major problem. This was not restricted to villagers but also indulged in by coffee planters and estate workers too.

Use of insecticides by the estates as also release of effluents from coffee pulpers began to affect the birds and insects. The challenge taken up by local environmentalists has been to make the farms and estates wildlife-friendly by going organic and reducing their pollution potential.

Adverse impacts of wildlife on humans often follow adverse human impacts on wildlife. Early this century, a 2-year field study at Bandipur National Park showed that resource competition between wild herbivores and livestock could be intense and trigger declines of wild herbivores if unchecked. It found a definite decline in densities of gaur, chital and elephant with increasing livestock densities, as also a drop in preferred plant biomass with livestock densities going up. The next year following a decline in livestock density, the density of the three wild herbivores went up.



*Representative image – Leopard in a trap. Photo credit : Karnataka Forest Department*

This has been witnessed in the past, as also here at Bhadra. Almost every household living in the forest had lost 12pc of their cattle holdings to large felines and 11 pc of their crops to elephant raids, as noted during surveys done during 1996-99. Using ten ecological indicators it was shown that an average area of 23.7 sq km around six villages had been altered by human activities. These villages, in short, had directly impacted 8-10 percent of the protected area.

### **People's problems**

In the early part of the last century, the reserve is said to have had one village Madla in a four sq km area, with 36 families of less than 100 people and around 200 heads of cattle. Soon others followed. Most were settlers who had come in as labour and settled in the forest. During 1956–1966, a major irrigation reservoir was constructed that split the reserve and totally isolated the Muthodi area. By then there were more villages and some of these were cut off from access to the outside world during the monsoons.

Deprived of education and health facilities, and sometimes even water; facing attacks by wild carnivores, and crop destruction by elephants, eventually saw the people put up the first request for relocation in the 70s.

The government did propose a resettlement project in 1974 but the plan took a long time to materialise with surveys to count eligible households initiated in 1987. But the planning took a few more years, during which the numbers of families went up as more migrants came in, calling for even more funds. Finally, the state government accepted the proposal and committed itself to relocation in 1996. It formally sought Central contribution for the same.



*Crop damage by elephants inside Bhadra Tiger Reserve before relocation. Photo credit: DV Girish*

By 2002, there were around 4000 people in 13 villages. Around 1200 acres of forest land had been converted to farmlands and plantations, of which at least 200 acres was encroached. Few had legal ownership. In fact, out of the 463 families, it was only seven that had legal housing land. Tigers and leopards claimed 12% of livestock while 15% of crops was annually destroyed by elephants and ungulates.

Except for one village in Madla, most others welcomed the relocation package but preferred to wait and watch how it went. The people of the Madla village filed a case in Karnataka High Court opposing the relocation, and as part of the agitation even set fire to around 25 sq km of the forest. In 2001, the High Court dismissed the case and recommended quick completion of the project.

The relocation process had the support of a group of environment and nature lovers, who from 1993, had been working with the forest and revenue departments to hasten the process. Concerned citizens and NGOs like Nature Conservation Guild and Bhadra Wildlife Conservation Trust played a vital role in building rapport with the people and convincing them on the benefits of relocation. D V Girish, honorary wildlife warden, and others took up the onerous task of survey of families in the forest with the forest and revenue departments. From 1250 applications the actual number was whittled down a quarter after all fake applications were removed. A laborious process, this meant going with the original list submitted and checking on every person. The forest department had a DCF with a people-friendly face in Yathish Kumar. He was



keen to ensure that the people got a good deal. Helping the two was the district administration in the person of the Deputy Commissioner, Gopalakrishne Gowda. Wildlife Conservation Society too played a catalytic role.

After winning the people's confidence, the NGOs and individuals involved worked with the government departments to ensure transparency and accountability in implementing the promises. While the bureaucratic procedures took time, life inside the forest was made more tolerant by improving the roads, bridges and water supply system. The Project Tiger steering committee on their part ensured that the deal was in place despite the long delays.

With the land surveys and markings initiated in June 1999 when the first village at Hebbe was notified, the actual shifting process began in October 2001. Households were handed land deeds, beside an individual housing site. The allotment was done in a fool-proof method that ruled out any possibility of bias towards anyone. There was no attempt to segregate the people socially or economically. However, there was a lot of work to be still done. For one, the money was to be handed directly into bank accounts, which had to be joint accounts of the couple. To facilitate a speedy completion, the banks obliged by coming to the doorstep of the households and opening the accounts.

The moment that land at MC Halli was finally cleared, the next step was taking possession. Hiring a tractor and running it on fuel supplied by the tractor owner and petrol bunk respectively on deferred payments, around 458 acres of land was ploughed in a period of three days. Grazing land had to be fenced and this was done by putting up 1000 poles across 750 acres, only to be removed by the MLA's men at the behest of the locals. The KSFC pitched in to put back the fence.

While originally around 334 hectares was set aside for resettlement, the delay in occupying had led to locals encroaching the land. This necessitated a further acquiring of 186 hectares of land at Kelaguru. At MC Halli, 373 families were resettled, including all those who did not possess any legal land deed in the forest. That was done as a goodwill gesture. The weaker sections were further helped by building houses at Rs 42,000 under the Rajiv Gandhi Housing Corporation, without any burden placed on them. Around 203 such units were put up in seven months. Suggestions from the people were incorporated in the design. In a novel initiative, a sustainable house design was offered to the people, something that looked into the climate of the land and use of locally available resources.

Help was on hand all through the process. Dismantling homes and transportation to the new site was also financially catered to in the compensation. The households were given a subsistence allowance for six months to help tide over food, fuel and fodder needs after they were resettled. All houses had electricity and water, as also easy access to health and education facilities.

Yet, there was discontent arising out of the differences at the two relocation sites, as also from common human tendencies. Land at MC Halli was fertile and suited for crops like paddy and sugarcane that fetched the settlers immediate benefits. At Kelaguru, it was mostly coffee and arecanut plantations, which would take time to reap profit. This meant the settlers had to find some other means to fend for themselves, often working as labour. Keeping this in mind, the administration, under the advice of the DC, allotted an extra acre for every acre, thus doubling the land allotted for those at Kelaguru.

The cost of land acquisition was originally proposed as Rs 7.02 crore in 1992, and revised to Rs 13.15 crore in 1999. The relocation and resettlement cost was originally proposed as Rs 5.74 crore in 1992, and revised to Rs 8.07 crore in 1999 (Karnataka Forest Department, 1999).

### **Post-relocation scenario**

Today, 18 years down the line, the story is like any human story. Overall, things have improved. Some have done very well, some quite well, and some have succumbed to the ills of big money. As Huliappa Gowda at Kelaguru puts it, "it is about hard work and fate". And who best to say that but Gowda who has come a long way.



*Paddy field cultivation of a relocation beneficiary at MC Halli. Photo credit: Praneeth Sargur*

Back in the forest, he had a small patch of land but mostly worked as labour on others' land. Today, he sits pretty on an annual earning of Rs 10 lakh from his four acres of land where he has grown coffee and pepper.

It took him seven years of hard work, caring for the land and crops, but arrive he has. When he talks, it is from confidence and learning that has built over these years. Visiting coffee experts swear at the quality of his beans, sure that "he speaks to all the plants, that is how they are so healthy."

Gowda acknowledges that he was once a nobody in the forest who none cared to talk to, except when called for some work. Today, people recognise me, he says proudly. His son runs a nursery and makes a good earning. He has big plans. The move has done them good, agrees the family. Saving the crops from elephants had been a struggle as also the need to send children away to the city for education.



*Relocation beneficiaries accessing commodities at doorstep at MC Halli. Photo credit : Praneeth Sargur*

Sundara Poojary is another one who persisted. Having sold his house, he moved out and built a new home adjacent to the land holding he was allotted. He too makes an annual earning of Rs 8-10 lakh from his five acres. His children and grand-children are doing well. In his porch sit three cars, including a SUV -- all his.

Unfortunately, not all at Kelaguru have a success story. Only 15 out of the 60 have managed to stick on and reap the harvest. Many have sold out their homes and bits of the land holdings. Many have left the land uncultivated, waiting to sell it off at a good price. They work as labour for Rs 300 a day, spend the money buying liquor and wait for buyers, as Gowda puts it sadly.

That sums up the story of most resettled. Those who have put in hard work and patience have reaped the benefits.



At MC Halli too, one will encounter locked up houses, left unoccupied. These belong to those who have left town and gone to the cities to pursue a 'better future'. There are also the ones who stayed behind and tilled the land. What used to be paddy and sugarcane today sees a definite shift toward arecanut. Dharme Gowda, from Madla, who was the first settler to build his house at MC Halli, has done well. His four acres of arecanut fetches a good income. His son is an engineer while his daughter completed degree in fashion design.

So also Kesave Surendra who has just harvested his first crop of arecanut after six years. Women from the neighbourhood sit in his verandah, dehusking the arecanut. His son has completed a degree in metallurgy and now seeks employment.



*Children of relocation beneficiaries boarding school bus at MC Halli. Photo credit :Praneeth Sargur*

Mallappa Hegde, known as the 'water man' as he operates the water from the common tank, had no land in the forest. Today, his son has completed education and found a job in Saudi Arabia. Ramachandra from Maadla has educated his two daughters who aspire to compete for IAS. Shifting out gave him 'khushi' he had said back then and today he has named his daughter 'Khushi'. Having lived in a small shack till recently, Ramachandra has now embarked on building a palatial home, designed and supervised by himself.

Land value has gone up considerably in both areas, with an acre fetching anywhere between Rs 25-30 lakh and even higher in some areas.

All the people spoken to have no doubts whatsoever that the move from the forest has done them good. The efforts of Girish and Yathish are recollected in gratitude by almost everyone. MC



Halli now boasts a community hall and its own school. Some of the residents have gone on to be elected to the local panchayat.

A telling difference can be seen in the form of the tempo vehicle delivering gas cylinders to doorsteps. A far cry from venturing into the forest to collect firewood at the risk of fatal encounters with wildlife. Similarly, the milk van comes to the colony. The school bus comes to pick the students while vegetable sellers from the markets come to sell their produce. The markets, schools, colleges, hospitals are all within a few hundred metres away and transportation is available.

### **Reasons for success**

In a survey conducted in 2002 and then again in 2006 at the two relocation sites, a majority of the residents expressed satisfaction with the relocation. The study concluded that financial compensation and other support provided to people during the transition, active consultation with people at every step, involvement of all stakeholders, a committed civil society, a good resettlement package costing three to four times more than what has been offered elsewhere, fertile lands with plenty of water, and a definite improvement in quality of life -- all these went to make Bhadra a model story in the voluntary relocation of people.



*Tigers inside Bhadra Tiger Reserve. Photo credit : Biddappa P A*

Some comparisons between the Bhadra experiment with others in the country have suggested that the success could be explained by the fact that the people involved were not tribals and that there was no significant shift in livelihood means – a factor that has been the challenge in many relocation attempts. It has also been noted that the structure of the society was not as fragmented as in other cases, and that most of the people at Bhadra were reasonably well-placed, with caste and politics not playing a major role.

While not disagreeing on the above, the fact remains that even here the people are no different and were very wary of relocating. It was the involvement of several NGOs and the cooperation between all the players that smoothed the road. There was no forced eviction and people were taken into confidence at every step.

In terms of recovery of wildlife too, according to the NTCA report ‘Status of tigers copredators and prey, 2014’ following the relocation in 2002 there has been a gradual increasing trend seen for large mammal populations at Bhadra.

Following the disappearance of tigers from Sariska in 2005, the Tiger Task Force had deliberated on the two alternatives of harmonious coexistence in the forest and relocation. Opinions varied between providing facilities within the forest or relocating people. In the latter context, the task force had cited the Bhadra relocation programme as one of the most successful ones in the country. Even today, it remains one of the best showcase for voluntary relocation -- in the way it was planned, supported, executed and monitored.

*Written by Jayalakshmi K*

*Head of Media and Outreach, Wildlife Conservation Society - India*

## Bhadra Relocation - *the Modus Operandi*

*Written by K H Gopalakrishne Gowda IAS (R)*

*Senior Advisor - Policy and Conservation, Wildlife Conservation Society - India*



Chikmagalur was my third district as Deputy Commissioner; prior to that I served a three-year stint at Mandya and a two-year stint at Tumkur in succession. Mandya, carved out of erstwhile Mysore district, is mostly irrigated from Krishna Raja Sagar and Hemavati irrigation dams. Tumkur on the other hand is a dry district on the eastern plains of the state with only agricultural lands under a chain of tanks being irrigated by the Hemavati project. I was posted to a third district only because I never sought any posting to the state capital.

Chikmagalur is a hill district in the lap of the Western Ghats with a large dry plain area of Kadur taluk bordering Tumkur district on the eastern side. The picturesque evergreen Western Ghat segment of the district is the birthplace of several rivers such as Tunga, Bhadra and Hemavati flowing towards the east and Netravati flowing towards the west. The district is home to the Bhadra Tiger Reserve and Kudremukh National Park, rich in flora and fauna and biodiversity. Coming from the dry district of Kolar I was enchanted by the natural splendour and scenic beauty of Chikmagalur. It also reminded me of the responsibility of preventing encroachments on wooded lands, protection of forest area, conservation of river systems, ecology, environment and wildlife.

As per my normal practice while in service, after handing over charge at Tumkur, I proceeded to Karwar, where my in-laws resided, for a restful stay of ten days. From there while travelling towards Chikmagalur via the Western Ghats from the Sirsi and Shimoga side, my vehicle broke down at the Chikmagalur district border between Bhadravati and Tarikere Taluks - to be precise at Malali Chennenahally village limits. There I observed on either side of the Bangalore-Honnavaara (BH) national highway, vast tracts of irrigated lands lying fallow (for decades).

Later on, the Assistant Commissioner of Tarikere Sub Division clarified that the land had been reserved for some public purpose but the locals were litigating for grant in their favour. I felt leaving hundreds of acres of irrigated land unproductive for two decades was a crime. This public land was once leased to the Mysore Paper Mills for growing species required for pulp

production. It was later released for cultivation following the construction of the Bhadra Reservoir in the seventies and reserved for grant to the inhabitants of the Bhadra Game Sanctuary notified under the Wildlife Protection Act 1972. A sum of Rs 1 crore was also released by the central government to rehabilitate villagers coming under the game sanctuary. Land was lying fallow; money was gathering interest at the local State Bank of Mysore branch but the project never took shape.

### **Early Days**

It is normal practice at district headquarters of Karnataka for public representatives, important citizens, heads of social organizations and various pressure groups to meet the new Deputy Commissioner and put forth their demands in the guise of welcoming him/her. It is routine for officials to meet the new DC and brief him on important issues concerning their department. Besides, newspapers also highlight the burning problems of the day to draw the attention of the new DC.

During the course of such welcome visits and briefings, two youngsters attempted to draw my attention towards relocating people from BTR, a project pending for years. One of them was Yatish Kumar, an officer of the rank of DCF from the State Forest Department, and the other was DV Girish, the honorary district wildlife warden (HDWW) who was also leading an NGO working for conservation.

I was very impressed by their knowledge about the forest, flora and fauna of the district, the rivers, rivulets and mountain ranges, problems of villages within BTR, etc. The soft-spoken DCF briefed me about what has to be done to speed up implementation of the project for which money had been released and land reserved a decade ago. I was moved by the commitment and determination of the two youngsters. While assuring them of my support, I also gave them a task. Unless people are convinced and willingly agree to move to the land earmarked for the purpose, we could not forcibly evict them. Therefore, meet the inhabitants of the villages and brief them about the benefits of the project and only after they are fully prepared to leave can we go ahead, I told the duo. They happily accepted the task and appeared confident of convincing the inhabitants of not one, but sixteen villages. I smiled inwardly at their inexperience and was sure they would never come back.

Two other developments within the district also welcomed me. Towards one issue my attention was drawn by none other than the famous litterateur-cum-conservationist Dr. Poornachandra Tejasvi. This related to the issue of mining in the Western Ghat peak area of Kudremukh. The tenure of lease granted to the KIOCL had expired, yet mining operations continued, polluting the Bhadra water downstream.

The writer K P Tejasvi and a group including the HDWW D V Girish and journalist Girijashankar submitted a memorandum to me and forced me to accompany them to Nellibeedu and Balehonnur to inspect the quality of the Bhadra water. Ullas Karanth and Praveen Bharghav were fighting against the mining company through courts at Bangalore and Delhi. All of them wanted the mining activity by the KIOCL stopped forthwith.



The other issue was about encroachment of forest area for coffee cultivation. Since coffee cultivation requires shade, coffee saplings are planted on the wooded land without cutting trees. This process is difficult to detect. The area under coffee cultivation thus increases without a single tree having been cut. Public interest litigants had moved the high court against rampant unauthorized cultivation of coffee in the wooded areas. The high court had directed the Deputy Commissioner time and again to evict encroachments and to save the pristine forest cover of the Western Ghats by preventing unauthorized occupation. The DC had to respond initiating appropriate action.

Amidst my collectorate functions of “Reception, Collection and Election”, there emerged three other priority issues that required my attention in this Western Ghat hill district of Chikmagalur. These were (1) Relocation of villagers from BTR (2) Discontinuance of mining operations by KIOCL (3) Prevention of further encroachment of forest and thickly wooded government lands for cultivation. I silently committed to contribute my might to bring in a positive change.

Compared to my previous stints at Mandya and Tumkur, I found that the workload of the Deputy Commissioner at Chikmagalur in terms of pending files and court cases was lower. This gave me enough time to concentrate on the three priority issues of nature conservation despite an election to the zilla panchayat and the taluk panchayats in the district.

Conducting elections is the unique responsibility of the Deputy Commissioner. The DC supervises overall conduct of elections from filing of nominations, appointment and training of polling staff, finalizing polling station-wise voter lists, setting up of polling stations, deployment and movement of polling staff and material, collection of polled boxes, arranging for their security at taluk headquarters and finally organizing counting of votes and declaration of results. The whole process, done in a limited time frame and according to a set calendar involves a lot of travel, frequent meetings and inspections. Yet, during this period, the DC would be alone and free as every other subordinate and district officer would be drafted and entrusted with election work.

### **Project initiation**

During one of those days I was surprised to receive DV Girish, Yatish Kumar and Girijashankar. The topic of our conversation shifted to the relocation of people from the 16 villages within the BTR protected area. To my surprise the trio enthusiastically declared that they had convinced the inhabitants of the villages who were now willing to relocate. The trio had managed this impossible task within two months by holding village-level meetings, giving the villagers all the information about the resettlement project, its benefits such as compensation for their agricultural lands and houses at market rate and grant of land - not always equal in extent to their holdings lost but enough for their survival - and assistance to shift families lock, stock and barrel to the place of relocation. The assurance that what was due to them would be delivered without any cut and delay made them change their mind. Another reason for their willingness was non-execution of any development work such as roads and buildings in these villages after it was deemed a ‘Tiger Reserve’. It was now my responsibility to at least initiate the project implementation.



*MC Halli site inspection by Gopalakrishne Gowda with the DCF and other officers during Bhadra relocation. Photo credit : DV Girish*

The project had been lingering for a very long time and some of the land acquisition notifications had vitiated without any follow up. In a few cases a survey had to be conducted, lands and structures inspected and evaluated and awards were to be framed to determine compensation. But the Central Government which is supposed to bear the cost of land acquisition had not released the second installment for want of a utilization certificate. Secondly, the land reserved for relocation was to be divided into plots for grant to agriculturists and a layout plan was to be prepared for grant of house sites.

In order to oversee the implementation of the project, I requested the State Government to constitute a district level committee. My proposal was accepted by the government and a committee on resettlement was constituted with only official members. No public representative was included. I met the district minister and requested him to include a few MLAs of Chikmagalur district. But the minister was of the opinion that such a committee would only delay matters and advised me to hasten the process, while promising his whole-hearted support. Needless to say, I was the chairman of the committee and the minister kept his word till the end.

At its very first meeting, the committee took stock of the state of affairs and resolved to adopt a multi-pronged approach. The general talk so far of acquiring land and structures in the villages, awarding compensation to property losers, grant of land to agriculturists was to be reduced to specifics. In other words, the list of beneficiaries (land holders, agricultural laborers) had to be finalized. Vitiating land acquisition notifications were to be reissued. As the grant of equal extent

of land lost by big holders was not possible, a matrix had to be evolved considering the parity between land acquired and the land available for grant to the identified number of beneficiaries.

### **Drawing the list**

About 200 landless agricultural laborers were to be granted a minimum extent of land for their survival. The greatest difficulty in implementing a government project properly is finalizing the list of beneficiaries accurately. When grant of land involves several branches of a joint agriculturist family, members put up rival claims. The important task of drawing the list of beneficiaries was not entrusted to subordinate revenue and forest officials susceptible to political influence or pecuniary interest. It was jointly entrusted to the HDWW and DCF duo since they personally knew every family to be shifted. In record time, a list of beneficiaries was accurately finalized.

Two very important and time-consuming tasks to be achieved within the available time frame of my likely tenure in the district were (1) Land acquisition (2) Grant of sites and land to the families. Both these fell under the revenue domain and it was my responsibility to accelerate the process by cutting red tape and avoiding political interference. The land acquisition officer was none other than the Assistant Commissioner, Chikmagalur, working from the DC's office complex. He was my immediate subordinate, but in the capacity of land acquisition officer, he was a quasi-judicial independent authority and I would not interfere in his work. My only interest was to hasten the proceedings, eliminating delay at every stage.

Normally, in any land acquisition proceedings a preliminary notification under section 4(1) of the Land Acquisition Act is mandatory, followed by sufficient time to land holders to file objections against the acquisition. Only on the expiry of the time specified for filing objections, are all objections heard and a 5A enquiry report submitted to the government by the LAO, following which a decision is taken by the government on whether to proceed with the acquisition or drop the process.

In case the decision is taken to proceed with the acquisition, the extent of the lands notified would then be measured and a final notification under section 6(1) of the Land Acquisition Act published with prior approval of the state government. From my past experience as land acquisition officer for Kabini, Hemavati irrigation projects and Kali-hydro Electric project, I was aware that the process of hearing individual objections, submission of the 5A enquiry report, joint inspection and survey of structures and agricultural lands, drafting the final notification with details of ownership of land, and getting the final notification under section 6(1) approved from the state headquarters, takes years together.

I was also sure that unless the project is finally implemented during my tenure of 2 years it would go haywire without a proper follow-up. The Land Acquisition Officer and the Assistant Commissioner, though my immediate subordinate, knew the law well. Being aware that he was an independent quasi-judicial authority, he was not inclined to speed up the process and told the villagers that he had to follow every rule, each process and opportunity as enunciated in the law. Further, he had other responsibilities to accord priority to. In other words, he wanted to take

adequate time for every stage, thus delaying the process of land acquisition, the first compulsory and statutory step for eviction of people from the sanctuary. This approach of the LAO discouraged the villagers and caused resentment among them.



*Gopalakrishne Gowda with the villagers from Bhadra Tiger Reserve. Photo credit : DV Girish*

At the very next meeting of the committee I had to advise the LAO as how the process could be expedited without violating any law, rule or procedure. Firstly, since all the land holders and inhabitants of the villages had given in writing their consent for acquisition and stated that they had no objection, there was no need to wait for two months to reject the objections and to proceed with inspection of lands, structures and conduct a joint survey. Secondly, since every piece of land and every structure in each village would be acquired, there was no need for actual field survey of lands and structure. The RTC, Village Record of Rights and the village panchayats' khata and demand register of all structures would be enough to prepare the draft 6 (1) notification since they contain all the details about the extent of land structures as well as ownership.

### **Cutting the red tape**

Yet the AC was reluctant. I had to finally tell him that I was the 'award' approving authority and hence equally responsible for any lapse in the process, and not the land acquisition officer alone. Then the AC and the LAO had no reason to resist. Thus the red tape was cut, eliminating enormous delay in the process. But delay was inevitable at the government level where they had to process the final land acquisition notifications and the high value awards of projects across the state. At this stage, Yatish Kumar played an important role in visiting Bangalore frequently and pursuing the publication of the notification process methodically. He also played an important role in liasoning with the Forest and Finance departments at the state and the central level for release of funds towards payment of compensation to land and property owners.



On my part, I reviewed the progress almost every day by contacting the AC, DCF and the Honourable Wildlife Warden, and according approval to proposals received on the subject the same day itself. The compensation amount was paid to the villagers by cheque and deposited into their bank accounts. Since all land and structures were acquired without exception and award of compensation was determined uniformly for every class of land and kind of structure there was no political interference or any serious allegation about the process from any of the beneficiaries or public representatives.

The other major issue was of allotment of dwelling sites and plots of agricultural lands at M C Halli to beneficiaries. The committee deliberated at length and since land reserved and available for grant was to be judiciously utilized observing the tenets of social justice, without ignoring the interest of any affected family, the benefit of grant of land equal to the extent acquired was deprived to large holders. The committee resolved to grant a minimum extent of 20 guntas of irrigated land each to 200 families of landless agricultural laborers. A matrix was worked out for the land holders for grant of 1-acre, 3-acre and 5-acre land depending on the extent of land acquired from each family. No one was granted more than 5 acres of irrigated land or an equivalent extent of rain-fed land.

Delineation of sites for construction of dwelling units and demarcation of land into plots (1A 2A 3A) etc., involved the process of survey which would again take a considerable amount of time if the state department of survey and settlement was involved. In order to completely divide a thousand acres of land into plots, it would take at least a year using the traditional chain survey, while the manual process is an invitation for complaints as well as mistakes and lapses.

Yatish Kumar came up with the idea to adopt the geodetic survey involving computerization. While it was a costly process, it saved a lot of time and confusion. A separate colony was planned for landless laborers and 20G of plots demarcated and allotted. Housing was taken up under the 'Ashraya Scheme'. For others, a settlement next to the BH road was planned and sites distributed. Demarcation of agricultural land into 1A, 2A, 3A plots with independent sketches for each plot was also completed in record time.

### **Land survey and allotment**

The latest technology for survey of lands was adopted to avoid traditional surveyors who create more problems than they solve. Thanks to the foresight of the DCF we could finalize the demarcation of sites and agricultural plots without any loss of time. Finally, what remained was the allotment. Normally government departments organize a function inviting one or two ministers for a token distribution of title deeds to a select few and then shift the scene to the office, where clerks deal with people. But at that point, there were three ministers from the district.

We wanted to maintain utmost transparency during the distribution of dwelling sites and agriculture plots to eliminate allegations of any kind. We decided to allot sites and agriculture plots through a lottery system. Then the question arose as to who should draw the lottery. It was decided to allow the beneficiaries themselves to draw the lottery. Under each category of

beneficiaries such as landless agricultural laborers, small farmers and big farmers, the serial number of beneficiaries' dwelling sites and agricultural plots were recorded on pieces of paper, rolled up and kept in three separate bowls. Category-wise, the beneficiaries were called to the stage one by one and asked to pick three rolled slips, one from each of the three bowls. The picked slips would then be pinned together and opened, and the serial number of the beneficiary and the serial number of the agricultural plot and dwelling site were announced in the open. This process ensured that total transparency was followed in the distribution of sites and plots of agricultural land to the affected people and any sort of political influence or official favor was totally avoided.

As luck would have it a prominent Congress leader's family from Madla village got a plot of 3A agricultural land, a part of which contained rock formation. He moved heaven and earth to get the plot number changed. We did not meet his demand since doing so would jeopardize the interest of some other person. We advised the leader to quarry out the rock and sell stones to the neighboring beneficiaries who would need them to lay foundation for their houses.

### **Eviction from forest**

The next stage was the actual physical eviction of villagers from their houses. After receiving compensation for their lands, structures and securing title deeds for sites and agricultural land at M C Halli, the villagers had no right to stay in the PA even for a night. But this process of eviction was not easy to achieve as the villagers delayed the process offering one excuse or another. In fact, I had to curtly order the demolition of houses to facilitate early exit of the villagers to the rehabilitation centre at M C Halli. Again Yatish Kumar, the DCF, accelerated the process by promising transport arrangement for the excavated material from demolished houses, and belongings of each family. A fleet of vehicles was hired for the purpose. Only then the process of actual eviction and shifting of families commenced.

After the excavated material reached the new settlement, the construction of houses by individual farmers started. Ashraya homes were ready for occupation by landless agricultural laborer families. Their houses were situated very close to the agricultural plots allotted to them. They were the first to be happily relocated.

Site allotment and grant order of agricultural lands to the affected people and the consequent title deeds were signed by me in the capacity of the Deputy Commissioner of the District. Since five acres of irrigated land could not be granted due to non-availability at M C Halli, an equivalent extent of dry land (C&D class) along with sites within Kelaguru village limits of Chikmagalur taluk were granted to about 50 families of agriculturists following a similar process. These lands were developed for coffee and spices cultivation by the families.

After grant of land and title deeds the names of grantees with the extent of land granted to them should be entered in the village record of rights and RTC issued in their favor. While the mutation of land grant rights was done without any problem in Chikmagalur taluk by the Tahsildar in respect of Kelaguru lands, the process was not done in respect of lands granted within the M C Halli village limits by the Tahsildar of Tarikere taluk. This was under the

influence of the local MLA who was opposed to the project tooth and nail and was obstructing it physically and officially at every stage. Then I had to rope in the Assistant Commissioner of Tarikere, bypassing the Tahsildar, a stooge of the local MLA.

Though the project could be pushed through during my tenure of two years as Deputy Commissioner, the entire process was not a smooth affair despite the whole-hearted support from the government (including the chief minister and the district minister). Hurdles were created by the local MLAs every now and then.

### **Politics of the land**

A peculiarity of this rehabilitation project was that the settlement from which the people were to be evicted, in other words the portion of the tiger reserve, was within the jurisdiction of Chikmagalur and Sringeri Assembly constituencies whereas the land reserved for relocation fell within another Assembly constituency viz., Tarikere. Two MLAs, though belonging to the ruling Congress party at that point of time, were opposed to the implementation of the project.

To politicians, successful implementation of the project meant shifting more than 1,000 voters from one constituency to other. While the Chikmagalur MLA, the transport minister at that point of time, wanted the whole project to be implemented under his control, the Tarikere MLA was reluctant to admit fresh voters into his constituency and totally opposed the distribution of land and house sites to beneficiaries from outside the taluk in his area. The Tarikere MLA had virtually assumed ownership of the land reserved for relocation by the government. He wanted at least some portion of the land to be granted to the families residing at Tarikere taluks as per his wish list. We could not meet this demand and hence the opposition.

Even his political opponent and a defeated candidate from the rival political party joined the local MLA in opposing the project tooth and nail. In fact, they jointly organized a bandh of Tarikere town against the district minister and the deputy commissioner and burnt our effigies. They joined hands and started opposing every move of ours. They incited people to destroy the fence raised by us to demarcate the boundary of the reserved land. I wanted to get the local MLA arrested, and the superintendent of police concurred. But the instructions from the state capital were to do anything and everything for the implementation of the project, except arresting the local MLA.

The MLA was powerful and all the Tarikere local officers were posted at his behest and they blindly obeyed him. The taluk executive magistrate and the tahsildar was no different. Under the influence of the MLA he pleaded helplessness to effect the mutation of rights into land records in favour of the grantee displaced families. I was eager to put the grantees into possession by creating an RTC in their favour to facilitate their cultivation of lands immediately.

The local MLA set up pressure groups of landless agricultural laborers and writ petitions against the deputy commissioner were filed in the high court every week. We had to be alert and defend the land grants made in favor of affected families evicted from the tiger reserve. The project implementation team would meet every day in the evening to take stock of the situation at the ground level in old and new settlements and at the high court at Bangalore.

All of us, the DC, DFO, SP, AC, HDWW, took personal interest in the matter and countered every mischief of the local MLA and ex-MLA to scuttle the project. We took quick decisions so that the evicted families could get legal possession of the granted houses, house sites and plots of cultivable land. The sincere service rendered by the Tarikere AC in recording RTC entries in favor of the displaced families over-ruling the Tahsildar's objections and the pace with which the beneficiary families were shifted with their belongings from old settlements to the relocation village in three days by the DCF Bhadra and the HDWW was the laudable climax of the project.

Thus we were able to overcome every hurdle created by the local MLA and put the people displaced from the tiger reserve in physical possession of alternative land and sites. I am of the opinion that unless one takes personal interest and monitors the progress every day and hour, assuming overall personal responsibility, it is impossible to implement such a project.

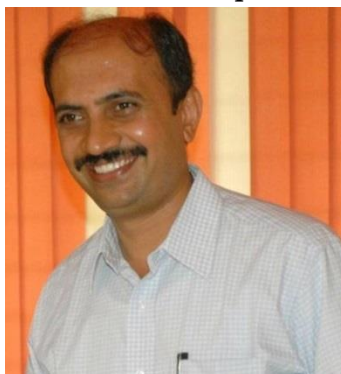
*(The author was Deputy Commissioner, Chikmagalur and played a big role in ensuring the success of Bhadra relocation project)*



## Bhadra Relocation - *lessons learnt*

*Yatish Kumar*

*Deputy Conservator of Forest, Karnataka Forest Department*



Relocation of people from any place is a very sensitive and emotional process, especially when the whole village is being relocated. The Bhadra story was no exception.

Bhadra lies in the coffee district of Chikmagalur district. It is part of the Western Ghats and endowed with rich flora and fauna. In 1974 the State Govt. declared an area of 492.46 sq kms as Bhadra Wildlife Sanctuary. With the construction of the Bhadra dam at Lakkavalli across the river, the villages of Hebbe, Madla and Hipla were cut off from the main cities like NR Pura and Chikmagalur. This led the Govt. to decide these villages should be relocated from Bhadra Wildlife Sanctuary, but nothing much happened with regard to the decision for some time.

In 1996, the forest department and district authorities for the first time surveyed all the villages and prepared a basic document including all the land holdings and properties of the villagers and estimated the cost of the relocation. This document was the first step.

Relocation is a two-step process where a person's land is acquired first and then he/she is rehabilitated elsewhere with all basic facilities. Since the lands were to be acquired first, the revenue department demanded that a quarter of the cost of acquisition be deposited with it before starting the process of acquisition, as per the Land Acquisition Act. Towards this, the State Govt. requested the Centre to release money for acquisition. The Centre sought an agreement with the State wherein it would assist in acquisition but the State should take up the responsibility of rehabilitation. Thus in 1996, an agreement was reached stating that the Centre would release the amount for acquisition and the State would bear the rehabilitation cost. The Govt of India released an amount of Rs. 1.68 crores to the State Govt. The amount should have been transferred to the revenue department for acquisition and then to the DC, Chikmagalur for initiating acquisition. But while a Govt. order was issued for transferring the amount to the RD, nothing else was done.

I took charge of Bhadra Wildlife Division in 1998 and started enquiring about that money. I soon realized that the money was still lying with the State exchequer and to utilize it we needed revalidation from the Govt. of India. This was obtained by the end of March 1999 and an amount

of Rs. 1.68 crores from the Centre and Rs. 50 lakhs from the State was deposited with the DC, Chikmagalur on Mach 31<sup>st</sup> 1999. The DC now issued Section 4(1) notification for acquisition of lands at Hebbe and Madla villages. This set the ball rolling in the process of relocation.



*Representative image: People carrying firewood inside forest. Photo credit : Conservation India*

Relocation of people from the forest will no doubt benefit wildlife in that area, but the benefit to people is greater and this needs to be communicated to them properly.

Relocation is a process that needs to be dealt with a human touch. More than what is actually allotted to the people, how this is given is very important for the success of the project. We cannot compensate for the emotional attachment they have with their forefathers' land nor for the memories. Hence, care should be taken in addressing the issue.

With the process of acquisition begun, we wanted to have a rehabilitation package approved by the Govt. This process was discussed at the district by involving all stakeholders and a generous package was prepared. The proposal was sent to the Govt. for approval, but again things remained dormant with no action. Then, I realized that without personal involvement and perseverance, nothing would move in the Govt. Taking the help of my senior officers, we got the rehabilitation package approved by a High-Power Committee in March, 2001.

Meanwhile, the people of Bhadra were opposing the relocation process, fearing that they would become homeless and be abandoned by the Govt. They had heard about earlier dam relocation stories where people had suffered. Hence, convincing them to agree to relocation was a challenge. First, we had to win their confidence and convince them that we were genuinely interested in their good. We could achieve this by providing basic drinking water facilities, solar

light and some other welfare measures within our capacity. As a result, they slowly started developing confidence in us and we were able to convince them that relocation was in their own interest, a once-in-a-lifetime opportunity to start a new life. Slowly they accepted the idea.



*MC Halli site inspection by Yatish Kumar with the DC and other officers during Bhadra relocation.  
Photo credit : D V Girish*

Now that the relocation package was in place and the people were ready to move out, it was important to expedite the implementation of the package. Normally the acquisition amount is paid to families through the Govt. treasuries, but this often results in delays and hardships to the affected families. Hence, the DC instructed the land acquisition officer (Asst-Com) to disburse the acquisition amount through crossed cheques. This ensured speedy disbursal of money to the beneficiaries.

The lands identified for rehabilitation were next surveyed and a plan prepared for accommodating all the affected families strategically, in a short time. It was transferred from paper to the ground with the latest technology and the plots demarcated. These plots were distributed to all the families through a lottery system in a transparent manner.

The identification of the families living inside the Bhadra Tiger Reserve was done with the help of local NGOs, and then discussed with all the villagers and the list was finalized. The list formed the basis for provision of all future facilities. The implementation of the project was taken on a war footing. We had to face a lot of local and bureaucratic hurdles, all of which were overcome by timely intervention and by going the extra mile.

The process of implementation taught us new lessons at every step and we were able to overcome all of them with a positive approach and support from like-minded people within the Govt. and outside.

It is very difficult to now list out all the hurdles but suffice it to say we overcame them. However, some of the major issues must be listed out for future reference of individuals involved in implementing relocation projects. But rather than merely listing out the problems, the approach needs to be highlighted. I have done this here below:

- 1) A human touch is a must in all planning and during the implementation.
- 2) We should maintain a positive attitude during the implementation, because there are bound to be many hurdles which can dampen the mood and lead one to think the task is impossible. It helps to keep the faith in the almighty who will show us the way. We often encountered such dead ends but miraculously the hurdles were cleared.
- 3) Perseverance and personal involvement at every step is the key element in successful implementation, especially when working with the Govt.
- 4) Teamwork is the essence of success. Since the work involves coordinating with different departments within the Govt., we should go beyond the limitations of our ego and be willing to communicate personally with people in every other department to get the required help from them.
- 5) We need to co-ordinate within the department, since it involves corresponding with the State and Central governments at every stage. Unless there is personal rapport with the higher officers within the department, both at the State and Centre, it is very difficult to implement the project successfully.
- 6) We should be ready to go the extra mile in helping the affected families. Since not everything can be put down in the rules and regulations, there will be situations where you are forced to think differently. We encountered many such situations, wherein we were able to help them while on the move. This increased our credibility and helped gain their confidence.
- 7) We should not care about who gets the credit for the success of the project. If bothered on that count, subconsciously we may end up blocking many opportunities. This could determine whether the project is a success or a failure.
- 8) At every stage transparency must be maintained. All the families received their compensation amount to the tune of Rs. 50 lakhs at their doorstep and without much hassles. Even the rehabilitation benefits were handed to them with a sense of honour and dignity. This helped maintain the clean image of the project.
- 9) Always try to dovetail other facilities available from the government to downtrodden families in a constructive way. We were able to build 203 houses for landless families by availing benefits from other schemes. In a span of three months, these units were ready for occupation.
- 10) Help the people with local farming techniques and other livelihood strategies by bringing in experts in those fields. This inspires confidence in starting a new life in a new place.



11) Lastly, we need dedicated officers and staff to implement these kinds of projects. We need to work beyond the call of duty to make the project a success.

The Bhadra relocation project has been a great teacher for me personally. It has taught me to look at people living in the forests with empathy. It has totally transformed my thinking about conservation. Conservation efforts without involving the people living in the forests is doomed to fail miserably. It has reinforced in me the confidence that implementation becomes possible provided we take the effort to listen and solve the problems of the local people. Finally, if forests and wildlife have to be saved in our country, it is possible only with the help of the local people living in the forests.

*(The author was Deputy Conservator of Forest, Bhadra Wildlife Division, Chikmagalur and played a big role in ensuring the success of Bhadra relocation project)*

## From a dream to reality – *the Bhadra relocation struggle*

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*Written by D V Girish*

*Founder of Bhadra Wildlife Conservation Trust and Wildlife Conservation Action Team –  
Chikmagalur*



I first visited Bhadra Wildlife Sanctuary in 1978 as a young boy interested in wildlife without much insight. Subsequently most of my trips to the park between 1978 and 1985 were when I was escorted and guided by parents, my school or scouting trips. Slowly my interest and knowledge about wildlife broadened. The understanding and love for all things wild was enriched and nurtured during those formative years. Soon enough when I became independent and was able to travel on my own and sometimes with a few like-minded friends, the explorative trips to the forests and mountains increased manifold, all the time with meager allowances and many hardships.

With knowledge, understanding and awareness, our love and a sense of belongingness increased and we slowly started noticing problems and threats to wildlife. While we greatly enjoyed birding, tree identification and watching wildlife, exploring new areas and new species, making trips to the forest helped to understand better the various aspects of wildlife and their ecology.

The other world of management and people and their life in the forest was also unfolding and it was stark. We started feeling the threats and realized wildlife was the last priority for authorities.

We were familiar with many villagers and interacted with them regularly. Listening to them and their stories, their life and problems, joys and sorrows, we did what we could to help them and offered whatever we could.

While we enjoyed the marvels and beauty of nature, what was unravelling was also the assault and wanton destruction by man. Cultivations in the forest that led to clearing of large patches, logging, cattle grazing, hunting, wood and bamboo extraction, fire and burning forests,

extraction of non-timber produce like honey, gooseberries, soap nut, shikakai, plants and herbs; diverting natural streams, depriving wildlife of limited and precious resources for survival, incursion of roads into the forest with the accompanying movement of people inside; it was all disturbing and enlightening.



*Sambar herd inside Bhadra Tiger Reserve. Photo credit : Ng Bishwanath Singh*

We became aware of the proposal to rehabilitate people from the Bhadra reserve and decided to pitch in and contribute what we could to the process. We started interacting with people and seeking their opinion about moving out to a life outside the forest. Some of us who were involved kept track of the paperwork and progress of the proposal. We intervened for the rehabilitation at any and every opportunity, pushing the idea at all forums.

To give an understanding of the process, we can begin with the demography of the villages. Around 920 acres of land had been reserved for occupation when people were settled in the forests as part of the grow-more-food campaign. But after encroachment, the total area occupied was around 1200 acres. 463 families spread over 13 villages cultivated the land which fell in the Muthodi subdivision of Muthodi and Hebbe ranges of Bhadra Wildlife Sanctuary.

The first notification of a reserve forest in 1915 referred to a village Madla with a population of 36. Most of the other families were settlers and composed mainly of people who came as contractors with their teams to work for the forest department, in silvicultural activities, timber extraction, charring coal, preparing teak plantations and maintaining them, etc.

The people we generally met were from the working class, farm hands and labourers. The small land holders were not very different from them. There were very few big land owners who were mostly residing outside the forest who had invested in land and housing outside the forest areas. About half of the population was landless.

Details of villagers from Bhadra Tiger Reserve							
Sl No	Village	> 5 acres	5-2 acres	2-1 acres	< 1 acre	Landless and farm workers	Total
1	Hebbe, Kanchigaru, Kurkulamane	2	24	19	1	31	77
2	Madla, Dabgaru, Vaddihatti, Hirebellu, Hegguru, Matvani	12	44	42	42	59	199
3	Hippla, Karvane	8	13	23	2	38	84
4	Kesave, Muthodi	6	7	12	13	25	63
5	Bidare (Pardesappan Matha)	2	7	0	0	9	18
	<b>Total</b>	<b>31</b>	<b>95</b>	<b>96</b>	<b>58</b>	<b>162</b>	<b>442</b>

\* With additional adult members in some families, the total was increased to 463.

\* Relocation of 13 villages has been fully completed.

Other than working as farm hands and growing crops, or barter-working in each other's fields and seasonally working for the forest department as fire watchers and labourers, or walking miles together out of the park to work in surrounding coffee estates and paddy farms, there was very little job opportunity.

In terms of education there were a couple of primary schools for the 13 villages. Higher education meant long walks out of the sanctuary or being put up in hostels or with relatives in nearby towns. Perhaps this was the reason why there were very few who had pursued any level of higher education.

Social interactions were severely limited owing to the distances and the forest. As a result, the people were isolated in their villages so much so that finding marriage alliances became very difficult. Marriages and deaths were the only occasions when families reached out of their villages. Feudal domination was another issue with the landless and labor class being subjugated by the few landlords.

With very little access to markets, even accessing efficient farming equipment was difficult. Marketing products was the biggest challenge. To procure household products it meant visiting the nearest town, a trip that needed elaborate planning and travel.

Most of the people cultivated or worked as rice paddy growers, few had areca nut and fewer had cultivated coffee. A couple of them had tried rubber growing too. No other crops were available for consumption within the villages.

Human wildlife conflict was part of the daily routine. Encountering wildlife, the constant fear and uncertainty around living in a forest, especially when children had to walk through the forest, crossing rivers and streams to reach school, was a daily affair. Crop loss caused by wildlife too was a regular casualty as a result of which elephants, gaurs, deer, pigs were not objects of affection or concern but perceived as the enemy. Prized cattle or milch cows, and



much-treasured draft bulls were lost to tigers or leopards. Retaliatory killing by poisoning cattle carcasses or shooting crop raiding animals were common, though not talked about. Harmonious living with the forest and wildlife was nothing more than a convenient theory.

Hunting for pot was common, known but mostly ignored by authorities. Life in the village almost bordered on lawlessness in administrative terms, with people following the jungle law.

In terms of entertainment there was pretty much nothing besides the radio. Communication too was nil. There was no electricity in the forest and with dusk it was time to abandon activities and retire for the day. Practices like using firewood for cooking, etc and the inhalation of smoke were detrimental to health. It was a day to day living that the forest allowed with no provision for future dreams and ambitions. The elders clearly did not want their children to continue in the forest given the many uncertainties and fears.

### **Process**

The initial survey was done in 1989 with another one and a formal proposal for relocation put up later in 1992. This became the base for us to move forward.



*DV Girish and team engaged in a field survey at Bhadra Tiger Reserve. Photo credit : DV Girish*

We started interacting with officers at various levels; the local officers of both revenue and forest department had to be convinced and informed about the project needs while interaction with the village people had to be direct and open. We feared all kinds of sabotaging efforts from many fronts and prepared ourselves for it.

Our interactions with state level officers were discouraging at best. I personally felt it was something impossible to persuade them to push the project but kept trying nevertheless. The most important person to take it forward and push it had to be the Deputy Commissioner as also the Deputy Conservator of Forests, Bhadra.

The year 1996 was a good one as we had a good politician, a Gandhian, in-charge of our district, (Govinde Gowda). We met him and explained the need and benefits of the project. We also had a good DC in Chikmagalur in I S N Prasad who understood the need of the project and was interested in taking it forward and the DCFs Bhadra (Lokanath and Parameswar) who were keen and wanted to start the process.

Though the project was approved by the government at the centre, and a quarter of its share of money to acquire lands was allotted by the finance department, it never reached the government of Karnataka as there was no commitment from the state. The first breakthrough came in the form of a letter of commitment from the state government of Karnataka, which the DC managed to get and communicated to the MoEF -- a letter stating that the government of Karnataka would take up the rehabilitation of the villages inside Bhadra Wildlife Sanctuary, if the Government of India provided funding for the acquisition of the villages. After 15 years from the date of submission of the relocation proposal, we had something that encouraged us to go forward.

In 1998, Yatish Kumar was posted as DCF Bhadra. He took some time to understand the issues related to Bhadra and placed the relocation as his priority. He promised us that he would try his best and make a sincere effort to move this project forward.

The initial paperwork was prepared and while we were continuously engaged at different levels, things started falling in place. It was a wonderful effort to engage at all levels and make it happen. The committed amount finally reached the DCF's office and in turn was deposited with the DC. This was 1999 and what was a project on paper finally seemed to be taking shape on ground. The DC began the paperwork and started the process of acquisition of the villages in Bhadra. These were spread in two taluks and the most interior village was Hebbe which had most vocally been demanding for the rehabilitation. The first notifications were published by the then DC Manjunath.

The rehabilitation package had to be approved by the state government based on good practices in many other acquisition and rehabilitation packages announced by the governments. Meanwhile we talked to the politicians from our district about the process and were able to garner their support and assistance for the project. We had two different governments at the state since we began the process in 1996 as also at the Centre. We managed to keep it going at both levels, thanks to some well-meaning people.

Continuous interaction with the people helped us to reach them with the acquisition process, to explain the rehabilitation process, the money and facilities they would get, the civic amenities

that would be provided at the new site, etc. We even organized a trip to the rehabilitation sites to show them the land and sites to make them comfortable and disprove rumours and fears.

The survey and designing of plots and land was very scientifically done using the best possible survey equipment and methods. Once we had the number of plots and sites required, based on the possession of land and housing inside the forest, a Computer Aided Design (CAD) was employed to make the number and sizes of plots and sites at M C Halli and Kelagur. Some additions were eventually carried out to accommodate people based on their demand and needs. One of the highlights was the building up of 203 houses under the housing corporation for the landless families, utilizing the rehabilitation grant money.

**Plot allocation details :**

<b>Residential plot allocation</b>					
<b>Relocated village</b>	<b>90X60 ft</b>	<b>80X50 ft</b>	<b>50X40 ft</b>	<b>Odd size</b>	<b>Total</b>
MC Halli	19	128	294	2	443
Kelagur	12	58	0	10	80
<b>Total</b>	<b>31</b>	<b>186</b>	<b>294</b>	<b>12</b>	<b>523</b>

<b>Agricultural plot allocation</b>							
<b>Relocated village</b>	<b>10 acres</b>	<b>5 acres</b>	<b>4 acres</b>	<b>3 acres</b>	<b>2 acres</b>	<b>1 acre</b>	<b>Total</b>
MC Halli	0	18	0	81	89	226	414
Kelagur	7	36	32	0	0	0	75
<b>Total</b>	<b>7</b>	<b>54</b>	<b>32</b>	<b>81</b>	<b>89</b>	<b>226</b>	<b>489</b>

**The challenges**

Prior to rehabilitation, we had conducted a survey of residents to note how many resided within the forest and how many owned properties inside but lived outside, how many were landless residents, etc. This was done with the consultation of residents in each village.

Ensuring no misuse of the project when it was announced and when applications were invited from residents, we saw that the number of residents had almost doubled. However since we already had the list of residents well categorized, it was easy to filter out the fake applications. We also went to each village and met everybody in person and finalised the list of residents.

There was need to handhold people who were innocent and had no idea of the outside world. We ensured the package reached every person in full. This also meant making sure the money was not misused or taken away by middlemen and operators. Hence it was deposited into their bank accounts that were opened after ensuring joint operation among family members. Temporary camps were established to feed and house the men from the community who were encouraged to take possession of their lands early. By being present and supporting them 24x7 we could give the rehabilitated villagers confidence and support in cultivating in the new areas. Help was enlisted from all quarters including petrol bunk and tractor owners who pitched in and helped with deferred payment.

Support came from the administration, police and politicians when the rehabilitated people were threatened or their new farms were damaged. Legal assistance and support was provided to families facing problems. Self-help groups were organized to involve people to diversify and invest in small savings, etc.

After the actual move, some of us continued to monitor the situation and ensure that the lives of those rehabilitated went on smoothly. In the end the reward came in the satisfaction that we had helped a few hundreds of people to take the first few steps towards a better life. A life with no constant fear of attack or loss of crops, a life where basic amenities were available and at arm's distance (almost!), a life where aspirations of the people and their desire for a better life for their progeny materialised.



*DV Girish interacting with a relocation beneficiary at MC Halli. Photo credit : D V Girish*

Years after the people moved out of the forest, it was equally heartening to see how the flora and fauna which had been impacted began to revive. Sloth bears began to frequent these parts of the reserve while tiger numbers showed. The bamboo began to flourish.

*(The author was the Honorary Wildlife Warden, Chikmagalur District and played a big role in ensuring the success of Bhadra relocation project)*



# **PUBLICATIONS**

# **BHADRA WILDLIFE SANCTUARY**

## **BRIEF NOTE ON BHADRA REHABILITATION PROJECT**

1. The Bhadra Wildlife Sanctuary extends over an area of 492.46 Sq. Kms., in the Districts of Chickmagalur and Shimoga. The initial Notification declaring Bhadra Wildlife Sanctuary was issued by State Government vide G. O. No. AFD 25 FWL 74 dated: 06-09-1974 (Annexure -A) and the final Notification was issued in the year 1998 vide G. O. No. FEE 58 FWL 96 dated 09-03-1998. Realising the ecological importance and the potential to support high-density faunal populations, this sanctuary has been upgraded to the status of Project Tiger Reserve by the Government of India on November 19, 1998. There are 16 villages inside the Bhadra Wildlife Sanctuary, comprising of 736 families. A project was prepared by the Deputy Commissioner, Chickmagalur in the year 1992 to acquire 861.00 acres of Revenue Land of these villagers and rehabilitate them outside the sanctuary at an estimated cost of Rs. 12.76 Crores. ( Rs. 7.02 for Acquisition and Rs. 5.74 Crores for Rehabilitation ) and this project was submitted to the Government for approval.
2. The Deputy Commissioner, Chickmagalur was directed by the Government to calculate the acquisition and rehabilitation cost as per the current rates. As per the directions of the Government, the Deputy Commissioner, Chickmagalur has revised the acquisition cost to Rs. 13.00 Crores and the rehabilitation cost to Rs. 4.65 Crores and has submitted to the Government for approval. The State Government has approved the rehabilitation package and has agreed to meet the cost of rehabilitation vide G.O. No. RD.69.REH.97, dated: 28.03.2001. Government of India is meeting the cost of acquisition. The Government of India has so far released 9.68 crores for acquisition and the State Government has released 2.50 crores for rehabilitation. The 16 villages: -

&lt; 2 &gt;

Villages	No. of families for the purpose of Rehabilitation benefits	Extent of land to be acquired (in Acres)
1. Hebbe	97	99.7
2. Madla	159	250.15
3. Hipla	98	143.46
4. Kesave	60	85.25
5. Muthodi	36	34.23
6. Karuvane	52	106.00
7. Madla - Waddihatti	51	17.62
8. Hebbe-Kurkulmane	7	5.00
9. Bidare	12	7.20
10. Shiragola	2	-
11. Balegadde	20	33.22
12. Mutt	24	17.49
13. Hunasekatte	15	-
14. Heggarmattuvane	68	1.1
15. Kanchagar	7	-
16. Madhuguni	28	60.87
<b>Total:</b>	<b>736</b>	<b>861.29</b>

3. The Cost of Rehabilitation package approved by the State Government as follows: -

SL. No.	Details	Amount ( Rs. in lakhs ) Expected budget	Remarks
1.	Exgratia payment for displaced families (736 families)	152.30 Tentative	Package being worked out
2.	Cost of Infrastructure at Rehabilitation centre.		
	a. Construction of School Building	10.00	
	b. Road network including drainage	51.00	
	c. Burial grounds & recreation park	6.00	
	d. Shopping complex	5.00	
	e. Bus Shelter	1.00	
	f. Temple	3.00	
	g. Water supply	33.00	

&lt; 3 &gt;

3.	Providing Electricity	100.00	
4.	Transportation cost at Rs. 5000/- per displaced family (736 families )	36.80	
5.	Dispensary and Veterinary Dispensary	25.00	
	<b>Total:</b>	<b>423.10</b>	
6.	Contingency & Administrative Overheads at 10% of total	42.31	
	<b>Grand Total:</b>	<b>465.41</b>	

4. The process of Acquisition was started by issuing 4(1) notification under Land Acquisition Act to the villages of Hebbe, Madla, Hebbe-Kurkulmane on 24-05-1999. Subsequently 4(1) notification has been issued for other villages and process of Acquisition has been completed and also the State Government has approved the awards for these villages. Details of award approved and distributed to the villagers is as follows: -

SL. No.	Villages	Award approved
1.	Hebbe (Hebbe Kurkulmane Kanchigar Colony)	1.19 Crores
2.	Madla (Heggar Mathvani, Waddihatti)	2.89 Crores
3.	Hipla (Karvane)	2.24 Crores
4.	Kesave (Muthodi)	1.30 Crores
5.	Cost of Buildings in all these villages	1.58 Crores
	<b>Total</b>	<b>9.20 Crores</b>

#### 5. Rehabilitation:

The Villagers of these villages have been relocated at 2 places viz. M.C. halli in Tarikere Taluk and Kelagoor in Chikmagalur Taluk.



&lt; 4 &gt;

The details of land granted at M.C. Halli and Kelagoor as per the Government Order.

SL. No.	Place of Grant	No. of Families	Total extent granted
1.	M.C. Halli	367	637 Acres
2.	Kelagoor	71	376 Acres
	<b>Total:</b>	<b>438</b>	

The details of families identified for Rehabilitation package

SL. No.	Name of the Village	No. Of Families	Extent of land granted at M.C.Halli	Extent of land granted at Kelagoor
1.	Hebbe	75	148.00 Acres	-
2.	Madla	205	363.00 Acres	40.00 Acres
3.	Hipla	79	64.00 Acres	163.00 Acres
4.	Kesave	58	48.00 Acres	115.00 Acres
5.	Shiragola	1	-	10.00 Acres
6.	P. Matta	20	14.00 Acres	48.00 Acres
	<b>Total:</b>	<b>438</b>	<b>637.00 Acres</b>	<b>376.00 Acres</b>

These lands are already under cultivation with paddy and Sugar cane Crops at M.C. Halli. Some of the villagers have already harvested one crop in the allotted lands at M.C. Halli. At M.C. Halli 202 houses have been built for landless and below one-acre villagers with the help of Rajiv Gandhi Rural Housing Corporation Limited. Already all these houses have been occupied by the rehabilitated families.

6. Action has been taken to provide drinking water facility at the centers. Also Electricity has been provided at the center, other facilities like school building and supply of ration cards under public distribution system has been issued for these families.

Samrakshan Trust, in collaboration with ERM India, has been commissioned by the World Bank to carry out the process documentation on Land Acquisition (LA) and Resettlement & Rehabilitation (R&R) in Transport and Parks & Sanctuaries sector in India. The Bhadra Wildlife Sanctuary Acquisition and Rehabilitation project, implemented by the District Collector, Chikmagalur along with the Karnataka Forest Department, has been selected as a case study in the conservation sector for the proposed study. This report captures the background, context, processes and outcomes and draws out key lessons, constraints and success stories of the project.

### **1.1 OBJECTIVES OF THE STUDY**

The process documentation on land acquisition and resettlement & rehabilitation in the Bhadra Wildlife Sanctuary (BWLS) in the state of Karnataka is aimed at documenting the outcomes of LA and R&R activities undertaken by the Karnataka Forest Department and the Office of the District Collector, Chikmagalur, with a focus on measures undertaken to address the social adverse impacts during different stages of the project cycle.

The specific objectives of the consultancy assignment are-

- To document the process adopted for LA and R&R by the project authorities to ensure mitigation/ minimization of adverse impacts
- To document the good experiences, the success stories and the best practices adopted in eliciting participation/collaboration with affected, ensuring transparency, restoring livelihoods, addressing equity issues etc
- To document the failures and the possible reasons and constraints for the ineffective R&R
- To draw parallels from the different studies and come up with a document on “best practices of LA and R&R”

### **1.2 SCOPE OF WORK**

The scope of work focussed on

- How was the social impact assessments carried out, including the preparation of Land acquisition and R&R framework to address adverse impacts of all affected including those with unclear title during the design of the project. How and to what extent were the outputs from social impact assessment integrated in the design of the project i.e. feasibility analysis, detailed design including budgetary provisions?
- What was the approach adopted and how was the process followed to ensure participation of affected and other stakeholders leading to a transparent mechanism i.e. disseminate information, consult, collaborate and extension of choice – on compensatory measures, relocation and rehabilitation.

- What was the organizational structure for carrying out the social impact assessments and consultation during the planning stage?
- How was the monitoring system designed for progress monitoring, including which indicators were included and what the reporting system was. How were the outputs from the monitoring system used for taking decisions at the planning stage?
- What was the mechanism set up in the design for addressal of grievances and how were grievances addressed during the planning stage?

*Implementation and Monitoring:*

- How was implementation of Land Acquisition and R&R framework carried out? To what extent was the framework included in the design actually implemented?
- What process was followed for disbursement of LA and R&R assistance, and was the package offered acceptable to the people?
- What was the process adopted for relocation for housing and commercial establishment, including identification of sites or providing alternate sites, support provided for resettlement?
- To what extent was restoration of livelihood addressed, and how?
- What was the time line provided in the plans to implement LA and R&R and how long it actually took to complete the LA and R&R?
- What were the institutional arrangement including coordination with other agencies, NGOs and the capacity to implement LA and R&R, address grievances and monitor the program, including which indicators were used.
- How did the process of implementation enable the project authorities to collaborate with affected people, adopt transparent practices, restore livelihood of the affected people and address equity.

### **1.3**

#### ***APPROACH AND METHODOLOGY***

Samrakshan's approach to the study was based on its understanding of the LA and R&R issues typically associated with wildlife conservation projects. In conducting the study Samrakshan made use of its technical skills, previous experience and local/regional knowledge of issues related to conservation-induced displacement and rehabilitation. The approach involved consultations, discussions and field verification with stakeholders to understand the processes and practices involved in the implementation of the project.

#### **1.3.1**

##### ***Phase I: Project Inception***

###### *Team mobilization and Kick-off meeting*

A 3-member team was constituted, consisting of an R&R Specialist, a Process Documentation Specialist and the Project Coordinator. Of these, the Process Documentation Specialist was local to the area and also served as the translator for local language documents. A team-briefing meeting was held in the ERM office, where the Project Coordinator represented the Samrakshan team. In this meeting, the objectives of the assignment and the methodology to

be adopted, as well as the project schedule were finalized between Samrakshan and ERM.

Meetings and discussions were also held with the World Bank representatives to understand the context and background of the project, the key expectations and outcomes of the study. The Samrakshan-ERM Team also briefed the Bank regarding the approach to the study, the team members and the tentative schedule of activities.

#### *Desk Review of secondary literature*

Samrakshan established contact with the project proponents (the Karnataka Forest Department) and also conducted a desk review of the available documents and secondary literature to understand the background of the project, the socio - political as well as administrative setting and the broad issues surrounding the project and its implementation. The desk review concentrated on documents available on the internet, websites of various NGO's, research papers, website of the project proponent, archives of newspapers and magazines, documents procured from the project proponents, and documents procured from the field based NGOs. A list of the main documents and other reference material reviewed is available at **Annexure A**.

Tools for the field visit were developed at this stage and shared with the client. These included checklists for carrying out FGDs and individual interviews with different groups and stakeholders, village-level checklists, urban area checklists and documentation formats.

An inception report capturing the approach and methodology, the work plan, tools and techniques and our understanding of the project was submitted by Samrakshan -ERM to the client.

<p><b>Approach and Methodology</b></p> <p><b>Step I:</b></p> <ul style="list-style-type: none"><li>• Initial consultations with World bank and MoRD</li><li>• Review of Secondary literature</li></ul> <p><b>Step II:</b></p> <ul style="list-style-type: none"><li>• Field Consultations with primary and secondary stakeholders (KFD, LAO office, District collectorate office, local NGO, contractors, PAFs across all villages and categories, PRI representatives etc)</li></ul> <p><b>Step III:</b></p> <ul style="list-style-type: none"><li>• Feedback, analysis and reporting</li></ul> <p><b>Step IV:</b></p> <ul style="list-style-type: none"><li>• Presentation and feedback to MoRD and the World Bank</li></ul>
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### **1.3.2 Phase II; Field Visits**

#### *Field Survey and consultations*

Using the tools and questionnaires, and information collected through the earlier tasks, the teams set out for the field study, which was carried out in two phases. Phase I consisted of a 7-day visit to Bangalore and Mysore to



establish contact with the project proponents and to obtain key documents. This was followed by a two week field visit to understand, discuss, observe and examine the process and procedures carried out during different phases of project implementation. During the second visit, detailed consultations, individual interviews and focussed group discussions were held with a range of stakeholders involved in the project to get views and opinions on the practices, impacts and key outcomes. The following activities were undertaken during the field visits:

- **Discussions with the Project proponents:** The team held discussions with the project proponents and in particular the department or team that handled the LA and resettlement aspects of the project. Besides procuring factual data on the project, the objective of meetings with these key informants was to understand the entire process of LA and R&R at different stages of the project.
- **Discussions with government and line agencies:** The key government agencies for the case studies included the District Administration, the Land Acquisition Officer appointed for the project, and the Forest Department. The key persons involved from these government agencies were identified during the first field visit in consultation with the project-implementing agency, with an understanding of their specific role. During the second field visits, these key individuals and agencies were contacted to understand their role, coordination and synergies, key issues, expectations, outcomes and impacts arising out of the project. Suggestions and propositions were also sought from them to improve the process and improve outcomes for such similar projects.
- **Consultations with the local representatives and contractors;** The team also carried out consultations with the key office-bearers of the gram panchyats in impacted and host villages, president and members of village panchyats, and the eminent citizens of the area (including owners of coffee plantations adjacent to the project area). The purpose was to understand their role, engagements and participation in the entire process of LA and R&R. Discussions were also held with consulting agencies responsible for design and supervision as well as, to understand the delays and any other issues arising out of the LA and R&R process.
- **Discussions with Project Impacted Communities:** Detailed consultations, interviews and focussed group discussions were carried out with a range of project impacted people to understand and gather insight about the processes, participation, impacts and outcomes of the LA and R&R. The effectiveness of measures adopted by the project proponents, the degree and extent of vulnerability, if any, arising due to the project, the adequacy of entitlements and compensation, awareness of benefits, systems of grievance redressal etc were dealt with in detail to understand the issues and get a better insight of the process. Some of the specific activities that were undertaken include
  - a) Community levels/village level discussions

- b) Focus groups discussions with different category of impacted people (small, medium and large farmers, absentee landlords, vulnerable groups including women, SCs and STs, the very poor households, landless households etc.)
- c) Select interviews with individual households to develop some case studies, illustrating specific issues.

**Sample Stratification**

**Geographically**, different categories of PAPs included

- Households resettled at Site 1 (MC Halli)
- Households resettled at Site 2 (Kelagur)
- Host communities at the two resettlement sites

**Socially and politically**, stratification was designed to include

- Absentee landlords
- Landless labourers
- Different social groups based on gender, caste and economic status

**Representative samples** were taken from each category, and **key individuals** were identified to bring on board the **heterogeneity of views** among the PAPs.

- **Discussions with other stakeholders:** Other stakeholders included implementing NGOs, other international, national and local NGOs that have been following the project, civil society representatives and researchers working in the Bhadra WLS and around it. The team met a wide range of stakeholders to understand stakeholder perception of the project, its main positive and negative features, key lessons and outcomes / impacts.

A list of key informants and stakeholders met during the two field visits is provided at [Annexure B](#).

**1.4 LIMITATIONS OF THE STUDY**

The study is heavily dependent on institutional memory and documentation of the LA and R & R processes by the project proponents. All information and details regarding the project, used for the purpose of this report, have been sourced from the Karnataka Forest Department and local NGOs.

Limitations of time prevented detailed ground -truthing of trends indicated by the interviews of the impacted community. Despite many attempts, details of court cases filed by the impacted community could not be obtained from the field.

**1.5 LAYOUT OF THE REPORT**

This report is divided into four sections and is structured as follows:

Section 1	Provides introduction to the study, objectives, scope of work, approach and methodology and limitations
Section 2:	Provides background and socio- political as well as administrative context
Section 3:	Outlines the review of the process
Section 4:	Broad outcomes, impacts and Lessons
Annexure A:	List of documents reviewed
Annexure B:	List of Persons met

Annexure C:	Map of India, Karnataka and the Bhadra Wildlife Sanctuary
Annex D-1:	Proceedings of the Meeting of the High-Powered Committee
ANNEX D-2:	List of Officers Present in the Meeting of the High -Powered Committee, GoK
Annexure E	Letter from the Finance Department, GoK, granting in-principle approval to the Bhadra LA and R&R Project
Annexure F	Government Order (GO.No.RD.69.REH.97 dated: 28.03.2001
Annexure G	Site Map of MC Halli, with individual farm plots and housing plots, produced by M/s Unicon Engineering
Annexure H	Extent of Land Granted at each Relocation Site, and Village wise details of land granted
Annexure I	Sanctioned and Actual Expenditure on Infrastructure Facilities and other Rehabilitation measures

The process of LA and R&R is often defined and driven by the context, background and purpose of the project and levels of significance accorded to it by the local government. The socio-economic, administrative and political milieu within which the project is carried out and implemented often defines the success of LA and R&R components. Hence, it is useful and important to understand the socio-economic and administrative context within which the Karnataka Forest Department implemented the Bhadra Acquisition and Rehabilitation Project. The context will prepare the ground to understand the implications of the impacts, issues and how and why the project achieved or struggled to achieve its desired objectives.

This section provides factual information and background of the project and dwells with the socio-economic and administrative context within which it was implemented.

**2.1****BHADRA WILDLIFE SANCTUARY AT A GLANCE**

<b>Bhadra Wildlife Sanctuary (BWLS) At a Glance</b>	
<b>Location</b>	Chikmagalur and Shimoga districts, Karnataka 75_150 to 75_500E and 13_250 to 13_500N
<b>Total Area</b>	492 sq. km.
<b>Current Legal Status</b>	Wildlife Sanctuary notified under the Wildlife Protection Act, 1972 <ul style="list-style-type: none"> <li>• Initial notification in 1974</li> <li>• Final notification in 1998</li> </ul>
<b>History and year of Establishment</b>	1. Reserved Forest between 1912-1950 2. Game Sanctuary in 1951 (parts) 3. Bhadra Wildlife Sanctuary in 1974 4. Project Tiger Reserve in 1998
<b>Major Vegetation types</b>	Dry and moist deciduous forests (bamboo), evergreen montane grasslands, teak plantations
<b>Conservation Significance</b>	The Western Ghats are a <b>global biodiversity hotspot</b> , with high levels of biological productivity, species diversity, and endemism

**2.1.1****Conservation Significance of BWLS**

The Bhadra Wildlife Sanctuary (BWLS) is located in the Malnad region of India's Western Ghats, an area delineated as a biodiversity hotspot, with high levels of biological productivity, species diversity, and endemism. While Nagarhole National Park and Bandipur WLS are better known Protected Areas of Karnataka, ecologists believe that the quality of the forest is much better in Bhadra.

- Fauna in this region represent 30% of all Indian mammal and bird species (Karanth et al. 2007).
- The Western Ghats are home to several larger vertebrate species, some of which have global conservation significance due to their rarity, endemism, habitat-specificity, susceptibility to commercial exploitation, or proneness to come into conflict with human societies.



The creation of the Bhadra reservoir by damming river Bhadravathi in the 1960s completely cut off the two main roads running through this area, which used to connect Chickmagalur to towns in the Shimoga district. As a result, the wildlife rich Muthodi valley became isolated and flora and fauna began to flourish in the region.

The Ghat forests occur as a fragmented strip within a larger landscape matrix consisting of crops, tree plantations, and montane grasslands – also known as “shola’ grasslands. Vegetation in BWLS comprises of wet evergreen forests and moist deciduous forests that are dominated by bamboo.

### **2.1.2 Conservation History of BWLS**

The initial Notification declaring Bhadra Wildlife Sanctuary was issued by State Government vide G. O. No. AFD 25 FWL 74 dated: 06-09-1974 under the Wildlife Protection Act, 1972. The final Notification was issued in the year 1998 vide G. O. No. FEE 58 FWL 96 dated 09.03.1998. In view of the ecological importance and the potential to support high density faunal populations, this sanctuary was upgraded to the status of Project Tiger Reserve by the Government of India on November 19, 1998. This, however, does not impact the legal status of BWLS, which continues to be a Wildlife Sanctuary.

### **2.1.3 Socio-Economic History of Villages inside BWLS**

#### *Demographic Trends: Increase in Population Pressure*

- In the early 1900s the area of the present-day Bhadra sanctuary was sparsely populated, and reportedly had “a village with 88 people and 186 cattle occupying an area of 4.19 sq. km.”<sup>1</sup>
- The population inside the Bhadra forests increased gradually during the colonial period, when settlers were brought in by the Imperial Forest Department, reportedly to cut trees and make charcoal for the development of railways nearby<sup>2</sup>
- This population growth continued after India’s independence. A recent estimate (Karanth 2003) puts the total number of individuals inhabiting the park just before resettlement at 4000, with a population density of 8.1 people per sq. km.

#### *Local livelihoods and Infrastructure*

Traditionally, households living in villages inside BWLS harvested wildlife, grazed livestock, and collected firewood, timber and forest products. However, development activities slowed down when the Bhadra reservoir was built in the 1950s and 1960s. This reservoir isolated the settlements in the sanctuary, limiting infrastructure development even before the declaration of this area as the Bhadra WLS in 1974.

#### *Impact of the Bhadra Dam and Reservoir*

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<sup>1</sup>(Karanth et al, 2007, quoting an anonymous, unpublished report of 1917)

<sup>2</sup>According to a local old woman interviewed in the film *Forgotten Villages*, 2002

Till the 1960s, the closest town for most of the villages inside Bhadra was Narsinghrajapura (or NR Pura), a sub-divisional headquarter town that provided the people with a market, banks, higher education and health facilities. The Bhadra villages were linked to NR Pura by an all-weather road, and by all accounts the people in these villages were well-networked, and not isolated households with a forest-dependent, self-sufficient, subsistence agriculture based economy.

There was a shift in the class composition of this population after the late 1960s, subsequent to the construction of the Bhadra Reservoir. The reservoir led to breakdown of communication and transport links of these villages from NR Pura (please refer to the map at [Annexure C](#)). As a result, most of the affluent landholders migrated out of the forest, to set up alternative residences in the nearby towns like NR Pura and Chikmagalur. They, however, became **absentee landlords** and continued to hold on to their land inside the forest, which they leased out to small and marginal farmers or cultivated using a class of agricultural labourers.

Thus, even as legal landholdings remained static, the profile of the average households actually living inside the forest in the 16 villages changed gradually during the 1960s to 1980s, **from self-cultivating agriculturalists to agricultural labourers and share-cropping tenants**. These dynamics were fairly important in determining the eventual outcome of the village resettlement project.

## 2.2

### **JUSTIFICATION FOR THE PROJECT**

According to the Karnataka Forest Department, pressures on flora and fauna in the Bhadra WLS emanated from multiple sources, including:

- Proposed irrigation/river linking and mining projects
- Commercial extraction of bamboo and other timber species.
- Resource extraction by the local population
- Poaching and forest fires caused by the local population

**Human Disturbance in Bhadra WLS:** There were 16 villages inside the Bhadra Wildlife Sanctuary, comprising of 736 families. Several recent studies have examined the negative impacts of human activities on wild animal and plant communities inside reserves. These activities include biomass extraction, livestock grazing, deliberate arson, and removal of wood. Karanth et al. (2006) estimated that combined human activities had directly affected 8 to 10 per cent of this Sanctuary by altering 23.7 sq. km. of the forest near the villages. Livestock grazing was said to have been widespread in the Bhadra WLS, and recent studies indicate that increased livestock densities have reduced forage availability, degraded forest vegetation, changed plant composition, and led to declines in wild herbivores due to competition in Bhadra.

All households living inside the Sanctuary reportedly collected fuel wood from the forest and this local scale collection of plant parts is estimated to have directly affected food availability for wildlife as well as regeneration and recruitment of plant species.

**Human-wildlife conflict:** Nearly 73 per cent of the households living inside Bhadra WLS prior to resettlement are said to have regularly lost 15% of their annual harvest to crop-raiding by elephants and ungulates. These households are also reported to have lost 11 to 25 per cent of their livestock to carnivores (Karanth 2003). Retaliatory killing of elephants and big cats was reported to be a serious conservation problem in this Protected Area.

**Earlier Attempts at Relocation:** Attempts to relocate villages had been made sporadically in Bhadra since the early 1990s, but were resisted vehemently by the people due to poor experiences of other resettled people nearby, especially those resettled during the construction of the Bhadra dam and reservoir in the 1960s. By the end of the 1990s, relocation-related conflicts and confrontations between the local people and the Forest Department intensified, and instances of damage to the forest by the people (through hunting, poaching and forest fires) began to escalate. Official attempts to impose conservation regulations on the villagers against illegal hunting, grazing, and timber removal caused great resentment, and villagers are alleged to have even used extreme measures like arson systematically and deliberately to register their disapproval of extant forest conservation laws and implementation methods of the forest authorities. Declaration of the Bhadra WLS as a Project Tiger Reserve in 1998 intensified the attempts by the Forest Department to 'manage' this Protected Area scientifically, and to reduce human disturbances within the area of the Sanctuary.

It is in this backdrop that the Bhadra LA and R&R project was undertaken to minimize human-wildlife conflict and improve the conservation potential of the BWLS. The resettlement of villages from Bhadra was seen as a measure that could improve the ecological sustainability of the Protected Area, while also addressing the severe human wildlife conflicts (crop raiding, property loss, livestock predation) that are said to have occurred frequently within this park. In this sense, the resettlement of villages from this Protected Area was posited as a 'win-win' solution to the problems of conservation and development in the Bhadra WLS.

However, no official surveys, studies or reports by the Project Proponent are available to support this claim, and no other studies by independent researchers have been cited in the Relocation Plan or other official documents to justify the need for village relocation.

### **2.3**

#### ***DISPLACEMENT AND MAGNITUDE OF IMPACT***

In view of the human disturbances and human-wildlife conflict caused by the presence of villages inside the Bhadra WLS, a project was prepared by the Deputy Commissioner, Chikmagalur in the year 1992 to acquire 861.00 acres of revenue land belonging to 16 villages, and to rehabilitate the 736 families living in these villages outside the sanctuary. This project was eventually executed during 1998-2001.

### 2.3.1 **Extent of Acquisition and PAP Details**

The proposed extent of land acquisition and number of PAP families is set out in [Table 2.1](#):

[Table 2.1](#) *Details of village lands to be acquired*

S. No.	Villages	No. of families to be Rehabilitated	Extent of land to be acquired (in Acres)
1	Hebbe	97	99.7
2	Madla	159	250.15
3	Hipla	98	143.46
4	Kesave	60	85.25
5	Muthodi	36	34.23
6	Karuvane	52	106.00
7	Madla - Waddihatti	51	17.62
8	Hebbe-Kurkulmane	7	5.00
9	Bidare	12	7.20
10	Shiragola	2	-
11	Balegadde	20	33.22
12	Mutt	24	17.49
13	Hunasekatte	15	-
14	Heggarmattuvane	68	1.1
15	Kanchagar	7	-
16	Madhuguni	28	60.87
	Total:	736	861.29

### 2.3.2 **Project Cost: Proposed, Allocated and Utilized**

An agreement was reached between the Central government and the government of Karnataka, whereby the cost of acquisition was to be borne by Government of India and the rehabilitation cost by the Government of Karnataka. The final cost-sharing arrangement is depicted in [Table 2.2](#).

[Table 2.2](#) *Estimated and revised project cost, sum released and utilization*

	Cost of Acquisition (Rs.)	Cost of R&R (Rs.)	Total Cost (Rs.)
Borne by	Government of India	Government of Karnataka	
Original estimated cost	7.02 crores	5.74 crores	12.76 crores
Revised estimates	13.0 crores	4.65 crores	17.65 crores
Final amount released	11.39 crores	3.37 crores	14.76 crores
Unspent balance out of released amount	25 lakhs	1.28 crores	1.53 crores

### 2.3.3 **The R&R Package and Relocation Sites**

The R&R package to be administered to the households displaced from Bhadra WLS was approved by the State Government vide Government Order No. RD.69.REH.97, dated: 28.03.2001, and is set out in [Table 2.3](#) below:

[Table 2.3](#) *The R&R Package*

Sl. No.	Details	Amount (Rs. in lakhs)
1.	Ex gratia payment for displaced families (736 families)	152.30
2.	Cost of Infrastructure at Rehabilitation centre.	
	Construction of School Building	10.00
	Road network including drainage	51.00

Sl. No.	Details	Amount (Rs. in lakhs)
	Burial grounds & recreation park	6.00
	Shopping complex	5.00
	Bus Shelter	1.00
	Temple	3.00
	Water supply	33.00
3.	Providing Electricity	100.00
4.	Transportation cost at Rs. 5000/- per displaced family (736 families)	36.80
5.	Dispensary and Veterinary Dispensary	25.00
	Total:	423.10
6.	Contingency & Administrative Overheads at 10% of total	42.31
	<b>Grand Total:</b>	<b>465.41</b>

**Relocation Sites:** As per the GO of 2001, nearly 1300 acres of cultivable land was to be made available to the PAPs at the resettlement site. The main site identified for resettling the people from Bhadra WLS was a large plot of 905.47 acres, adjacent to the village of **Malala Chenannahalli** (MC Halli), located on the Bangalore - Shimoga stretch of National Highway No.206, between Tarikere and Bhadravathi. This site used to be a part of the West Hadikere State Forest, which was de-reserved during the 1960s under the Grow More Food Campaign, and leased out to a sugar mill for cultivation of sugarcane. The lease expired in the late 1980s, and subsequently, in the early 1990s the area was earmarked for resettlement of the Bhadra villages.

The second resettlement site is located near village Handi, at a place called **Balehalli-Kelagur** nearly 23 km from Chikmagalur town. The site was a part of Revenue Department land, on which the Forest Department had raised *Acacia* plantations under the Social Forestry Programme since 1974. There is 433.15 acres of dryland available for resettlement at Balehalli-Kelagur, which was earmarked for 109 PAP families.

### **2.3.4 Actual Status of Rehabilitation in 2007**

Against the proposed 16 villages to be relocated, till August 2007 only 10 villages have actually been shifted out (*Table 2.4*). Of the remaining 6 villages, 3 villages continue to remain inside the Bhadra WLS, while the remaining three are awaiting relocation once specific problems with their shifting are sorted out.

Three villages that are still inside Bhadra (Bidare, Madhuguni and Balegadde) are at a geographical location that distinguishes them from the villages relocated so far. These 3 villages are situated on the south-western tip of the Sanctuary, across the river Bhadra (see map at *Annexure C*). Thus, they form a distinct pocket, which did not have too many linkages with the resettled villages, and have an economy and lifestyle which is also distinct. Their level of forest dependence is quite high, and at this point the residents of these villages are vehemently opposed to the idea of relocation. For now, the approach of the Forest Department is also to let them continue residing inside the Sanctuary, and therefore no serious attempts are being made at present to identify alternative land for them and to convince them to move out of Bhadra.



Table 2.4

*Actual Status of Resettlement in 2007*

<b>Villages that have been resettled</b>	<b>Villages inside the Bhadra WLS</b>	<b>Reason(s)</b>
Hebbe	Paradeshappanamutt	22 families in the village.
Hebbe - Kurukalumane	Sirgola	1 family - The owner has filed a petition in the high court against the rehabilitation package and continues to reside in this village
Kanchigar Colony	Hunsekatte	The villagers have moved out of the reserve on their own, as all were encroachers
Madla	Bidare	Total 46 families are residing in these three villages.
Madla-Vaddihatti Heggarmathuvani	Madhuguni Balegadde	Village Balegadde has 20 families and rest of the 26 are in villages Bidare and Madhuguni.
Hipla Karuvane Kesave Muthodi		
<b>Total Families =</b>		
<b>418</b>		

**2.4*****INSTITUTIONAL MECHANISM FOR PROJECT IMPLEMENTATION***

**Mechanism for LA:** In the Bhadra LA and R&R project, the office of the District Collector was designated as the nodal authority for land acquisition, and the Assistant Collector was appointed as the Land Acquisition Officer (LAO). The LAO was responsible for framing the final compensation award, based on market value of the immovable assets at the time of issue of the 4(1) notification.

**Mechanism for R&R:** The Government Order of 2001 also provided for the establishment of an R&R Committee under the chairmanship of the DC. The DCF, Bhadra WLS was the Secretary of this Committee, the membership of which consisted of all Line Department representatives.

The following platforms were available for coordination of the project at different levels:

- The State level High-Powered Committee (presided by the Chief Secretary, Govt. of Karnataka) - for coordination and smooth fund flow between the District and the State Government levels
- The office of the District Minister - for coordination between the District level bureaucracy and the local political class
- The R&R Committee chaired by the DC, Chikmagalur - for coordination between different Line Departments for proper development of the resettlement sites

The process documentation study looked into the different phases of the project with a framework of LA and R&R process across different project stages. The stage wise framework and process along with the analysis of the same is provided below.

### **3.1 CRITERIA FOR REVIEW**

The litmus test of resettlement and rehabilitation is the degree to which the basic goal – i.e., *assistance for rehabilitation to achieve at least the same level of well being as without the project* – has been achieved. Within this framework, the review process specifically examined the basic goal in two key stages and various sub -stages of the project:

- Inception and Design stage
- Implementation and Monitoring stage

Apart from this the process documentation assessment also examined the various aspects of resettlement and land acquisition, resettlement planning , eligibility and entitlement issues, consultation and disclosure, implementation aspects, and supervision and monitoring of resettlement operations. These processes reflect key requirements of the National Policy on Resettlement and Rehabilitation 2004 (NPRR 2004), and therefore were included in this review, assessment and documentation.

The observations and findings presented below are largely drawn from the project profiles, with focus on “on-the-ground” performance. The discussion has also considered other available relevant material to aid the analysis of specific aspects and experiences with the process of land acquisition, displacement and resettlement.

### **3.2 INCEPTION AND DESIGN STAGE**

#### **3.2.1 Reconnaissance and Initial Planning**

Preliminary data collection on LA and R&R was carried out as early as 1992, when the Karnataka Forest Department, in collaboration with the then DC, Chikmagalur, drafted a plan for land acquisition and resettlement. In 1996, a revised proposal was drawn up using rates prevailing at that point of time, and the Government of Karnataka again requested for funds from the Central government for the acquisition of land in the Bhadra WLS.

In 1998, with the appointment of a new DCF of the BWLS, the paperwork for the project gained momentum again. A revised proposal was submitted, and the planning process for village relocation was set into motion.

### **Consultations and Stakeholder Mapping**

**Local Community** The project proponents did not carry out or commission any formal study to identify and map stakeholders. However, villagers living inside the Sanctuary were consulted from time to time regarding their willingness to shift outside the Sanctuary for nearly a decade, starting in the early 1990s. The response of the local people to these proposals was consistently negative, and they even formally established a forum (The Bhadra Hitarakshana Horata Samithi, with nearly 150 members) to oppose any move to shift them outside the Sanctuary. In 1994-95, they filed a court case to stop the resettlement attempts, and even at the time when the land acquisition notification under section 4(1) were issued, a majority of the people were actively opposing the resettlement attempts.



There was a gradual shift in the opinion of the PAPs from 1999 onwards, in response to a series of confidence building measures initiated by the DCF of BWLS. A local NGO, Wildlife First, and its field based representative also helped the project proponents in convincing the PAPs to agree to relocation, through intensive information dissemination, local problem-solving and outreach activities. In 2001, the Bhadra Hitarakshana Horata Samithi withdrew its court case and its members accepted the R&R package.

#### **Confidence -building measures**

Initial opposition to the idea of relocation was overcome through a series of confidence building measures by the project proponents to bring local community to the discussion table.

The focus of the CBMs was to solve infrastructure problems *at their original site of residence*. This included measures like:

- Tarring of fair weather roads
- Provision of piped drinking water
- Prompt compensation for crop depredation by wild animals
- Provision of solar lighting in villages

Detractors predicted that such measures will strengthen the local people's resolve to oppose relocation from BWLS, but this was proved wrong. The CBMs actually helped to create an atmosphere of trust and goodwill, paving the way for amicable voluntary resettlement.

The consultations carried out during this period covered aspects like:

- Identifying critical places and the issues
- Identifying key stakeholders
- Identifying problems at the existing place of residence and potential solutions (like roads, bridges, cattle vaccination camps etc.)
- Site selection for relocation of households

- Site selection for relocation of common property resources and community infrastructure like schools, hospital, community hall, temples etc.

**NGOs and Civil Society** There was no formal agreement between the project proponents and local NGOs and civil society organizations for collaborating on the Bhadra LA and R&R project. However, local conservation organizations like Wildlife First, Wildlife Conservation Society and Nature Conservation Guild had been active in the Chikmagalur district, especially in and around the Bhadra WLS, for over a decade before the project was implemented. These are local NGOs formed and run by local people (including some influential coffee planters) living in the same area, and as such, they had a long term association with and stake in the conservation of the Bhadra WLS, were politically influential, and also had fairly well-established links with many of the PAPs. It is for this reason that these NGOs were able to play an important support and oversight role in the project even in the absence of any formal collaboration with the project proponents.

### **3.2.3 Analysis of Alternatives, Impact Mitigation**

Available literature and interviews with project proponents indicate that there were virtually no attempts to identify non-displacing alternatives such that conservation concerns could be reconciled with livelihood needs and aspirations of the local people.

However, tangible and sustained attempts were made by the project proponent to identify, anticipate and mitigate the negative impacts of displacement. The project proponents appear to have been committed to delivering an adequate rehabilitation package to the people in an efficient and time-bound manner, and devoted considerable time and energy towards finding a range of solutions that could help people to resettle properly outside the Sanctuary, and recreate livelihoods at a level equal to or higher than that enjoyed inside the Sanctuary.



*Bridge constructed by project proponents over a perennial stream inside BWLS to ease transportation for the local people*

### 3.2.4 ***Social Impact Assessment***

No formal Social Impact Assessment was carried out by the project proponent or any agency commissioned by them. Information on number of Project Affected Persons (PAPs) and families was obtained from the Relocation Plan prepared in 1992, and land records were also obtained from this older plan. Ground-truthing of this information was carried out by the DCF office using Forest Department staff which conducted village surveys to identify the number of households actually residing in the BWLS in 1998. Moreover, a local NGO put in place a researcher to help the DCF Office in collecting baseline data on number of households and their asset profile. This information was used by the project proponents in verification of claims and settlement of objections of the PAPs during the land acquisition process.

#### **Identification of Beneficiaries and Impact Assessment**

- **Original database** prepared by DCF and DC in 1992, during formulation of the first Relocation Plan, which was later abandoned
- **Ground-truthing** of this database by Forest Department frontline staff through village visits during 1998-99
- **Further verification** by NGO appointee, who spent over a year in the project area (1999-2000) and helped with various aspects of relocation planning

A detailed inventory of people's fixed assets was prepared for the purpose of payment of compensation. By all accounts, including those of the resettled people themselves, this process was carried out quite meticulously, and THE PAPs got their immovable assets inventoried adequately by the authorities.

### 3.2.5 ***Finalization of list of Beneficiaries***

Instead of asking the staff of the Revenue Department to carry out the task of identification of bonafide families entitled to rehabilitation benefits, the Land Acquisition Officer delegated this task to the Forest Department. The final list was made through a consultation process involving the Forest Department, local community leaders, and a local NGO, Wildlife First (WLF).

- Landholding records of households residing inside the Bhadra WLS were obtained and tabulated using revenue records, along with documents held by the community itself.
- For the listing of landless families, the Forest Department worked in close collaboration with the local NGO (Wildlife First).
- The Forest Department, through a survey conducted in 1998 by its frontline staff, compiled a list of landless families residing in BWLS.
- Meanwhile, the villagers prepared a (much longer) list, consisting of additional people who were supposedly residents of these villages but were missed out in the Forest Department's survey.
- Simultaneously, Wildlife First recruited an individual and placed him at the project site under the aegis of the Karnataka Tiger Conservation Project<sup>1</sup>, specifically to act as their local point person for beneficiary identification and subsequent relocation work.

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<sup>1</sup> A collaborative project of Wildlife First with the Karnataka Forest Department



- After the notification for land acquisition under section 4(1) was issued in May 1999, the DCF and the WLF representative visited each village scheduled for resettlement.
- In the meetings held with the local people, they emphasized the need to identify genuine residents as beneficiaries and to weed out non-genuine people from the lists.
- The final list of beneficiaries was notified in August 2001

Thus, the final list of beneficiaries was compiled after a series of open and transparent negotiations and discussions between the village leaders and the project authorities, often in the presence of the local NGO representatives. In a number of instances, the PAPs used the NGO representative to get a better hearing for their case by the project authorities. The beneficiary list finalized at the end of village meetings and negotiations was duly signed by the DC, the DCF and the NGO representative and retained as part of the project's documentation.

**Definition of "Family" for Beneficiary Identification**

- It was anticipated that PAPs may attempt to get additional benefits by sub-dividing their household and showing it as multiple households. To check this, the project proponents decided as a rule to consider *each adult male, along with his wife and children below 18 years of age* as a single family.
- Each such family was entitled to a plot of agricultural land at the relocation site, even if the husband and wife were, for instance, residing separately.
- Once the primary list of beneficiaries was compiled using this rule, exceptional situations like widows and women-headed households were considered **on a case-to-case basis** and added to the beneficiary list if the case had merit.

**3.2.6**

***The Entitlement Framework***

*General Framework*

In addition to due compensation for land and other immovable assets, each displaced household was entitled to a plot of agricultural land and a housing plot at the relocation site. The R&R package consisted of a house, transportation allowance of Rs.5,000, and a range of civic amenities like roads, drains, sanitation, drinking water, electricity, school, post office, hospital, playground, shopping complex, and place for worship.

*Extent of Land Entitlement*

The R&R package initially identified 3 categories of beneficiaries, and fixed their land entitlement as follows:

**Table 3.1**

*Land Entitlement Matrix*

	<b>Landholding inside BWLS</b>	<b>Land Entitlement at Relocation Site</b>
<b>Category 1</b>	5 Acres and above	5 Acres at upset price of Rs.1,000/- per acre
<b>Category 2</b>	1- 5 Acres	3 acres at upset price of Rs.1,000/- per acre
<b>Category 3</b>	Less than 1 Acres/ Landless	1 acres at upset price of Rs.1,000/- per acre

However, an additional category was created subsequently by the project proponents, in order to fine-tune land distribution and bring it in line with the

size of original landholdings. Thus, Category 2 was split into 2 sub -groups as follows:

- Families with 1 to 3 acres inside BWLS: To receive 2 acres of land at relocation site
- Families with 3 to 5 acres inside BWLS: To receive 3 acres at the relocation site

As a result, the project proponents were able to eventually provide land to a larger number of PAPs at the more coveted resettlement site in village MC Halli.

**Treatment of “encroachers”:** If the encroachers were considered eligible as per State Government Orders for regularisation of their unauthorised cultivation, then compensation as per the Land Acquisition Act was to be granted to them to the extent eligible for regularisation.

### 3.2.7 **Land Acquisition Planning (LAP)**

#### *Valuation of Land*

The office of the District Collector was designated as the nodal authority for land acquisition, and the Assistant Collector (AC) was appointed as the Land Acquisition Officer (LAO). Each LAO was instructed by the DC to fix the value of land using the highest registered value in the previous year as a benchmark.

Since the villages inside BWLS spanned two blocks or *talukas* of Chikmagalur, they were located under the jurisdiction of two different Assistant Commissioners. This resulted in differences in land valuation for the PAPs from different villages. Village Hebbe was a part of the NR Pura *taluka*, which was under the jurisdiction of the AC, Tarikere, while all other relocated villages were under the jurisdiction of the AC, Chikmagalur. As a result, village Hebbe received compensation rates that were far more favourable than those received by other villages (Table 3.2). This, in fact, continues to rankle with the PAPs and is brought up by them in interviews and discussions even now, four years after the process has been completed.

**Table 3.2** *Difference in Compensation rates across two talukas*

<b>Land type</b>	<b>Compensation rate per acre for village Hebbe</b>	<b>Compensation rate per acre for other villages</b>
Paddy land	Rs.92,000	Rs.42,000
Coffee land	Rs.2,00,000	Rs.80,000
Mixed crop land	Rs.2,50,000	Rs.1,20,000

#### *Valuation of other Immovable Assets*

This was conducted by different departments at the district level. The DC, as nodal officer, played a critical role in guiding the LA process, helping to speed it up, and ensuring that the best possible compensation award was received by the PAPs for all condemned assets.

- Standing instructions were given by the DC to all officers involved in valuation to fix the *maximum permissible amount* as the compensation value for each beneficiary, instead of trying to minimize the amount of compensation.

- In an interview, the then DC of Chikmagalur revealed that this was done in the spirit of providing PAPs with just and adequate compensation, in view of their sacrifice and the hardships involved in resettlement.
- All valuation was carried out by the officers on the basis of actual field visits to the lands being acquired, so that local nuances and details could be taken on board during valuation.
- Even for houses and other buildings constructed on encroached Revenue land, the project proponents obtained permission from the State Government to compensate the PAPs by payment of 50 per cent of the estimated value of such buildings.
- Familiarity among PAPs with state processes in general, and specifically with LA and R&R processes, enabled them to ensure that fair and just compensation was promised and then actually delivered.

Table 3.3

*Valuation of Immovable Assets*

Valuation of <b>Fruit trees</b> on private land	The Horticulture Department
Valuation of <b>coffee plantations</b>	The Coffee Board
Valuation of <b>water harvesting structures</b>	The Soil and Water Conservation Department
<b>Final Award:</b>	The sum of individual awards prepared by the above agencies, <i>Plus</i> Interest payable on the total award for the period between the 4(1) and 6(1) notifications
<b>Disbursing Authority</b>	
For amounts less than Rs.50 lakhs	Direct payment by the District Collector
For amounts higher than Rs.50 lakhs	Payments to be made by the DC, with due permission from the State Government

**3.2.8**

**Overview of the LA Planning Process**

The final compensation award given to PAPs was legally watertight, and the compensation amount was quite high

<b>Profile of Compensation Paid to PAPs</b>	
Minimum compensation amount	Approx. <b>Rs.35,000</b> (house construction grant, transportation allowance and compensation for condemned housing at original site)
Maximum compensation amount	Approx. <b>Rs.50 lakhs</b> (received by a coffee planter who had large landholdings inside BWLS)
Average compensation amount	Ranged between <b>Rs.1 lakhs – 4 lakhs</b> per household

As such, the award was acceptable to a majority of the PAPs, as witnessed by the fact that *no objections were received by the LAO on the final award*

The important factors contributing to this high degree of satisfaction included:

- Success of confidence-building measures by the project proponents
- Openness and transparency, as for instance through involvement of all relevant departments in the valuation process
- Fair and generous valuation of immovable assets
- High levels of organization, awareness and political clout among PAPs

**Awareness among PAP: Playing the LA system**

Some influential PAPs in village Hebbe were aware of the intricacies of the land acquisition process, due to their prior experience with displacement during construction of the Bhadra dam and reservoir. A few families from this village sub-divided and sold a part of their lands at a high registered value just a few months before the LA process began, in anticipation of impending land acquisition. These land sales pushed up average recorded sale price of land for the NR Pura *taluka*. and served as benchmarks when past revenue records of this *taluka* were used to determine land value for payment of compensation (Table 3.2).

### 3.3

### *IMPLEMENTATION AND MONITORING STAGE*

#### 3.3.1

#### ***Timeline and Milestones in Land Acquisition***

- In the 1970s, some villagers living in the most inaccessible locations inside Bhadra WLS approached political leaders and officials for resettlement (Karanth et al 2007).
- In 1987, a preliminary survey of households eligible for resettlement was conducted (Karanth et al 2007).
- In 1992, the State Forest Department, in collaboration with the then DC, Chikmagalur, drafted a plan for land acquisition and resettlement (Karanth et al 2007).
- In 1996, a revised proposal was drawn up using rates prevailing at that point of time, and the Government of Karnataka again requested for funds from the Central government for the acquisition of land in the Bhadra WLS.
- In 1998, with the appointment of Mr. Yatheesh Kumar as DCF, Chikmagalur, the paperwork for the project gained momentum again. A revised proposal was submitted, under which the LA and R&R costs were revised upwards.
- A meeting<sup>1</sup> under the Chairmanship of Minister-in-charge of the district was held at Chikmagalur on September 13, 2000 to finalize the R&R process, and to address the concerns of the community leaders regarding the package. It was decided that various rehabilitation facilities should be developed first at the relocation site before the process of shifting starts.
- A high-powered Committee Meeting, presided by the Chief Secretary, was held by the Government of Karnataka on January 16, 2001, which cleared the Bhadra LA and R&R project and helped to garner support at the State Government level for the project. The minutes of this meeting are at [Annexure D-1](#). A list of members present in this meeting is at [Annexure D-2](#).
- This meeting sought the opinion of the Finance Department, Government of Karnataka, on the financing of the Bhadra LA and R&R project. The Finance Department (vide Letter No.FD/140/Exp.VII/2001 RD/67/REH/1997 dated February 7, 2001, reproduced and summarized at [Annexure E](#)) agreed in principle to fund the cost of rehabilitation by the Government of Karnataka, subject to a ceiling of Rs.5 crores. The Finance Department further agreed to grant lands as per the discussions of the High Power Committee meeting held on 16-01-2001 at an upset price of Rs.1,000.
- A Draft Cabinet Note was submitted by the DC, Chikmagalur, to the Karnataka Government in March 2001, outlining details of the project. A Government Order (GO.No.RD.69.REH.97 dated: 28.03.2001- reproduced at [Annexure F](#)) was issued on the basis of this Note, and this GO formed the basis for the Bhadra LA and R&R project.

<sup>1</sup> Attended by the DCF Chikmagalur, the DC Chikmagalur, heads of all Line Departments of the district, the local MLA for Chikmagalur, three Ministers hailing from Chikmagalur, as well as main community leaders from the villages affected.

- The Karnataka State Government set aside 1300 acres of irrigated land for resettlement of the people whose land was being acquired from the Bhadra WLS area.
- The Government of India released Rs.1.68 crores in March 1999 for acquisition of lands, while the Government of Karnataka released Rs.0.50 crores for rehabilitation. Thus, a total amount of Rs.2.18 crores was deposited with the Deputy Commissioner, Chickmagalur on March 31, 1999, enabling the initiation of the Bhadra LA and R&R project.
- The Government of India released the next tranche of Rs.2.00 crores in January 2001 for further acquisition of lands.
- The Bhadra LA and R&R project began to be implemented in 1999 with the involvement of forest and revenue departments, village representatives, and two NGOs (the Bhadra Wildlife Conservation Trust, and Wildlife First).

#### **Timeline of the Relocation Process**

May 24, 1999	The <b>first notification</b> under section 4(1) for land acquisition was issued to village Hebbe, the first village to shift
June 22, 2000	The <b>final notification</b> under section 6(1) was issued to village Hebbe
October 2, 2001	Grant of <b>land rights certificates</b> at the new sites to all PAPs
End-2001 to early 2002	<b>House construction</b> at the resettlement site
March-April 2002	The PAPs <b>physically moved</b> to the new site at MC Halli

**Thus, the entire LA and R&R process from initiation to completion took less than 3 years.**

### **3.3.2**

#### ***Institutional Mechanism (LA and R&R and their interface)***

The R&R Committee established vide the Government Order of 2001 met fairly frequently during the project period (usually every 2 to 3 months) to review the progress of work on development of the two resettlement sites at MC Halli and Kelagur. The minutes of these meetings were recorded by the DCF, and illustrate a fair degree of coordination, speed and efficiency in handling emergent problems at the resettlement site. The PAPs frequently met the DCF (mainly due to this officer's greater accessibility, and their personal rapport with him) and made representations about their problems, which were resolved during the Committee meetings.

The multiple levels at which coordination was required and obtained are set out below:

- Coordination between line agencies, Revenue Department and Forest Department staff was consistently of a high quality during 1999-2002, when the bulk of the LA and R&R work was carried out.
- A major contributing factor was the regular and smooth communication between the DCF and DC offices, which helped them to anticipate problems and find solutions with minimum time lag.
- Coordination even among different levels of the State Government, as well as between the State Government and the Government of India (specifically Project Tiger Office at the MoEF) was of a high quality, largely due to the zeal of the officer(s) directly in charge of the project during 1998-2002.



- Full support was provided and proactive problems-solving initiatives were undertaken by the then Director, Project Tiger at New Delhi in response to the frequent personal visits and telephonic appeals by the DCF, Bhadra WLS.
- The role played by the DC, Chikmagalur was instrumental in promoting inter-departmental coordination, thereby speeding up LA and R&R. Consequently, the task of provision of roads, water supply, recreation facilities, community centre, temple and cremation grounds was completed quickly and efficiently by the relevant line departments

### 3.3.3 ***Disbursement of compensation***

Individual bank accounts were opened for each PAP household in a bank close to the resettlement site. Compensation was disbursed to PAPs through crossed cheque. By all available accounts, including those of the PAPs, there was negligible leakage of funds, corruption or delay in disbursement of funds for a majority of the PAPs.

### 3.3.4 ***Survey and Demarcation of Resettlement Sites - Outsourcing***

#### **Securing of Land at the Relocation Site**

The land to be allocated to the PAPs at village MC Halli was the centre of a dispute between the PAPs and the host community of MC Halli. A group of people in MC Halli even filed a court case, claiming rights of their sugarcane cooperative over this land. In the face of this potentially disruptive move, the DC and the DCF involved the then Law Minister of Karnataka (Mr. Chandregowda), who was also the District Minister in charge of Chikmagalur, to diffuse the crisis. The DC activated the support of the Superintendent of Police, Chikmagalur, to complete the land survey, plot demarcation and land preparation process without disturbance. In an interesting and rare instance of effective coordination, the DCF arranged for 30 tractor owners to be contracted for rapid ploughing and clearing of the demarcated plots, and this task was completed in a record 10 day period in the presence of one representative of each family of PAPs. The DCF, in collaboration with the local NGO representative, even arranged for a makeshift kitchen to be run for the entire duration of these 10 days, so that the PAPs camping at the site could be fed and sustained. At the end of this period, ploughing was completed and the PAPs were given possession of their individual plots under the supervision of the DC and the SP. This effectively diffused the crisis and the court case by the MC Halli farmers was withdrawn.

One of the hallmarks of the Bhadra LA and R&R project was the speed with which the resettlement site was prepared for receiving the PAP families. Before shifting the PAPs, the resettlement sites at MC Halli and Kelagur had to be surveyed extensively, and residential and agricultural plots had to be demarcated for allotment to each family. Anticipating that the Revenue Department may not be equipped to carry out this task quickly and efficiently, the project proponents decided to outsource it to a private GIS firm.

Thus, a Davangere-based firm, M/s Unicon Engineering, was given a contract for survey and demarcation of the twin resettlement sites. Their brief was to map the entire area, carve out plots of agricultural and residential land, and to prepare a ready-to-use map outlining the following:

- Layout and demarcation of individual residential plots
- Layout and demarcation of individual farm plots (farm plots have been laid out according to entitlements (1-acre to 5-acre plots)
- Location of key infrastructure and facilities

The selected firm was provided with details of the total number of PAPs, and the size of residential and agricultural plot that each family was entitled to. It then used a combination of a desk-based Total-Station Survey, followed by ground-truthing and actual demarcation and layout of plots on the site. GIS-based data was super-imposed on Revenue Survey numbers, so that the map was compatible with the government's own Revenue Records (Annexure G). The maps prepared by Unicon Engineering then formed the basis for draw of lottery by the Project Authority to grant farmland and house plots to PAPs. This is an interesting example of public-private partnership, using which a difficult and potentially long-drawn task was completed in only 5 months, during April to August 2001.

### 3.3.5 **Plot Distribution – Criteria and Method**

#### **Criteria for Allocation of Agricultural and Housing plots**

- All landless households were resettled at MC Halli, the site with irrigated land
- Villages that were cooperating with the project proponents, or were politically powerful, were resettled at MC Halli
- Larger landowners of BWLS (including coffee planters) resettled at Kelagur, the site with rain-fed land
- Land entitlements at Kelagur were double those of MC Halli to compensate for lack of irrigation

#### **Method of Plot Allocation**

- Allocation of plots by a Lottery system
- DC, DCF and Local NGO representative present at draw of lots
- Local community representatives not present at draw of lots

Across the board, most PAPs expressed a preference for the MC Halli site over the Kelagur site, since the land there was perceived to be of better quality, as well as being canal-irrigated round the year. In order to induce some families to shift to Kelagur, where the land was not irrigated, each family shifting there was given twice the amount of land being given at MC Halli. Thus, PAPs with landholdings between 1-5 acres were entitled to 4 acres of land at Kelagur (as opposed to only 2 acre at MC Halli), while PAPs with landholdings of more than 5 acres were entitled to 10 acres of land at Kelagur (as opposed to 5 acres at MC Halli). Despite this, most PAPs could not be convinced to move voluntarily to Kelagur. Even till date, most of the PAPs of Bhadra who show significant resentment about their relocation are those living at the Kelagur site.

The criteria used for allocating people to MC Halli or Kelagur were somewhat mixed, as summarized below:

- Landless families were treated on priority and resettled on prime agricultural land at MC Halli. Thus, on the official records, out of the 75 PAPs allocated land at Kelagur, not even one is an erstwhile landless household.
- All households from village Hebbe were resettled at MC Halli, since Hebbe was among the first villages to agree to move out of Bhadra, and they were given land at MC Halli in appreciation of their cooperation with the project authorities.
- Nearly all households from village Madla were resettled at MC Halli, since Madla was politically the most powerful village out of all 16 slated for relocation, and its support was critical for the success of the project.

The extent of land granted village-wise, and details of the different categories of land granted at each of the two resettlement sites are set out at **Annexure H**.

*Grant of Land Rights Certificate (the Hakku Patra)*


On the basis of plot allocation arrived at through lottery, individual PAPs were allotted land at the relocation site, and were asked to occupy the land and house earmarked for them. Each PAP household head was provided with a **Land Rights Certificate**, which is the possession document on the basis of which they moved into the new area.

**Land Rights Certificate (“Hakku Patra”)**

This is a document consisting of:

- A reduced photocopy of the map of the resettlement area
- Residential and agricultural plot of the PAP marked in highlights
- Verbal description of its location in relation to surrounding plots

The quick distribution of a user-friendly and easily understood document like the Hakku Patra helped to bolster confidence of the PAPs and reduced confusions associated normally with complex rehabilitation processes.



Government of Karnataka  
Revenue Department  
Certificate of Rights

Serial No.: \_\_\_\_\_ / 2001-2002

This is to certify that Mr. \_\_\_\_\_ of District Chikmagalur, Taluka Muttodi, has been resettled in District Tankere, Taluka MC Halli, as per the following details: Survey No. \_\_\_\_\_, Extent of Land \_\_\_\_\_ acres, Type of land Wetland, Housing site no. \_\_\_\_\_, District Tankere, Taluka MC Halli, Site Dimension \_\_\_\_\_ feet X \_\_\_\_\_ feet.

Details of Agricultural Land	Details of Housing Site:
Block No. 229	Site No. 361
Chakbandi:	Chakbandi:
East: 230 N Block	East: Plot no. 362
West: 228 Block	West: Plot no. 360
North: 194 Block	North: Road
South: Road	South: Plot no. 391 and 392

Date of issue: \_\_\_\_\_  
Place: \_\_\_\_\_

(Signature)  
District Collector  
Chikmagalur

*Correction of Mistakes in the Hakku Patra*

Once the land rights certificates were distributed, a number of PAPs came forward, usually through contacting the DCF, to point out problems or mistakes in their Rights Certificates. All these mistakes were rectified speedily through issue of **Correction Orders** by the DC. Here, again, the DCF and the DC worked in close collaboration, so that Correction Orders could be issued efficiently and with minimum delay.

*Formal Title Deeds (“Pakka Podu”)*

The last step in transfer of land to the PAPs involves the grant of formal title deeds on the basis of the *Hakku Patra*. This process has been completed for most PAPs, but for a few PAPs at each relocation site, the final title deed or **Pakka Podu** has still not been granted to the PAPs even in 2007 due to transfer of officers and the resultant loss of momentum.

### 3.3.6

#### ***Preparation of housing and other facilities***

- House construction for the 1-acre landholders (the erstwhile marginal farmers and landless households) was carried out by the project proponents.
- The 2-5 acre landholders at both relocation sites were asked to construct their houses privately.



#### **Inter-Agency Coordination for House Construction**

The task of house construction for the smallest landholders (1 acre holders) at MC Halli was given by the DC to the Nirmithi Kendra, an autonomous undertaking of the Government of Karnataka that specializes in construction of houses under the Indira Awaas Yojana. The design of the houses was modified through the initiative of the local NGO, which drafted the services of an architect to bring in low-cost, high impact improvements in the design of these houses. The modified design allowed the PAPs to extend their house according to their own convenience, using building material salvaged from their original residences. This improved the PAPs' acceptance of the new site significantly, by allowing them flexibility in the design of their house even while maintaining certain minimum standards in design, construction quality and speed.

### 3.3.7

#### ***Provision of electricity and other facilities***

Instead of getting the State Electricity Board involved directly in provision of electricity to the resettlement sites, the Karnataka Power Transmission Co. Ltd. was asked to carry out cost estimation for the tenders. The project authority then floated a tender inviting private contractors for this task. This was again an area where speed and efficiency were achieved through the **Public-Private Partnership** model, and the task of electrification was completed by a private contracting firm in a record time of less than 4 months.

Other infrastructure facilities were provided at the relocation sites by the relevant line departments, working under the overall supervision of the project proponents. [Annexure I](#) sets out the expenditure made on provision of other facilities at the two resettlement sites.

### 3.3.8

#### ***Income And Livelihood Restoration***

The households living in BWLS depended on a combination of agriculture and forest-based resource extraction and processing for subsistence. The ability to switch between different livelihood activities was an important survival strategy of the poorest households, since it enabled them to minimize livelihood risks and uncertainties. BWLS was also a source of raw materials and food items that were obtained for free from the forest (for instance, fuel and fodder) by the poorest households.

Relocation outside BWLS resulted in highly reduced access to forest resources, and a near-total dependence on agriculture. Thus, the success of post-relocation livelihood restoration depends on comparative returns from

agriculture and new non-farm enterprises at the relocation site, as against loss of earlier livelihoods.

<b>Livelihood Gains and Losses from Relocation</b>	
<b>Gains</b>	<ul style="list-style-type: none"><li>• Better quality of land at the relocation site; access to irrigation</li><li>• Reduced uncertainty and improved incentive to invest in land, due to formal title</li><li>• Better market linkages, and higher returns to agriculture</li><li>• New non-farm enterprise opportunities, especially due to proximity to National Highway</li><li>• Lower crop damage, livestock loss due to attacks by wild animals</li><li>• Improved access to schools, hospitals, roads</li></ul>
<b>Losses</b>	<ul style="list-style-type: none"><li>• Loss of access to forest-based raw material, food items, fuelwood, fodder</li><li>• No planning for alternative livelihoods for non-agricultural households like trappers, livestock-herders, artisans, service providers</li><li>• Higher cash requirements due to increased dependence on market-based inputs, consumption goods</li><li>• Loss of familiar surroundings, breakdown of social networks and linkages</li></ul>

The contribution of common property resources to livelihoods, diet and income was not inventoried as part of relocation planning. No attempt was made to ascertain the intangible or non-quantifiable livelihood benefits derived by the people from their surroundings, or to impute a value to these in order to arrive at methods to compensate people for these losses. Similarly, there was no attempt to identify the contribution of activities like NTFP collection, hunting, trapping, livestock rearing and petty manufacturing or services to the overall income of the people. The resettlement package and process, likewise, did not contain any provisions for restoration of income from such sources.

No formal studies were commissioned by the project proponents to ascertain the level and composition of people's income and livelihood prior to displacement. It was assumed that all the people living inside Bhadra Sanctuary were agriculturalists, who will be able to re-establish livelihoods after relocation provided they were given adequate, good quality land and basic facilities. Therefore the rehabilitation plan and process is silent about issues like capacity building of PAPs for new livelihoods, and creation of alternative livelihoods for non-agriculturalist PAPs like trappers, livestock herders, petty manufacturers and service providers. The project proponents also did not take into account the new opportunities that the shift to a new site may throw up, and did not have any provisions to enable the PAPs to use these opportunities to their advantage.

### **3.4 GRIEVANCE REDRESSAL MECHANISMS**

The dedication, skill and commitment of key individuals rather than any innovative grievance redressal mechanism appears to be responsible for speedy settlement of issues and the high degree of satisfaction observed among most PAPs.



- The project did not have any additional formal grievance redressal mechanisms over and above those stipulated under the Land Acquisition Act.
- However, the rapport building efforts of the DCF, Shri Yatheesh Kumar, were probably the single most important factor that provided the PAPs with confidence that their demands will be considered and their problems resolved sympathetically.
- Most PAPs brought their grievances and problems directly to the DCF, either formally or informally, and were heard to their satisfaction and provided speedy redressal.
- PAPs also used the representatives of the local NGO (Mr. Panduranga Swamy and Mr. D.V. Girish) to convey their problems to the project authority and get redressal.

Prima facie, the project has caused very limited loss of assets to the PAPs. Against total land acquisition of 861 acres, nearly 1300 acres of cultivable and irrigable land was made available to the PAPs at the resettlement site. In fact, the project brought about a progressive shift in asset distribution, since it involved grant of 1 acre of cultivable land to landless families, which formed a majority of the PAPs. The bigger landholders have also not lost significantly, since they have received 5-10 acres of good quality land in a more mainstream area next to an important National Highway, along with due compensation for all immovable assets. In addition, a range of socio-economic infrastructure and development facilities have been provided at the resettlement site, thereby improving the overall welfare of the relocated people. The high levels of cash compensation have improved the living standard of many PAPs, who show visible signs of prosperity (private vehicles, larger and more expensive houses, better schooling of children, etc.).

#### Manjamma's Story

Before her relocation, Manjamma had 3 acres of land in village Karvane inside BWLS and has been shifted to MC Halli where she has a 1 acre plot of land. At MC Halli, she works 365 days a year on her land. Her son runs an autorickshaw which he purchased from the compensation money, while her daughter works for daily wages. After relocation, Manjamma has joined the Chamundeswari SHG in MC Halli, has constructed an extension to her house, and has married one daughter. While she thinks that her new agricultural land is of good quality, she finds that grazing their cattle and obtaining firewood are problematic at MC Halli. Overall, she feels that relocation from BWLS to MC Halli has been good for her, and for others who were smart and knew how to deal with the outside world. They have good schools, an excellent bus service and fertile agricultural land.

However, she often becomes nostalgic about her old village and the old way of life there. She feels that at Karvane, people had no problems about feeding their families, and in fact, she could easily have fed 10 unexpected guests even if they turned up at her doorstep late at night. At MC Halli, she feels that this will be a problem since all food items have to be purchased. She is quite sure that the relocation of people has not done anything to improve forest quality at Bhadra, and has in fact made things worse, since thieving inside the forest can go unchecked now.

Interviews with the PAPs reveal that for all of them, relocation has brought about important changes in their livelihood pattern. Significant adjustments have been made to the new circumstances, especially to the fact that after relocation, most requirements of the household have to be purchased and cannot be obtained *gratis* from the forests and commons. The overall need for cash income has increased, even while the potential sources of such income may have remained static. The PAPs have made a sudden and drastic transition from the subsistence mode of production to a predominantly market-based economy, and find the process of adjustment quite difficult. This, of course, is more true for the poor and marginalized households, and for vulnerable groups like women, than for the better-off households and for men in general. Two or three landless PAPs have reportedly been unable to adjust, and have sold their lands and moved to other locations

### **Nagesh's Story**

Nagesh stays with his wife, parents and 2 children at MC Halli, where he has a 3 acre plot of land and built his family a 6-room house that is equipped with good furniture and appliances like a TV, mixer and pressure cooker. The house, furniture and appliances were all financed out of the compensation money and the income he earns at MC Halli.

He grows paddy and sugarcane on his land, and has begun using chemical fertilizers instead of staying with organic manure as he used to at his old village Hebbe-Kurkulmane inside BWLS. His family keep a cow, whose milk they use as well as sell to a local dairy. He is happy with the school and hospital near MC Halli, but thinks that the General Post Office here is not up to the mark. He finds it difficult to obtain firewood and fodder in MC Halli, and also feels that the micro-climate here had initially affected his health adversely, but now he has begun getting used to the new place, surroundings and climate.

Nagesh says he is reconciled to spending the rest of his life at MC Halli, and is now trying to build a good life here. Given the hardships his family and others had to face inside BWLS, he feels that on balance, relocation has been good for them.

## **4.1 EMERGING LESSONS**

### *Success Factors*

The major factors behind the success of the Bhadra LA and R&R project can be classified as proximate and ultimate factors.

### **4.1.1 Proximate Causes of Successful LA and R&R**

- Very good quality of land and generous compensation package
- Dedicated officers (DCF and DC)
- Open and transparent LA and R&R process

However, each of these proximate factors is in turn the outcome of a series of long-term or ultimate success factors. These are examined in some detail below:

### **4.1.2 Ultimate Causes of Successful LA and R&R**

#### *Quality of Human Resource*

- The presence of a dedicated Forest Officer, with a talent for detailed planning and robust documentation of LA and R&R process, a problem-solving approach to issues and good managerial skills
- The presence of a very efficient District Collector, with a humane approach to LA and R&R, who provided overall support to the DCF without indulging in micro-management

#### *Convergence*

- Good coordination between Forest and Revenue Departments, resulting in good compensation awards, identification of high quality land, and helping the community to get actual possession of land
- Other departments were involved effectively to provide housing, infrastructure, other facilities at rehabilitation site
- Good coordination of the DCF and the DC with elected representatives, so that local conflicts could be avoided, project sanction was speeded up, and the entire

process of land acquisition and grant of compensation occurred smoothly and with minimum delay and leakages

#### *Out-sourcing of critical services*

- Survey of rehabilitation site and delineation of plots was carried out by a private agency using GIS and other modern techniques
- Construction of houses was done by Nirmithi Kendra
- Electrification of the resettlement colony at MC Halli was carried out by a private contractor
- All these resulted in avoidance of delays, and improved quality of the rehabilitation services provided to PAPs

#### *Strong local community leadership*

- This strength was derived in large part from their caste composition and exposure to the mainstream
- It gave the PAPs the ability to identify and obtain good quality land and good terms of compensation
- It also gave them the ability to dialogue with political leaders and bureaucrats to push their agenda effectively
- In times of crisis, it gave them the ability to protest at various levels to get their demands met, or to bring the project authority to the negotiating table

#### *Pro-active Local NGO*

- The organization Wildlife First, represented by Mr. D.V. Girish and Panduranga Swamy, helped with listing of beneficiaries, proper distribution of package, and in general in building bridges between the PAPs and the project authority
- Their involvement helped to maintain continuity between officers when transfers occurred
- It also created sustained pressure for conservation of the PA against threats from commercial interests as well as local community users

#### *Circumstantial Factors*

- The local community is well-exposed to the mainstream society, economy and political processes
- Local livelihoods were mainly agricultural, so that it was easy to recreate livelihoods at the resettlement site for a majority of PAPs if good land could be identified
- The resettlement area was characterized by easy availability of wage employment opportunities (due to the presence of coffee plantations and towns nearby)
- The overall level of governance is good in Karnataka, and the degree of efficiency of state systems is quite high

## **4.2**

### ***POLICY IMPLICATIONS***

The policy environment governing relocation of people from Protected Areas has undergone significant change in recent years, with the enactment of the Scheduled Tribes and Other Forest Dwellers (Recognition of Rights) Act, and the Amendments to the Wildlife Protection Act, 2007. Both legislations dwell in detail on the circumstances under which relocation of people from PAs can

be undertaken, and are firm on the principle of minimizing displacement and working on co-existence options wherever possible.

In this light, the Bhadra LA and R&R project needs to be viewed through the twin lenses of (a) the justification or scientific basis for village relocation, and (b) the net impact of relocation on the ecological security of the Bhadra wildlife sanctuary.

A few important questions in this regard are:

- Were pressures from local people high enough to cause irreversible damage to the PA?
- Were other, non-displacing alternatives for conserving flora and fauna, involving coexistence of people and wildlife, explored adequately?
- Were pressures on the PA only generated by people living inside the PA, or also by others living on its periphery? If the latter, how are these pressures being addressed?
- How serious are the pressures on the PA from the development, industrial and mining sectors? Does the PA management have the capacity to handle these pressures effectively? If not, is relocation of villages still justified, or should co-existence options be explored to create a wider constituency for conservation of Bhadra's biodiversity?



***Area vacated inside BWLS by villages Karvane and Muthodi, and forest regeneration at the vacated site after three years***



# Living Amidst Large Wildlife: Livestock and Crop Depredation by Large Mammals in the Interior Villages of Bhadra Tiger Reserve, South India

**M. D. MADHUSUDAN**

Centre for Ecological Research and Conservation\*  
3076/5, IV Cross, Gokulam Park, Mysore 570 002, India  
and National Institute of Advanced Studies  
Indian Institute of Science Campus, Bangalore 560 012, India

**ABSTRACT** / Conflict with humans over livestock and crops seriously undermines the conservation prospects of India's large and potentially dangerous mammals such as the tiger (*Panthera tigris*) and elephant (*Elephas maximus*). This study, carried out in Bhadra Tiger Reserve in south India, estimates the extent of material and monetary loss incurred by resident villagers between 1996 and 1999 in conflicts with large felines and elephants, describes the spatiotemporal patterns of ani-

mal damage, and evaluates the success of compensation schemes that have formed the mainstay of loss-alleviation measures. Annually each household lost an estimated 12% (0.9 head) of their total holding to large felines, and approximately 11% of their annual grain production (0.82 tonnes per family) to elephants. Compensations awarded offset only 5% of the livestock loss and 14% of crop losses and were accompanied by protracted delays in the processing of claims. Although the compensation scheme has largely failed to achieve its objective of alleviating loss, its implementation requires urgent improvement if reprisal against large wild mammals is to be minimized. Furthermore, innovative schemes of livestock and crop insurance need to be tested as alternatives to compensations.

An elephant in a crop field or a tiger in a cattle pen presents a situation that is doubly perturbing: not only are crops and cattle at risk from hungry wildlife, but so are the elephant and the tiger from angry humans. Throughout the world, conflicts between wildlife and humans undermine their mutual well being and increasingly threaten the conservation of many wildlife species involved. Although of worldwide occurrence (Sukumar 1991, Hoogesteijn and others 1993, Cozza and others 1996, Barnes 1996, Mishra 1997, Naughton-Treves and others 1998), conflicts between humans and wildlife are most intense in the tropics, where wildlife competes directly with a rapidly increasing human demand over scarce land and resources. Almost invariably, the species implicated—and threatened—in such conflicts are large-bodied mammals that are intrinsically rare and extinction-prone (Madhusudan and Mishra 2003).

India is believed to contain over half the world's remaining population of tigers (Seidensticker and others 1999) and Asian elephants (Sukumar and Santiapillai 1996) and holds the greatest promise for the long-term conservation of these species in the wild. Today, populations of these and other large mammal species

in India are mostly distributed across the country's network of 540-plus wildlife reserves (Madhusudan and Karanth 2000). Significantly, 69% of these reserves also support resident human populations, mostly poor and disadvantaged, whose overall numbers are estimated to exceed three million (Kothari and others 1995). As a result, India's wildlife reserves support a variety of human land uses, including agriculture, pasturing of livestock, and many direct extractive uses of natural resources. A survey in the late 1980s (Kothari and others 1989) revealed that cultivation, livestock grazing, and extraction of nontimber forest products occurred in 66%, 69%, and 57% of the reserves, respectively. Such a close juxtaposition of tigers, elephants, and other large mammals with humans and their land use has precipitated serious conflicts countrywide over space and resources (for reviews, see Sukumar 1994, Madhusudan and Mishra 2001). The conservation of large and potentially dangerous mammals within India's densely populated wildlife reserves thus poses singular challenges.

India's wildlife managers and academics have, in general, appreciated that losses suffered by humans in such conflicts inevitably erode local goodwill and generate animosity towards conservation efforts. Wildlife managers have therefore instituted several schemes for preventing human-wildlife conflicts (Sukumar 1994, Karanth and Madhusudan 2002) involving physical and behavioral means of excluding large mammals from

**KEY WORDS:** Human-wildlife conflict; Livestock depredation; Crop raiding; Large mammals; India

\*Address for correspondence; e-mail: mdm@ncf-india.org

human habitation. In reality, conflicts continue to occur despite such measures. Thus, reparatory measures, such as monetary compensations, are believed to help in assuaging these conflicts. However, in relation to the diversity of socioeconomic and ecological contexts, there are very few assessments (Mishra 1997; Manakadan and Rahmani 1998; Sekhar 1998; Nath and Sukumar 1998) of the extent of monetary losses suffered in wildlife–human conflicts in India, and the effectiveness of compensation schemes in offsetting these losses.

In this paper, I present a case study of livestock depredation by tigers and leopards (*Panthera pardus*) and of crop depredation by elephants in five interior villages of Bhadra Tiger Reserve, southern India. Specifically, I assess the extent and impact of material and monetary losses suffered by resident villagers, examine spatiotemporal patterns in loss suffered in the villages from livestock and crop depredation, evaluate the effectiveness of compensation schemes instituted by the Forest Department to offset such losses to villagers, and discuss the options available to streamline the *post facto* management of conflict between large mammals and humans in India.

## Study Area

Bhadra Tiger Reserve (hereafter Bhadra) is located at the foothills of the Western Ghats Mountains and stretches across Chikmagalur and Shimoga districts in the southern Indian state of Karnataka. Bhadra covers an area of 495 km<sup>2</sup> and is dominated by moist to dry deciduous forests. It receives over 2000 mm of rain annually, with most of it falling during the southwest monsoon between June and September. Bhadra was designated as a Wildlife Sanctuary in 1974, and included as a Tiger Reserve under the Indian Government's Project Tiger initiative in 1998.

The large mammalian fauna of Bhadra comprises a diverse assemblage of predator and prey that includes large herbivores such as the Asian elephant (*Elephas maximus*), gaur (*Bos gaurus*), sambar (*Cervus unicolor*), chital (*Axis axis*), wild pig (*Sus scrofa*), and muntjac (*Muntiacus muntjak*), and large carnivores such as the tiger, leopard, and the Asiatic wild dog or dhole (*Cuon alpinus*). Greater detail about the wildlife of Bhadra is available in Karanth (1982) and Kumar (2000).

In Bhadra, 16 isolated villages under the administrative control of the State Revenue Department are embedded within a larger forested landscape managed by the State Forest Department. According to records (Government of Karnataka 1992), 736 families (population ca. 3000) own property within these villages.

However, the number of families actually residing within these villages is much lower (personal observation). Of these villages, I chose five—Muthodi, Késavé, Maadla, Hipla, and Karvaani—that accounted for over half of the human population resident within Bhadra. Nearly 65% of the resident families in these villages were landless and either tilled land as sharecroppers, worked as wage laborers in coffee estates surrounding Bhadra, or gathered forest produce seasonally for local markets.

Cattle dominate the village livestock, which also includes buffalo, sheep, and goat. Oxen make up the majority of the cattle population and are employed mainly as draft animals in agricultural fields. Cattle are rather unproductive as milk animals and are reared mostly as sources of organic manure used in the crop fields. During the primary growing season (May–November), adult livestock graze exclusively in the surrounding forests, while at other times they may also graze in the fallow cropland. Wet paddy (*Oryza sativa*) cultivation is the dominant agricultural activity in the villages. Most farmers raise a single monsoon-dependent paddy crop, although a small proportion of farmers with access to year-round irrigation raise a second crop during the dry season. A few families also maintain small plantations of coffee (*Coffea robusta*) and areca (*Areca catechu*), in addition to cultivating paddy and pulses.

Although all three large carnivores present in Bhadra—tiger, leopard, and dhole—are capable of killing livestock, it is mainly the solitary and nocturnal felines that cause most of the damage. Elephants are the most important species jeopardizing crops grown in the interior villages. Besides feeding on paddy, elephants are believed to destroy greater amounts of grain by trampling the fields. In addition to elephants, wild pigs also damage paddy crop in villages.

Humans seldom accompany cattle that graze in the forests, whereas goats, sheep, and buffalos always graze under human escort. Livestock, however, are always penned overnight in stalls within human settlements. All villages except Karvaani are ringed by perennial streams, which serve to attract wildlife, including the depredatory species. The crop fields also extend considerable distances (up to a kilometer) from the village. Prior to harvest, therefore, farmers erect treetop lookouts on the periphery of the fields and maintain continuous vigil over their crops. Shouting, beating tin cans, hurling rocks, and bursting firecrackers are the primary methods used to scare off elephants, although it is not uncommon to fire at marauding elephants with shotguns and muzzle-loaders (D.V. Girish personal communication).

## Methods

### Data Collection

During April–May of 1999, I conducted a survey of 86 households owning livestock in the villages of Muthodi, Késavé, Maadla, Hipla, and Karvaani. The 86 households surveyed accounted for over two thirds of the estimated livestock population and 52% of the total cropland tilled in the five villages. The surveys gathered the following details regarding the livestock holding of each respondent: size and composition of current holding, annual sale or purchase of livestock between April 1996 and March 1999, and annual livestock mortality between April 1996 and March 1999 attributed to predation by large carnivores, and whether such kills occurred within the village or in the adjoining forests. Further, data were gathered on whether victims had filed compensation claims with the Forest Department for livestock losses suffered, as well as reasons for not doing so, where claims were not filed. I also enquired about the outcome of their claims, including the reasons for rejection, if provided.

In order to gather data on crop depredation by elephants, I surveyed 81 households that raised paddy crops in the above villages. I collected information pertaining to the amount of agricultural land owned or tilled by a family, their estimated annual crop production, and their estimated annual crop losses to elephant depredation between April 1996 and March 1999. From each interviewee, I also gathered details of compensation sought and received from the state Forest Department for crop losses. I did not include coffee in the assessments of damage inflicted by elephants. The extent of land under coffee was relatively small, and it was cultivated closer to human habitation. Moreover, since elephants did not feed on coffee, villagers did not perceive them a serious threat to coffee. I also omitted losses to coconut (*Cocos nucifera*), areca nut, garden plants, and other property within the village as they occurred infrequently, and the resultant damage was difficult to quantify.

I systematically cross-verified reported loss of livestock or crops with a local field assistant and randomly with other villagers in order to corroborate the correctness of the information provided. Additional data were gathered on measures adopted by villagers to protect their livestock and crops from wild animals. I also tried to obtain information on reprisal tactics by villagers against marauding large carnivores and crop-raiding elephants. This information was, in general, difficult to obtain, although some interviewees did divulge details of the retaliatory measures used. Anecdotally, I recorded visible injuries (embedded shotgun pellets and

shrapnel from muzzle loaders) sustained by elephants in the adjacent forests that could be ascribed to encounters with farmers. From the records of the State Forest Department in Chikmagalur, I obtained details of compensation sought by and paid to the villagers for livestock and crop losses to wildlife between April 1996 and March 1999.

### Data Analysis

From the 1999 census of cattle in the sample villages and additional data available on births, stock supplementation, livestock depredation, and natural mortality, I modeled the dynamics of livestock populations in Bhadra for the preceding three years. Birth rates were calculated as the number of calves (age <1 year) per hundred females. I assumed natural mortality rates in Bhadra to be the same as nationwide averages given in Mishra (1978). Data on stock supplementation and livestock depredation were obtained from the survey.

The chi-squared goodness of fit test (Siegel and Castellan 1988) was used to examine the degree of correspondence between the observed livestock loss in the villages and the expected loss, given their livestock holding. A Spearman rank correlation was used to examine the association between crop loss per unit area and the extent of cropland in a village. Tests were considered significant at  $P \leq 0.05$ .

The monetary value of cattle was assigned on the basis of an animal's worth, as assessed by applicants filing compensation claims with the Forest Department. Accordingly, the average value of a bullock was estimated at Rs. 3333, a cow at Rs. 2640, and a yearling calf at Rs. 1360 (Rs. 47 = 1 US\$). The monetary value of goat and buffalo was estimated in accordance with prevalent market values as Rs. 1000 and Rs. 4000, respectively. For paddy, I used the market rate at the time of the survey (Rs. 6250 per tonne) to assess the monetary value of losses to crop raiding. Figures of household income were taken from the "marginal land-holder" category in a recent survey carried out in the region (National Council for Applied Economic Research 2001)

## Results

### Livestock Holding, Depredation, and Compensation

Cattle were the dominant livestock species in the villages (Table 1) at 92%, while buffaloes (4%), goats (2%) and sheep (2%) constituted the remainder. Between April 1996 and March 1999, the sampled households attributed a loss of 219 livestock to large carnivore predation (Table 2). In nearly all these cases, the identity of the predator was not readily available. How-

Table 1. Livestock holdings in the villages of Bhadra Tiger Reserve, India (1999)

Village	Cattle <sup>b</sup>			Total cattle	Other livestock <sup>a</sup>	Total livestock	Families sampled	Stock holding per family
	AdM	AdF	Yr+Yg					
Hipla	75	52	34	161	37	198	29	6.8
Karvaani	32	19	16	67	3	70	10	7.0
Késavé	23	15	13	51	0	51	9	5.7
Maadla	100	87	69	256	3	259	28	9.3
Muthodi	13	12	7	32	0	32	10	3.2
Overall	243	185	139	567	43	610	86	7.1

<sup>a</sup>Includes buffalo, sheep and goat.

<sup>b</sup>AdM = Adult male; AdF = adult female; Yr = yearling calf; Yg = young calf.

Table 2. Livestock losses inflicted by large carnivores in Bhadra Tiger Reserve, India (1997–1999)

Village	Incidents (N) <sup>a</sup>	Livestock killed (N)	Total monetary loss (Rs.) <sup>b</sup>	Annual monetary loss		
				Mean (Rs.)	CV (%)	Per family (Rs.)
Hipla	36	57	164,764.00	59,500.00	16	2,051.72
Karvaani	14	17	51,223.00	19,166.67	81	1,916.67
Késavé	13	29	75,223.00	26,166.67	53	2,907.41
Maadla	58	103	299,208.00	109,333.33	47	3,904.76
Muthodi	10	13	36,611.00	13,333.33	46	1,333.33
Overall	131	219	627,029.00	227,500.00	4	2,645.35

<sup>a</sup>Data from a sample of 29 interviewees in Hipla, 10 in Karvaani, 9 in Késavé, 28 in Maadla, and 10 in Muthodi.

<sup>b</sup>Monetary value of cattle assigned on the basis of appraisal of animals' worth by applicants in compensation claims: adult male = Rs. 3333; adult female = Rs. 2640; yearling calf = Rs. 1360; goat = Rs. 1000; buffalo = Rs. 4000

ever, villagers attributed nearly all kills to tigers and leopards, and none to wild dogs. Of the 219 kills, 216 were of cattle, while 2 goats and 1 buffalo were the only other livestock species killed. The observed frequency of kills in the villages deviated significantly ( $\chi^2 = 12.94$ ;  $P = 0.01$ ) from frequencies predicted from the abundance of livestock in the villages. Késavé suffered disproportionately heavier livestock losses ( $\chi^2$  contribution = 48%), while Hipla and Karvaani suffered lower losses ( $\chi^2$  contributions = 22% and 20%, respectively) than expected from their livestock abundance. The overall loss from large carnivore kills amounted to 0.9 animals/household/yr, or an estimated annual loss of 12% of the average family livestock holding. In monetary terms, the livestock loss amounted to Rs. 2645/household/yr, which was 14% of the monetary value of the average holding per household, and equivalent to 16% of the average annual household income in the region. The overall annual monetary value of livestock losses to large carnivores in the villages was Rs. 227,500 (approx US\$5056).

Livestock killing by large carnivores seemed to have a significant impact on cattle populations in Bhadra (Table 3). It is important here to note that the livestock population in the villages was male-biased (Table 1), which resulted in low per-capita population growth

rates. Births alone were unable to offset losses occurring due to natural mortality and killing by large carnivores. However, annual purchases of cattle were able to annul this decline, and in fact, overcompensated for cattle losses, showing an effective overall increase in cattle populations in Bhadra from early 1997 to 1999.

Of the 83 livestock kills whose location was available, 45 (54%) occurred within the villages, while the remainder occurred in forests adjoining the villages. Interestingly, of the 45 livestock kills that took place within the villages, 44 (98%) were in the post harvest season between November and May, while livestock kills made in the forest peaked in the dry period between March and May (Figure 1).

Compensation was sought for livestock killed in over half the instances (Table 4). Of the 71 applications filed for compensation, 15 cases were compensated for Rs. 17,250. Of the 35 applications rejected by the Forest Department, 10 were rejected because kills occurred on forestland; 3 because the applicants did not possess "proof of land rights"; and 22 for unknown reasons. Twenty-one applications were still pending when these data were collected. Among the 60 cases where villagers did not seek compensation, 19 (32%) involved livestock kills made in forests, 16 (27%) involved the absence of "statement of land rights," while 25 (42%) respondents

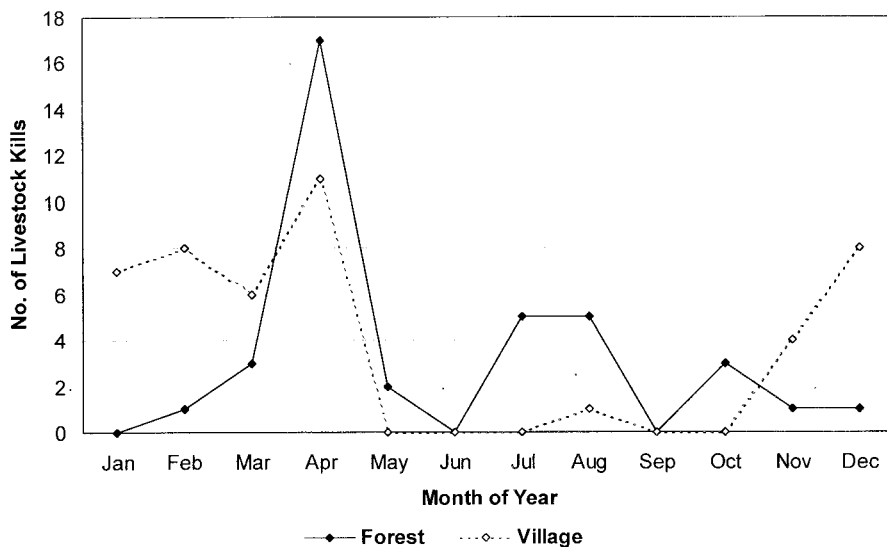
Table 3. Dynamics of resident cattle populations in Bhadra Tiger Reserve, India (1996–1999)

Year	Population at year start	Births <sup>a</sup>	Stock purchased	Natural mortality <sup>b</sup>	Killed by large carnivores	Population at year end <sup>c</sup>	Annual rate of increase (%)
1997	519	77	44	18	71	551	5.98
1998	551	75	43	18	73	578	4.78
1999	578	70	11	17	75	567	-1.92
Average annual rate of population increase							2.95

<sup>a</sup>Annual birth rate: 37.6 per 100 females (M.D.M., unpublished data).

<sup>b</sup>Stage specific mortality data from Mishra (1978).

<sup>c</sup>Births/purchases were assumed to occur at the start of a year; mortalities/kills were assumed to occur at the year end (for details, see Methods section).



**Figure 1.** Seasonal variation in frequency and location of livestock kills by large carnivores in Bhadra Tiger Reserve, 1998-1999.

did not specify reasons for not applying. None of the villagers questioned reported instances where forest department officials had solicited bribes in order to dispose of compensation claims.

Compensations awarded by the Forest Department were 3% of the overall loss sustained by the villagers from livestock depredation, and 5% of the loss for which villagers filed claims. A successful claimant for compensation, on average, was awarded 27% of the value sought in the application. Forest Department records also indicated that applications took an average of 180 days (SD = 55 days;  $N = 18$ ) to be processed.

#### Land Holding, Crop Production, Losses, and Compensation

Sixty-eight (84%) of the 81 villagers interviewed tilled land totalling 146.6 ha. Of them, 49 owned a total of 97.7 ha, at an average holding of 2.0 ha (SD = 2.5 ha) per family. Fifteen families cultivated on encroached land totaling 21.4 ha, or 1.4 ha (SD = 0.7)

per family. In addition, 22 interviewees (including those owning land) tilled others' land as sharecroppers. Sharecropped land totaled 27.5 ha, or 1.3 ha (SD = 0.8 ha) per family. Crop productivity averaged 3.4 tonnes/ha (SD = 0.9 tonnes/ha;  $N = 66$ ). Nineteen percent of the interviewees raised a second paddy crop in summer, which contributed 23% of their annual crop production, and 6% of the total output. Sharecroppers returned a share of 1.0 tonnes/ha (SD = 0.4 tonnes/ha;  $N = 19$ ) to land owners, which amounted to approximately a third of their produce.

Most elephant damage to paddy occurred in the month before harvest. Between April 1996 and March 1999, interviewees attributed a total crop loss of 114.7–118.7 tonnes to elephants, at an annual loss of 38.9 tonnes, or approximately 14% of the total annual crop production (Table 5). In monetary terms, the overall annual loss to interviewees was estimated at Rs. 243,167 (or US\$5404), which was 11% of the monetary value of their annual production. The annual loss per family



Table 4. Details of compensations awarded for livestock depredation by large carnivores in Bhadra Tiger Reserve, India (1997–1999)

Village	Incidents ( <i>N</i> )			Successful claims <sup>a</sup>			Total compensation awarded as %: total loss claimed <sup>b</sup>	Time taken (days)
	Total	Seeking compensation (%)	Receiving compensation (%)	Sought (Rs.)	Awarded Rs.	Awarded %		
Hipla	36	44	11	12,000.00	3,650.00	30	4	196
Karvaani	14	21	0	NA <sup>c</sup>	0	0	0	-
Késavé	13	92	23	16,000.00	3,250.00	20	5	172
Maadla	58	55	10	36,700.00	8,950.00	24	5	181
Muthodi	10	80	20	NA	1,400.00	-	5	NA
Overall	131	54	11	64,700.00	17,250.00	27	5	183

<sup>a</sup>Successful claims sought refers to claims honored by the Forest Department; successful claims awarded refers to the amount paid by the Forest Department so far against valid claims

<sup>b</sup>Total loss claimed refers to all claims made by villagers to the Forest Department, including those that were rejected on various grounds (see text for details)

<sup>c</sup>NA = not available

Table 5 Crop losses inflicted by elephants in Bhadra Tiger Reserve, India (1997-1999)

Village	Incidents ( <i>N</i> ) <sup>a</sup>	Land (ha.)		Annual productivity (T/ha)	Annual loss (T/ha)	Ratio of loss to productivity (%)	Annual monetary loss (Rs.) <sup>b</sup>		Annual loss per family (Rs.)
		Owned	Share-cropped				Mean	CV (%)	
Hipla	41	46.01	4.86	4.05	0.54	13	69,750.00	38	5,103.66
Karvaani	26	14.97	0.00	2.82	0.35	12	28,750.00	74	3,317.31
Késavé	16	9.71	4.86	2.97	0.84	28	52,166.67	7	9,781.25
Maadla	53	43.75	16.59	3.46	0.32	9	79,666.67	14	4,509.43
Muthodi	7	4.65	1.21	3.19	0.64	20	12,833.33	74	5,500.00
Overall	143	119.1	27.5	3.43	0.47	14	243,166.67	30	5,101.40

<sup>a</sup>Data from a sample of 23 interviewees in Hipla, 9 in Karvaani, 9 in Késavé, 23 in Maadla, and 4 in Muthodi.

<sup>b</sup>Monetary value of paddy computed at the prevailing market rate of Rs. 6250 per tonne.

amounted to Rs. 5101, which was 11% of the monetary value of their annual production, and approximately 30% of the average annual household income in the region. Crop loss per unit area was inversely correlated with the extent of cropland across the five villages ( $r_s = 0.90$ ,  $P = 0.037$ ,  $N = 5$ ).

In 63 of 143 cases of crop losses to elephants, victims applied for compensation. None of the villagers from Karvaani and Muthodi applied for compensations, although they accounted for a quarter of all crop-raiding incidents. Of the 63 who applied, 37 (59%) cases were awarded compensation totalling Rs. 29,800. Fifteen (24%) applications were rejected for reasons unknown to applicants, and 11 (17%) were still pending before the Forest Department. Among the 80 cases where victims did not apply for compensations, 39 (49%) did not do so because the losses occurred on encroached land for which they did not have relevant legal documents, 14 (18%), owing to the lengthy bureaucratic

process involved in obtaining compensation, while 8 (10%) did not apply since they were sharecroppers without access to the relevant land documents, and 19 (24%) did not specify reasons for not applying. No villager reported solicitations of bribe by Forest Department officials involved in the processing of compensation claims.

According to the Forest Department records, between April 1996 and March 1999, 67 cases of crop loss from elephants totaling 52.8 tonnes were compensated at Rs. 53,090. This worked out to 14% of the monetary value of crop loss for which villagers had filed claims with the Forest Department and 7% of the monetary value of total crop loss sustained by interviewees during the same period. Successful applications were awarded approximately 44% of the claimed amount. The Forest Department, on average, took 77 days ( $SD = 21$ ;  $N = 37$ ) in order to fully process an application for compensation of crop loss.

## Discussion

### Wildlife–Human Conflict in Bhadra: Spatiotemporal Patterns

The results indicate that villagers in Bhadra experience substantial livestock losses to large carnivores and crop losses due to elephants. Indeed, in the absence of livestock purchases, predation by wild carnivores appears to be causing livestock population declines in the villages (Table 2).

The seasonal patterns of livestock losses (Figure 1) have interesting implications for managing conflict with large felines. I posit that even routine human activity and vigilance, although not specifically conceived to keep away large carnivores, may achieve a considerable level of deterrence. As my data show, over half (54%) the livestock kills occurred within villages, with 98% of them occurring between harvest and sowing. A possible explanation for this trend is that the daytime presence of humans in crop fields and a continuous nocturnal vigil on the periphery of fields against elephants during the growing season may deter large felines from entering villages to kill livestock. Indeed, during the agricultural season, just one kill occurred within the villages as compared to 15 kills in the forest during the same time. After harvest, daytime human activity in the fields decreases and cattle begin to feed in the crop fallows. Nocturnal vigil on the periphery of crop fields is also abandoned. This emboldens large felines to enter villages and kill livestock in fields during the day and in their stalls at night: 33 kills occurred in villages in the fallow season (November to March) as compared to just three in the forests. During April, at the height of the dry season, when village cattle must go farther into the forests to forage, the kills peak in the forests.

In the villages surveyed, the overall area under crops seemed to be an important determinant of crop losses per unit area. Larger villages such as Maadla and Hipla that had a greater extent of cropland (Table 5) suffered lower crop losses per hectare than villages such as Muthodi and Késavé. The greater perimeter–area ratio of smaller villages (Muthodi and Késavé: 19.2 km/km<sup>2</sup>) compared with larger villages (Maadla and Hipla: 8.9 km/km<sup>2</sup>) is likely to have enhanced their vulnerability to raids by elephants. Késavé, in particular, appeared to be among the most seriously affected by both livestock and crop losses. Annually, villagers in Késavé lost nearly a fifth of their livestock and over a quarter of their crop to animal damage, which appears to have been an important factor in the emigration of many families from there.

### Living Amidst Large Wildlife: What Does Biology Tell Us?

Large mammal biology conveys a simple but vital point with respect to conflicts between humans and wildlife: a certain level of conflict is inevitable in any interface between humans and large mammals (for a detailed discussion, see Madhusudan and Mishra 2001). Therefore, it is unreasonable to treat conflict as an aberration, rather it must be recognized at the very outset that conflict can, at best, only be managed, and never eliminated.

While conflict might not be entirely unexpected, it is important to recognize that anthropogenic pressures on wildlife and their habitat can precipitate the problem. In Bhadra itself, a study showed that the palatable herb cover was 30% lower and palatable shrub biomass was 25% lower in plots that were heavily grazed by village cattle compared with plots with low levels of livestock grazing (Madhusudan 2000). Such a decline in biomass of palatable forage could lower carrying capacity of the area for elephants and wild ungulate prey of large felines, in turn provoking intensified crop-raiding and killing of livestock by big cats. In general, the intense removal of biomass from wildlife habitat could depress carrying capacities for large mammals to levels where it intensifies their natural tendency to raid crops and kill livestock (Madhusudan and Mishra 2001).

### Of Compensations and Insurance

Several studies in India have discussed preventive measures to manage conflict between humans and wildlife (Sukumar 1991, 1994; Mishra 1997, Sekhar 1998, Nath and Sukumar 1998, Karanth and Madhusudan 2002). Still, there are no documented successes in preventing all possible conflict between humans and wildlife. Considering the reality of wildlife damage, it is imperative to examine *post facto* options available to manage emergent conflicts. Indian wildlife law does not sanction the killing of species such as the elephant, tiger, or leopard for reasons such as livestock or crop depredation (Sawarkar 1986, Anon 1997). Given that either the prevention of all wildlife damage or the destruction of problematic wildlife is not achievable, reparatory measures become important in managing conflicts. Compensation programs have sought to evaluate and offset monetary costs to humans in such conflicts. But have these programs succeeded?

Before addressing this question, it is important to understand how the present system of compensation works. In order to be considered for compensation, the putative victim is required to file a complaint with the

Table 6 Details of compensations awarded for crop losses inflicted by elephants in Bhadra Tiger Reserve, India (1997–99)

Village	Incidents (N)			Successful claims <sup>a</sup>			Total compensation awarded as % total loss claimed	Time taken (days)
	Total	Seeking compensation (%)	Receiving compensation (%)	Sought (Rs.)	Awarded			
					Rs.	%		
Hipla	41	29	20	24,250.00	10,775.00	44	13	69
Karvaani	26	—	—	—	—	—	—	—
Késavé	16	56	31	11,250.00	3,750.00	33	4	86
Maadla	53	79	45	85,750.00	38,565.00	45	19	78
Muthodi	7	—	—	—	—	—	—	—
Overall	143	44	26	121,250.00	53,090.00	44	14	78

<sup>a</sup>Successful claims sought refers to claims honored by the Forest Department; successful claims awarded refers to the amount paid by the Forest Department so far against valid claims.

<sup>b</sup>Total loss claimed refers to all claims made by villagers to the Forest Department, including those that were rejected on various grounds (see text for details)

Range Forest Officer (RFO) of the concerned Forest Range immediately. In order to claim compensation for crop damage, as well as livestock loss, victims are expected to attach valid documents establishing their rights over the land where the loss occurred. Present procedures of claim verification require an investigation report, statements from local witnesses and the village council corroborating the loss, and an evaluation of the loss by a section forester. Thereafter, the claim has to be ratified by the RFO, and then verified and endorsed by the assistant conservator, before obtaining a final sanction from the deputy conservator. The deputy conservator is constrained by a government order (Government of Karnataka 1995) to pay an arbitrary maximum compensation of Rs. 1000 for a given instance of livestock depredation or crop damage. Higher claims are again subject to a ceiling of Rs. 2000 and require approval from the conservator; claims even higher than these are referred to the chief conservator.

In reality, difficulty of access to forest offices and nonavailability of concerned staff make the seemingly simple act of filing a compensation claim an onerous task. The insistence on producing documents of land rights to support claims of livestock loss is without basis. In fact, this “requirement” has ensured that none of the livestock kills in Karvaani, where almost all families have encroached land and therefore do not have access to this document, have been compensated to date (Table 4). Similarly landless families have had poor success in obtaining compensation for livestock kills. The bureaucratic claim verification and approval procedure takes more than ten weeks to be completed; my data showed that compensations for livestock kills took six months, on average, to be discharged (Table 4). The filing and follow-up of compensation claims also require significant financial investment (mostly for travel

to forest offices, but occasionally on bribes to obtain land records) on the part of the claimants. Finally, compensations, even if awarded, offset only a miniscule proportion of the loss sustained by the victim (Tables 4 and 6). Thus, compensation programs, in their current form, have achieved little of their implicit objective of helping victims of wildlife damage. As a result, it also seems unlikely that compensation programs have improved the conservation prospects of marauding wildlife species in these areas: villagers in Bhadra still do poison livestock kills occasionally, and elephants still carry injuries from encounters with angry farmers.

So, should compensations be abandoned? Sixty-nine percent of the respondents in the village surveys wanted to see the continuance of the compensation program despite the fact that it undervalued losses, so long as the process was quicker and less bureaucratic. Timing is of serious concern as losses absorbed over time tend to get compounded. For example, a villager who loses a ploughing bullock at the onset of the crop season, and cannot afford replacement, jeopardizes his crop in addition to losing an animal.

Compensation, as a policy, recognizes and addresses the monetary aspects of damage by wildlife, although serious problems exist in delivering policy to action. Without a doubt, compensations need to be more realistic and responsive if they are to help in assuaging conflict. Implementation procedures need to be streamlined, but yet verify the veracity of claims and estimate the extent of loss. In Bhadra, the Forest Department has been extremely forthcoming on this count and has endeavored to bring down the time from application to compensation to five weeks from present levels. However, considering the cash-strapped condition of governments, it is unrealistic to envision on-par

compensation policies that keep pace with the escalation in crop or livestock value.

The compensation scheme is based on the premise that all responsibility for losses and compensation rests entirely with the Forest Department. It must be recognized that a part of the responsibility for minimizing conflicts must rest with local villagers, whose use of adjoining wildlife habitat is a key determinant of the intensity of conflicts. By and large, villagers appreciate this logic and seem willing to make small investments to protect their livestock and crops from wildlife. It is here that protective measures for livestock and crops hold considerable promise as an alternative to compensations. Insurance programs can be envisioned with a one third share of premiums from three interest groups: the villagers interested in securing their livestock and crops, the Forest Department, as the custodian of wildlife, and nongovernmental organizations interested either in the well-being of rural communities and/or wildlife. Under such a split, the actuarially fair insurance premium that a villager in Bhadra would have to pay annually per head of livestock and per acre of paddy could be as low as Rs. 125 (US\$2.60) and Rs. 223 (US\$4.60), respectively. Such a collaborative insurance program currently underway in the trans-Himalaya has shown encouraging results (Charudutt Mishra, personal communication).

The advantages of such a program would be (1) an explicit recognition that the responsibility for conflicts is shared; (2) possibilities of monetary compensation on par with market value; (3) a lower likelihood of false claims when premiums are shared; and (4) relieving the overburdened Forest Department of additional responsibilities and permitting them to focus on protecting wildlife and their habitat. However, this proposition requires closer examination, particularly into its economic aspects, and must be attempted on an experimental basis before larger scale changes are sought.

## Conclusions

The conservation of large and potentially dangerous mammals carries a definite economic cost to humans in terms of damage to livestock and crops. This cost is levied disproportionately on human communities residing in and around large mammal habitat. While it is imperative to offset these costs, it is also important to recognize that strong linkages exist between human impacts on wildlife and their habitat, and the damage inflicted by wildlife upon human communities. In India's wildlife reserves, where human presence and land use is extensive, it is important to link realistic and responsive loss alleviation packages in the short term

with longer-term measures geared to significantly minimize human impacts on large mammal habitat. In this context, voluntary relocation programs—where villagers have agreed to relocate to areas outside the park in return for satisfactory packages offering land, amenities, and better access to socioeconomic opportunities—do hold great promise for the villagers as well as for wildlife.

Conflict has gone hand in hand with the presence of large wildlife all over India. Still, India is truly remarkable in its ability to retain a vast complement of its large mammal fauna even under its existing socioeconomic and demographic milieu and to hold the greatest promise for the conservation of species such as the tiger and Asian elephant. This is attributable to no small extent to India's unique traditions of tolerance against these losses. Culture has certainly advanced the limits of tolerance to economic losses, but cannot do so indefinitely. Economics has begun to eclipse cultural symbolism in this age of markets, and one must recognize this reality in conserving large mammals. Yet, whatever the economic and administrative means of tackling wildlife-human conflict, they must be seen not as substitutes to India's tolerant traditions, but as important means of strengthening them.

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## Ungulate densities and biomass in the tropical dry deciduous forests of Gir, Gujarat, India

JAMAL A. KHAN,<sup>1</sup> RAVI CHELLAM, W. A. RODGERS<sup>2</sup> and  
A. J. T. JOHNSINGH

*Wildlife Institute of India, P.O. Box-18, Chandrabani, Dehradun, 248 001, India*

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**ABSTRACT.** Data on densities, biomass and ecological factors governing the distribution of various wild ungulate species in the different management units of Gir forest from 1987 to 1989 were collected. Density of ungulates ranged from 50.8 km<sup>-2</sup> to 0.42 km<sup>-2</sup>, the highest for chital (*Axis axis*), followed by chinkara (*Gazella gazella*), sambar (*Cervus unicolor*), nilgai (*Boselaphus tragocamelus*) and chowsingha (*Tetracerus quadricornis*). The density of chital did not vary significantly between different censuses and management units. The wild ungulate biomass ranged from 3290 kg km<sup>-2</sup> in the National Park to 1900 kg km<sup>-2</sup> in the Sanctuary East. Following the partial removal of people and livestock in the mid-1970s, there was an increase in the population of all wild ungulates except nilgai and wild pig (*Sus scrofa*). Concurrently, there was an increase in the proportion of wild ungulate prey in the lion's diet. Chital density has shown a 1320% increase. An increase in suitable habitats and a decrease in direct competition with livestock are the most likely factors to have triggered the eruption in chital population. These density estimates are discussed in relation to the prevailing ecological conditions in different management units of Gir.

**KEY WORDS:** *Axis axis*, *Cervus unicolor*, dry deciduous forest, ecological implications, Fourier Series Estimator, Gir Lion Sanctuary, livestock grazing.

### INTRODUCTION

Expressions of population density and biomass have been used to investigate the complex relationship between a species and its environment (Brown 1984) and interspecific relationships in a community (Sinclair *et al.* 1990). These have also been used to examine differences in carrying capacity of various habitats (Eisenberg 1980, Eisenberg & Seidensticker 1976) and to formulate conservation and management strategies for endangered species and wildlife habitats (Berwick 1974, Dinerstein 1980). Karanth & Sunquist (1992) and Srikosamathara (1993) recently reviewed the data on density and biomass of large herbivores of southern Asia and stressed the need for extensive documentation of herbivore densities and biomass of this region with standard census methodologies.

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<sup>1</sup> Present and correspondence address: Conservation Ecology Research Group, Centre of Wildlife and Ornithology, AMU, Aligarh-202 002, India.

<sup>2</sup> Present address: c/o FAO, P.O. Box-2, Dar-e-Salam, Tanzania.

In this paper, we provide data on densities and biomass of an ungulate community characteristic of the tropical dry deciduous forest ecosystem. Data were collected in Gir Lion Sanctuary and National Park (hereafter referred to as Gir) from 1987 to 1989.

#### STUDY AREA AND SPECIES

Gir lies at  $21^{\circ} 20'$  to  $20^{\circ} 57'$  N and  $70^{\circ} 27'$  to  $71^{\circ} 13'$  E in the Kathiawar peninsula of Gujarat (Figure 1) and covers an area of 1412 km<sup>2</sup>. Gir is divided into three management units: Sanctuary West (SW), National Park (NP) and Sanctuary East (SE). These units differ in terms of vegetation, rainfall, topography, human settlement density and, hence, habitat degradation. SW is moderately wooded (mean tree density  $\pm 95\%$  confidence limits  $268 \pm 31 \text{ ha}^{-1}$ ) and water is available throughout the year in streams between the undulating hills. The NP is more densely wooded ( $301 \pm 53 \text{ ha}^{-1}$ ) with more hilly terrain while SE has open wooded grassland vegetation ( $109 \pm 31 \text{ ha}^{-1}$ ) with undulating topography (Khan *et al.* 1990).

The vegetation is tropical dry deciduous forest interspersed with tropical thorn forest (Champion & Seth 1968). Nearly 70% of the total area of Gir (west and central) is covered with teak, *Tectona grandis* (L.), and its several associates, while much of the SE is dominated by *Anogeissus latifolia* (Roxb.). Eight major vegetation types are present in Gir: riverine woodland, distributed along all rivers and streams in the whole of Gir; thorn woodland, distributed on patches

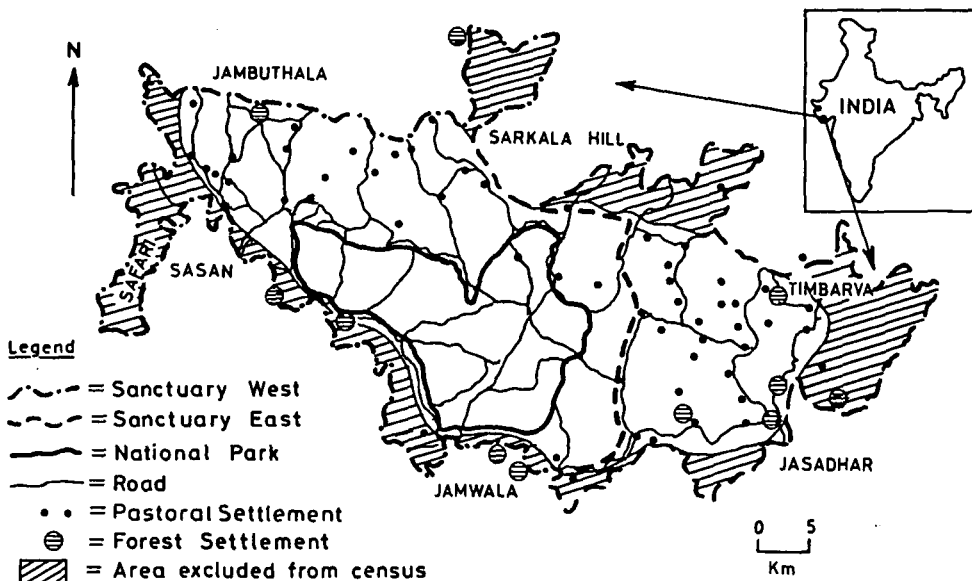


Figure 1. Map of Gir Lion Sanctuary and National Park, India. Sanctuary West = 690 km<sup>2</sup>, National Park = 259 km<sup>2</sup>, Sanctuary East = 463 km<sup>2</sup>.

of Black Cotton soil in the whole of Gir with high browse availability; mixed valley community, found in moist valleys in the whole of Gir; *Tectona-Acacia-Zizyphus* woodland, distributed in SW and NP with high grass and browse availability; *Tectona-Boswellia-Sterculia* woodland, distributed on hill slopes of SW and NP with low grass availability; mixed teak woodland, distributed mostly in NP with low browse availability; *Anogeissus-Boswellia-Lannea* woodland, distributed on hill slopes of SE with low browse availability; and *Anogeissus-Terminalia* woodland, distributed on undulating terrain of SE with high grass and browse availability (Khan 1993).

There is a cool dry winter in Gir from December to March (average minimum 9°C) followed by a hot dry season (average maximum 42°C) which lasts until mid-June. The monsoon breaks in June and continues till September and is followed by a dry post-monsoon season till mid-December. The average rainfall based on the past 28 years' data from the SW and 10 years' data from the SE are approximately 1000 mm and 800 mm, respectively. In 1987, however, SW and SE received only 199 mm and 456 mm of rainfall (Khan *et al.* 1990).

Grazing by livestock of Maldharis (a pastoral community) is heaviest in SE and least in NP (Khan, in press). Prior to 1972, there were 137 pastoral settlements (locally known as nesses with no cultivation) with approximately 16,400 resident domestic livestock distributed throughout the Gir. An additional 25,000–50,000 migratory livestock used to graze inside Gir during dry seasons (Berwick 1974). There are now 74 pastoral settlements and 14 forest settlements (mostly located on boundaries of Gir with cultivation) with 16,800 resident domestic livestock. The resident livestock density is 21.5 km<sup>-2</sup> in SE and 9.8 km<sup>-2</sup> in SW while NP has no resident livestock population. Apart from resident livestock, livestock populations from villages close to Gir graze within sanctuary limits for which no reliable estimates of their numbers are available. The pastoral settlements are located in valleys near permanent water sources.

The ungulate community in Gir comprises of two large (nilgai, *Boselaphus tragocamelus* Pallas, 184 kg; sambar, *Cervus unicolor* Kerr, 166 kg), two medium (chital, *Axis axis* Erxleben, 45 kg; wild pig, *Sus scrofa* L., 32 kg) and two small-sized ungulate species (chowsingha, *Tetracerus quadricornis* Blainville, 21 kg; chinkara, *Gazella gazella* Pallas, 12 kg). These species differ in their spatial distribution within Gir. While chital, nilgai, chowsingha and wild pig are present throughout Gir, chinkara is largely confined to SE and sambar is rare in SE.

## METHODS

### *Sampling ungulate populations*

We chose the road-strip count method of Hirst (1969) to sample the ungulate populations in Gir considering its open habitats and the presence of 700 km of motorable roads. Our data would also be comparable with those of Joslin (1973) and Berwick (1974) who used the same method in Gir with a fixed width of road transects for sampling ungulate populations. Monitoring of road transects

to sample ungulate populations in Gir did not seem to violate many of the crucial assumptions of line transect sampling method (e.g. no selection or avoidance of roads by ungulates, no animals present directly on transects were missed).

Four census operations were carried out in Gir during summer of 1987, winter of 1988, winter of 1989 and summer of 1989. Table 1 provides the details of each census. Each census operation was spread over the entire season. An open vehicle, driven at a constant speed of  $20 \text{ km h}^{-1}$ , with a crew of four people, was used. The road transects (average length 20 km) were monitored during the two hours after sunrise and the two hours before sunset. Two observers carefully scanned to either side for groups of ungulates. Each sighting of a group was described according to (a) species, (b) number of animals in the group, (c) sex and age category, (d) km segment, (e) perpendicular distance and (f) vegetation type.

The perpendicular distances from the geometric centre of the group to the edge of the transect were visually estimated and recorded in 5 m class intervals. These visual estimates were checked regularly by pacing out the distance and were found to be reasonably correct. To maintain consistency in the data collection and to minimize the observer's bias in distance estimation, the first author (JAK) recorded the distances throughout the census operation with regular cross-checks by the second (RC). Approximately  $1008 \text{ km}^2$  (71%) of Gir was covered for counting of ungulates, and the density estimates apply only to the censused area.

#### *Data analysis*

The frequency distributions of perpendicular distances of various species in 5 m distance class intervals were very irregular and therefore the distances were further grouped into 10 m class intervals for each unit. Before analysis, the distance data for each species in different units during each census were checked for detection of size-biased sampling (Buckland *et al.* 1993, Drummer & McDonald 1987) but no data set showed a significant correlation between the perpendicular distance and group size. Distance data for each species from each unit and census were truncated by removing 1–3% of extreme sightings (outliers) following Burnham *et al.* (1980).

Perpendicular distance data for all four censuses were pooled to calculate an overall density estimate for each species by Fourier Series Estimator using computer program TRANSECT (Laake *et al.* 1979, PC version 2.1 by G. White). The width used in analysis was based on the values obtained after data truncation. The data sets for chital and sambar were large (>40 sightings in each unit) which allowed a calculation of separate densities for each management unit and census. Chital densities with respect to topography (hilly and flat areas) were also calculated for each management unit for summer 1989 data. The group densities thus achieved were multiplied by the mean group size of each species to calculate the densities of individuals ( $\text{animals km}^{-2}$ ) for

Table 1. Details of four censuses in Gir. KC = km coverage, TR = number of transect runs, n = number of groups, a = number of animals.

Census	KC		TR		Chital		Sambar		Nilgai		Chowsingha		Chinkara		Wild pig	
	n	a	n	a	n	a	n	a	n	a	n	a	n	a	n	a
Summer 1987	652	29	505	2258	93	160	11	28	22	25	—	—	5	25		
Winter 1988	679	33	526	2857	57	105	45	96	32	38	20	37	16	54		
Winter 1989	953	51	442	3078	30	38	15	18	8	8	5	5	6	10		
Summer 1989	848	40	521	3405	36	68	29	36	4	4	26	67	7	14		

Table 2. Densities ( $\pm 95\%$  confidence limits) and estimated total population sizes for different ungulates in various management units of Gir. MGS = mean group size.

Species	Management unit	MGS	Density (animals km <sup>-2</sup> )	Population size
Chital	Sanctuary West	5.0	46.0 $\pm$ 3.4	22,560 $\pm$ 1,664
	National Park	6.3	57.3 $\pm$ 4.7	14,823 $\pm$ 1,215
	Sanctuary East	5.8	38.8 $\pm$ 1.7	10,200 $\pm$ 446
Sambar	Overall	5.6	50.8 $\pm$ 3.2	51,221 $\pm$ 3,226
	Sanctuary West	1.7	0.98 $\pm$ 0.3	479 $\pm$ 146
	National Park	1.6	3.50 $\pm$ 0.64	905 $\pm$ 165
Nilgai	Overall	1.7	2.09 $\pm$ 0.28	2,107 $\pm$ 282
	Overall	1.9	0.58 $\pm$ 0.15	584 $\pm$ 151
	Overall	1.1	0.42 $\pm$ 0.12	423 $\pm$ 120
Chinkara	Sanctuary East	2.2	2.40 $\pm$ 0.96	630 $\pm$ 252



each species. The overall densities of animals for each species were multiplied by their average weight following Berwick (1974) and Karanth & Sunquist (1992) to calculate the wild ungulate biomass for the whole of Gir and for the different management units. The biomass of domestic livestock was calculated for SW and SE by using resident livestock densities of both units.

A distribution map of spatial abundance for each species was prepared by plotting all the sightings of each species in 1 km road segments. A grid system of 5 km  $\times$  5 km was laid over the km segment map. For each grid, total number of animals seen were divided by the total number of km segments. The calculated values for each grid were grouped into various abundance categories such as high, medium and low and were plotted accordingly on each grid.

The density estimates of chital and sambar for each management unit were used to calculate the mean densities for each census. One-way analysis of variance (ANOVA) was used to compare the variation in mean density between the censuses and management units. Density values were log transformed wherever the values showed skewed distribution. Student's t-test was used to check for differences between mean density estimates of chital in hilly and flat areas and for sambar densities in SW and NP. All statistical tests were performed following Fowler & Cohen (1986).

#### *Accuracy of density estimates*

It was assumed that the non-random distribution of ungulates and sampling units (as existing roads pass through valleys and flat areas more than hills) in Gir violated one of the assumptions of line transect sampling theory (i.e. random distribution of animals) and may have biased the estimates of densities. Contrary to expectation, overall mean chital density does not vary significantly between the hills and flat areas. The difference of 5608 chital between unstratified estimates ( $51,221 \pm 3226$ ) and total of stratified estimates ( $30,337 \pm 5433$  and  $15,276 \pm 3127$ ) is also close to 95% confidence limits of stratified estimates. Hence, we believe that estimation of ungulate populations without stratification does not result in biased estimates of densities in Gir. We feel that the initial sampling of road transects in proportion to their availability during each census, and the random distribution of ungulates with respect to roads, contributed to the absence of a significant difference between the two analyses.

The other potential source of bias in our estimates relates to the skewed distribution of group sizes of each species. The frequency distributions of group size of various species were positively skewed in all censuses. In such a case, where the distribution of a parameter is not normal, the mean does not give a correct estimate of central tendency (Campbell 1989) and it has been suggested that median provides a better estimate of the most frequent group size (Barrette 1991). We had, previously, used median group size of each species to calculate the animal densities (Khan *et al.* 1990) which caused a significant drop in chital density and total population size ( $50.8$  to  $36.3 \text{ km}^{-2}$ ,  $51,221$  to  $36,617$  chital). However, K. P. Burnham (pers. comm.) considers use of median group size in

density analysis incorrect as it would result in significant underestimation of density. Moreover, the general theory of line transect holds regardless of skewed distribution of group sizes (Buckland *et al.* 1993).

## RESULTS

Estimates of mean group sizes, densities (animals km<sup>-2</sup> ±95% confidence limits) and population sizes of different ungulate species in Gir are given in Table 2. The mean group size was highest for chital compared to other ungulate species. The overall density was also highest for chital, followed by chinkara, sambar, nilgai and chowsingha. Among three management units, the chital density was highest in NP, compared to SW and SE. Similarly, the sambar density was also highest in NP, compared to SW. Neither the density values for chital ( $F_{2,8} = 1.4$ ,  $P > 0.05$ ) nor for sambar ( $t = 0.46$ , d.f. = 5,  $P > 0.05$ ) showed significant variation between different management units.

Table 3 provides the density values for chital and sambar during different censuses for various management units. Even though the index of groups/km for various ungulate species showed variation, the chital density lacked significant variation either between different censuses (e.g. mean chital density between summer 1987 and winter 1988,  $t = 0.70$ , d.f. = 4,  $P > 0.05$ ; between winter 1988 and summer 1989,  $t = 1.1$ , d.f. = 4,  $P > 0.05$ ) or between all mean values ( $F_{3,7} = 2.02$ ,  $P > 0.05$ ). Similarly, sambar densities also showed no significant variation in mean values between various censuses ( $F_{2,3} = 1.3$ ,  $P > 0.05$ ).

Results of post-facto analysis of summer 1989 data according to broad topography type are shown in Table 4. The chital density was considerably higher in flat areas compared to hills in all management units as well as overall values for the whole of Gir. The difference between mean density values of chital between flat and hill areas, however, was not significant ( $t = 2.11$ , d.f. = 4,  $P > 0.05$ ).

The wild ungulate biomass was highest in NP compared to SW and SE (Table 5). In terms of contribution of each species, chital biomass was the highest with 88.2, 78.8 and 92.4% contribution to overall wild ungulate biomass in SW, NP and SE, respectively; this was followed by sambar. The overall ungulate biomass (wild and resident domestic livestock) was, however, highest in SE.

## DISCUSSION

### *Eruption in chital population density*

Comparing ungulate densities in Gir with densities estimated in the 1970s (Berwick 1974, Joslin 1973), all species, except nilgai and wild pig (only 34 sightings during the four censuses), have shown a substantial increase in their densities (Table 6). Chital density has increased by 1320% in 19 years. Chital's contribution to the total wild ungulate population has increased by

Table 3. Densities (animals km<sup>-2</sup>) during four censuses in three management units of Gir for chital (CH) and sambar (S).

Management unit	Summer 1987			Winter 1988			Winter 1989			Summer 1989		
	CH	S		CH	S		CH	S		CH	S	
Sanctuary West	63.4	1.2		72.3	3.2	28.2	0.63			48.1	#	
National Park	45.4	5.9		73.4	1.9	65.5	0.14			39.6	1.8	
Sanctuary East	20.3	—		31.2	—	#	—			52.1	—	
Mean	43.0	3.5		58.9	2.5	46.8	0.38			46.6	—	

# Data not amenable to analysis.

Table 4. Chital densities ( $\pm 95\%$  confidence limits) in flat and hilly areas of Gir (post-facto stratification of summer 1989 data). MGS = mean group size, D = density (animals km<sup>-2</sup>), A = area in km<sup>2</sup>, PS = population size.

Management unit	Flat						Hills					
	MGS	D	A	PS	MGS	D	A	PS	MGS	D	A	PS
Sanctuary West	6.2	43.7 $\pm$ 7	243.7	10,650 $\pm$ 1,803	5.3	39.2 $\pm$ 11	261.5	10,251 $\pm$ 3,033	7.4	71.4 $\pm$ 11	153.2	2,114 $\pm$ 704
National Park	7.4	133.9 $\pm$ 28	105.7	7,547 $\pm$ 1,173	3.9	23.1 $\pm$ 10	186.7	4,313 $\pm$ 1,941	7.1	67.4 $\pm$ 12	601.5	15,276 $\pm$ 3,126
Sanctuary East	7.4	133.9 $\pm$ 28	100.7	13,484 $\pm$ 2,829	5.5	25.4 $\pm$ 5						
Overall	7.1	67.4 $\pm$ 12	450.2	30,337 $\pm$ 5,433	4.8							

Table 5. Biomass estimates for different ungulate species in Gir.

Species	Management unit	Biomass (kg km <sup>-2</sup> )
Chital	Sanctuary West	2,084 ± 154
	National Park	2,597 ± 213
	Sanctuary East	1,758 ± 77
	Overall	2,301 ± 145
Sambar	Sanctuary West	163 ± 50
	National Park	581 ± 106
	Overall	347 ± 46
Nilgai	Overall	107 ± 28
Chowsingha	Overall	9 ± 2.5
Chinkara	Sanctuary East	29 ± 11.5
All ungulates	Sanctuary West	2,362
	National Park	3,292
	Sanctuary East	1,902
	Overall	2,764
Livestock <sup>1</sup>	Sanctuary West	4,018
	Sanctuary East	8,815
All species	Sanctuary West	6,380
	National Park	3,292
	Sanctuary East	10,717

<sup>1</sup> Unit weight for livestock (410 kg).

Table 6. Comparison of densities (animals km<sup>-2</sup>) and population size of ungulates in Gir in 1970 and in 1989. D = density, PS = population size, %C = percentage contribution.

Species	1970			1989		
	D	PS	%C	D	PS	%C
Chital	3.57	4,404	71.7	50.8	51,221	93.1
Sambar	0.24	276	4.4	2.0	2,107	3.8
Nilgai	0.85	1,004	16.3	0.58	584	1.0
Chowsingha	0.22	256	4.1	0.42	423	0.76
Chinkara	0.17	200	3.2	2.4	630	1.1

21%. The increase in chital density was highest in SW (74.1%) compared to NP (56.2%) and SE (51.9%). Similarly, sambar density has increased by 770% but its contribution to the wild ungulate population has decreased very slightly.

The significant increase in ungulate densities, especially of chital, is inconsistent with the observations of Berwick (1974), who, based on life table analysis of chital, sambar and nilgai, concluded that predation was the sole factor regulating the wild ungulates in Gir. The composition of the diet of the Asiatic lion population, as determined by scat analysis, comprised domestic livestock (79%) and wild ungulates (21%) in the 1970s (Joslin 1973). In 1972, 57 pastoral settlements and their livestock populations were shifted outside of Gir. This implied a rapid and total removal of human

impact from the 258 km<sup>2</sup> of NP and partial but significant removal from SW with a complete ban on migratory domestic livestock (numbers estimated at >25,000). The removal of sizeable numbers of domestic livestock must have resulted in reduced food availability for lions and an increased predation on wild ungulates. Subsequent studies have shown an increase in lion predation on wild ungulates to 52% of its diet in the early 1980s (Sinha 1987), and 74% in the late 1980s (Ravi Chellam 1993) and an increase in lion numbers from 177 to 284 (Ravi Chellam & Johnsingh 1993). This suggests that predation has not had a strong regulatory effect on ungulate populations as postulated by Berwick in the 1970s. The increase in predation on wild ungulates and in lion population merely suggests a combined response (i.e. functionally and numerically), of lions to increasing ungulate densities, but whether density dependence exists or not remains to be empirically tested.

We believe that the presence of excessive domestic livestock was actually limiting the chital population in Gir in the 1960s and 1970s. The removal of livestock is likely to have resulted in a significant increase in food resources for chital through a gradual increase in grass production (Khan, in press) and improved access to optimum habitats and permanent water sources which were earlier occupied by the domestic livestock and people. The remaining livestock in Gir may have acted as a buffer prey species for lions, enabling the chital population to erupt. Currently, domestic livestock contribute 26% to the diet of lions in Gir (Ravi Chellam 1993). There is a significant negative correlation between the dung densities of chital and domestic livestock in SW and SE (Khan *et al.* 1990) which suggests a depressive effect of domestic livestock on chital population. The high chital density of 50 km<sup>-2</sup> in Gir is similar to that reported from an intensively protected area (Nagarahole) in teak forest in southern India (Karanth & Sunquist 1992).

The increase in chital density provides conclusive but indirect evidence of the cattle population limiting the growth of chital population (a principally selective grazer) as a result of competition for common food resources. Information on food habits of wild ungulates from cafeteria trials during the dry season, where all species fed on 20 offered browse species, led Berwick (1974) to believe that no forage competition existed between domestic livestock and wild ungulates. Our observations (Khan 1994, Khan *et al.* 1990) showed that grass remains the preferred food of chital during the hot dry season despite the low protein level of the grasses. Browse dominated chital diet only in the complete absence of grass such as in severe drought conditions in Gir (Khan *et al.* 1994).

Other ungulate species (sambar, chowsingha and chinkara) which have shown marginal increases are browsers and therefore did not benefit from the increase in grass production in Gir. All three species occupy hilly terrain and do not come in direct conflict with cattle as grazing is mostly concentrated in

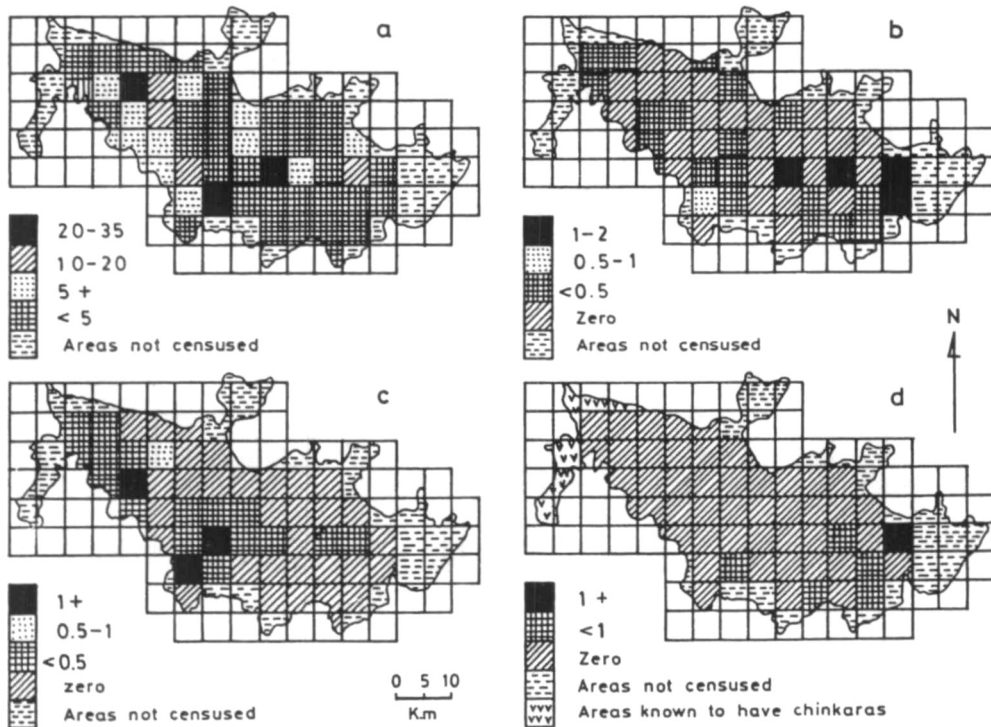


Figure 2. Spatial abundance (animals km<sup>-2</sup>) of (a) chital, (b) nilgai, (c) sambar and (d) chinkara in different management units of Gir.

valleys. The decrease in nilgai density mostly occurred in SW and NP and is, probably, due to a significant increase in tree and shrub cover in these units. Nilgai prefer open habitat conditions (Berwick 1974, Schaller 1967) and an increase in the overall cover condition might have been detrimental to it.

#### *Factors influencing distribution of ungulates in Gir*

All ungulate species showed considerable variation in their spatial abundance within the three management units of Gir and differed in terms of values of diversity of habitat use (Figures 2 and 3). This is attributed to the high spatial habitat heterogeneity across Gir and indicates a greater influence of habitat factors (e.g. cover, habitat structure, availability of food) on distribution and densities of ungulates in Gir. Chital, for example, attains its highest densities in areas with flat topography, supporting *Tectona-Acacia-Zizyphus* woodland or a mixture of *Tectona-Acacia-Zizyphus* woodland, thorn woodland and riverine woodland. The construction of large reservoirs in Gir (e.g. Kamleshwar, Machundri) has also indirectly benefited the chital population by creating



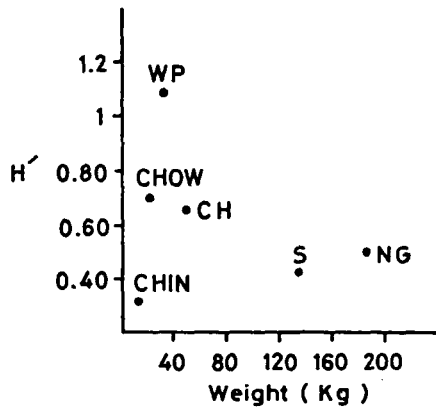


Figure 3. Diversity of habitat use ( $H'$ ) of different ungulate species in Gir. CH = chital, S = sambar, NG = nilgai, CHOW = chowsingha, CHIN = chinkara, WP = wild pig.

optimum habitat conditions. Open areas on the periphery of these reservoirs have been recolonized by *Acacia* and *Zizyphus* species as a consequence of secondary succession which intermix with *Tectona-Acacia-Zizyphus* woodland and riverine woodland. This provides a high diversity of habitats and food species with ample ecotones which chital is known to prefer (Mishra 1982). Chital densities in these areas exceed 100 chital  $\text{km}^{-2}$  during summer. The fruits of *Acacia* and *Zizyphus* species dominate the diet of chital during winter which provides much needed nutrition for lactating females. During this time grasses have a low level of protein (Khan *et al.* 1990). These factors were possibly responsible for a greater increase in chital density in SW and parts of NP after the removal of domestic livestock. It is, however, likely that the more hilly terrain, relative scarcity of water and subsequent increase in vegetation cover due to protection from livestock grazing and fire in the NP has limited the increase in chital density compared to the SW. The removal of domestic livestock from SE was marginal and it still remains overgrazed for most of the year. This, coupled with low water availability in SE, has not allowed the chital population to grow at the same rate as in SW and NP.

Sambar shows high abundance in much of NP due to its preference for hilly terrain, dense shrub cover and absence of biotic disturbance (Johnsingh 1983, Khan *et al.* 1990). The density is, however, much lower than other tropical sites in India (e.g. Nagarhole, Bandipur) which may be due to high predation pressure as it accounts for 15% of the diet of lions and is also the most preferred prey species (Ravi Chellam & Johnsingh 1993). Chowsingha and chinkara, though similar in size and diet, differ in terms of values of diversity of habitat use due to their contrasting cover requirements. While chowsingha inhabits dense hilly areas throughout Gir, chinkara is only restricted to open wooded grasslands of SE.

Data on ungulate densities from Gir and Nagarhole (Karanth & Sunquist 1992) clearly suggest that generalizations about animal densities and habitat

use based on body mass and diet (Damuth 1981, du Toit & Owen-Smith 1989, Peters & Raelson 1984, Robinson & Redford 1986) are inadequate for predicting patterns of ungulate densities in tropical areas of southern Asia and, therefore, require further investigation.

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**DENSITY, BIOMASS AND HABITAT OCCUPANCY OF  
UNGULATES IN BHADRA TIGER RESERVE,  
KARNATAKA**

Final report submitted to Save the Tiger Fund of the National Fish  
and Wildlife Foundation, Washington, DC and the Exxon  
Mobil Corporation.

By

**DEVCHARAN JATHANNA**

**DR. K. ULLAS KARANTH**  
**DIRECTOR**  
**WILDLIFE CONSERVATION SOCIETY**  
**(INDIA PROGRAM)**  
**BANGALORE**  
**INDIA**  
**PROJECT ADVISOR**

**DR. A. J. T. JOHNSINGH**  
**HEAD, DEP.T OF ANIMAL ECOLOGY**  
**AND CONSERVATION BIOLOGY**  
**WILDLIFE INSTITUTE OF INDIA**  
**DEHRADUN**  
**INDIA**  
**PROJECT SUPERVISOR**

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## **Introduction**

This project was carried out when I was at the Wildlife Institute of India, pursuing a Masters' Degree in Wildlife Science, with a grant from Save the Tiger Fund of the National Fish and Wildlife Foundation and the Exxon Mobil Corporation. The course consisted of four semesters, of which the fourth semester was a six-month field study, where each student was required to propose a research topic with biological and/ or conservation implications, design the study, carry out the field study as well as the data analysis, and submit a thesis, based on the results of the field study. We defended our thesis at a presentation held at the institute, which was followed by a viva voce with external examiners.

Theory courses completed as part of the course are as follows:

I Semester- Ecosystem Ecology, Evolutionary Ecology, Biogeography, Plant Systematics & Vegetation Science, Mammology, Ornithology, Herpetology and Fish, Invertebrates, Population Ecology, Quantitative Methods-I, and Conservation of Natural Resources.

II Semester- Behavioural Ecology, Habitat Ecology, Quantitative Methods-II, Community Ecology, Wildlife Restraint & Barriers, Conservation Biology, Wildlife Health, Remote Sensing & GIS, Elective Topic in Wildlife Biology (Term Paper on 'Optimal Foraging and Carnivore Community Structure'), Human Ecology, Natural Resource Economics, and Environmental Impact Assessment.

III Semester- Wildlife Physiology & Nutrition, Advanced Statistics, Captive Breeding & Wildlife Utilisation, Elective Topic in Habitat Ecology and Management (Term Paper on 'Reserve Design and Management in the Light of the Island Biogeography and Metapopulation Biology Paradigms'), Coastal & Wetland Ecology, and Forest and Wildlife Management & Management Planning.

In addition, the course had a strong field component with several field tours to various protected areas in India as well as the field study, which will be described in

detail elsewhere in this report. The following field tours were conducted, where the principal investigator underwent training in several field techniques in various field conditions, and was given first hand, in-the-field exposure to important conservation issues, conservation practices and management practices.

Orientation Tour (31<sup>st</sup> July 1999- 8<sup>th</sup> August 1999)

Site: Koluchaur Reserve Forest, Uttar Pradesh.

-Introduction to wildlife and their habitats, quantitative observations, field skills, collection of study material, identification of wildlife signs & evidences.

Zoo Orientation Tour (9<sup>th</sup> September 1999- 12<sup>th</sup> September 1999)

Sites: Morni Hills Red Junglefowl Captive Breeding Centre, Himachal Pradesh; Chatt Bir Zoological Park, Punjab.

-Introduction to captive breeding and zoos, principles and objectives, design of facilities, education and research in zoos.

Techniques Tour- I (3<sup>rd</sup> October 1999- 13<sup>th</sup> October 1999)

Site: Sariska Tiger Reserve, Rajasthan.

-On-site training in field techniques:

Animal abundance- Line transects, Point counts, Dung counts, Block counts, Vehicle transects;

Quantification of habitat and vegetation parameters- Total enumeration, Sample plots & Plotless methods for tree abundance and DBH, Line intercept method for ground cover;

Radio-telemetry- Triangulation and homing-in;

Trapping techniques;

Use of GPS and maps;

Analysis of kills- identification of predator, age/ sex of the prey, assessment of body condition.

Techniques Tour- II (Wetlands: 3<sup>rd</sup> February 2000-8<sup>th</sup> February 2000)

Site: Keoladeo Ghana National Park, Bharatpur, India.

-Field exercises in waterfowl counts, feral cattle counts, terrestrial & aquatic vegetation sampling, calculation of water budget, identification of waterfowl. Problems of park management and effects of tourism.

Techniques Tour III (Wetlands: 3<sup>rd</sup> March 2000- 5<sup>th</sup> March 2000)

Site: National Chambal Sanctuary, Madhya Pradesh.

- Boat surveys for gharial, marsh crocodile, Gangetic dolphin, freshwater turtle and waterfowl abundance; water sampling; visit to smooth-coated otter den sites, identification of otter spraints, tracks & holts.

Conservation Practices Tour (6<sup>th</sup> March 2000- 7<sup>th</sup> March 2000)

Sites: Ghatigaon Great Indian Bustard Sanctuary, Karera GIB Sanctuary, Madhav National Park, Madhya Pradesh.

- Visit to semi-arid grasslands and dry deciduous forests; Conservation of the great Indian Bustard; Management problems; Effect of habitat changes, grazing and woodland invasion; conservation problems in sub-optimal habitats.

Wildlife Health Tour (8<sup>th</sup> March 2000- 9<sup>th</sup> March 2000)

Site: Van Vihar National Park, Bhopal, Madhya Pradesh.

- Exercises in vaccination, blood sample collection, restraint & immobilisation of carnivores and ungulates; haematological tests; wildlife diseases.

Techniques Tour IV (High Altitude: 11<sup>th</sup> June 2000- 19<sup>th</sup> June 2000)

Site: Kedarnath Musk Deer Sanctuary, Uttar Pradesh.

- Techniques for estimating abundance of western Himalayan ungulates; Himalayan flora, avifauna; vegetation and soil sampling.

Management Practices Tour (North East India: 8<sup>th</sup> September 2000- 22<sup>nd</sup> September 2000)

Sites: Kaziranga National Park & Pigmy Hog Conservation Program (Guwahati), Assam; Shillong & Cherrapunji, Meghalaya.

Problems associated with conservation of Asian one-horned rhinoceros and sympatric large herbivores: tall-wet grassland management; burning & flooding; anti-poaching strategies; tourism in protected areas; captive breeding and re-introduction programs for endangered species; problems of slash and burn (shifting) cultivation; discussions with state Forest Department, and Ministry of Environment & Forest officials.

I had started thinking about a suitable research topic early in the first semester, when Dr. Karanth, my advisor, suggested a tiger prey study at Bhadra Tiger Reserve, which had recently been made a Project Tiger Reserve and presented excellent opportunities to study herbivore populations and human impacts. After several discussions, and much reading up, I was able to formulate my objectives, and submitted a proposal to NFWF/ STF, which was subsequently accepted. I focused my questions and fine-tuned the methodology after a reconnaissance visit to Bhadra in July 2000, when I was able to familiarise myself with the area, as well as speak to several people, especially Mr. D.V. Girish, Honorary Wildlife Warden, Bhadra Tiger Reserve, who introduced me to the reserve and its problems. A question that struck me (like it does several other visitors to the place) was that though the habitat seemed to be excellent as far as resources for herbivores were concerned (abundant bamboo, grass, water, clearings), the animals themselves were extremely scarce. Though many problems were immediately evident (e.g. cattle grazing, poaching, extraction of forest products), I was intrigued and puzzled by the extreme scarcity of animals, especially when compared to other reserves with fairly similar vegetation which supported extremely high densities of large mammals (e.g. Nagarahole).

Fieldwork for the project started in November 2000 with line transect surveys. After that I spent some time carrying out decay rate experiments before I started investigating the local distribution, and environmental correlates of distribution, of my study species. I wound up camp at the end of April, when I returned to Bangalore, and later to Dehradun, for data analysis. The report that follows is based on the results of those analyses.

## **Introduction to the field study**

The study of distribution and abundance of organisms is recognised as an important concern in ecology (Burnham et al. 1993). Studying the distribution and abundance of animals, in relation to various factors that govern them, such as habitat features and anthropogenic disturbances, helps in understanding the relative importance of these factors in driving animal occupancy patterns, and at a larger spatial scale, abundance. This understanding is essential if we are to understand and address the problems leading to wildlife declines and maintaining low population densities.

A major problem in conserving and managing large mammal species is the relative lack of reliable quantitative information regarding the distribution, abundance and habitat requirements of these species, using which the effectiveness of management practices can be assessed, and goals set for the future. An important area, in which such studies have a great deal of relevance, is the conservation of tigers and other carnivores which depend directly on the large ungulates for their energy needs. Large mammalian carnivore populations are mainly resource limited (Hairston, Smith and Slobodkin 1960). The fitness of a predator population depends on the availability of its prey (Sunquist and Sunquist, 1989). Karanth and Sunquist (1995), Karanth and Nichols (1998), and Karanth and Stith (1999) suggest that densities of tigers are governed primarily by the abundance of prey species. In fact, the evolution and radiation of the *Panthera* stock is closely tied to that of the cervids and bovids (Sunquist et al. 1999). Thus, ecological densities of tigers show a high degree of correlation with densities of cervid and bovid prey species.

Large herbivores, particularly, are very difficult to conserve due to several factors: inherently low population densities, unique habitat requirements, tendency to raid crops and, in several cases, their consumption by local people (Karanth and Sunquist 1992). In addition, we need to consider the fact that we cannot hope to plan and effectively implement any conservation measures unless we have on hand basic information regarding the status and health of these animals and their habitat. The urgent need, then, is to collect quantitative data, which will help us not only to assess



and monitor the present situation, as well as to formulate future strategies, but will also strengthen our understanding of various ecological processes.

Models that relate an organism's distribution to environmental variables (Brown 1984, Brown et al. 1995, Ferrar and Walker 1974) by considering the relevant environmental variables as axes in a species' niche (*sensu* Hutchinson 1957) provide us with a useful framework, using which we can expect a strong relationship to exist between a species' local distribution and environmental variables (i.e. habitat features). According to these models, non-random distribution of organisms in space is explained by deterministic processes that cause individuals to aggregate in favourable locations, approximating an 'ideal free distribution'. Variations in abundance of organisms across sites is related to the variation of combinations of environmental variables, with sites that are closer together tending to have, on average, similar conditions and therefore similar abundance of plants and animals. This niche model includes no population dynamics, but simply assumes that some combination of natality, mortality and dispersal will maintain the abundance at a level set by the extent to which the local environment meets the requirement of the individuals.

However, Brown et al. (1995) point out that in certain cases, the distribution patterns seen may not be best explained by environmental conditions, such as when time lags in responses to environmental changes decreases the correspondence between environmental conditions and abundance, or when territoriality/ aggregation for group benefits changes distribution in a way different from that expected by availability of resources. Certain anthropogenic factors, such as human presence (Ceballos-Lascrain 1996) and poaching may also be expected to affect abundance in ways not reflected in the environmental conditions. Lack of a clear pattern indicates the confounding effects of factors external to the system being considered. Further, it is possible to gauge the effects of these confounding factors themselves.

Anthropogenic disturbances may affect animal distribution and abundance in different ways. Certain types of disturbances may cause highly localised declines (e.g. around point sources of pressures), thus forming new gradients of density, different

from those that were determined solely by habitat features. Other types of disturbances (or even animal movements) may result in a uniform thinning over a large area. In addition, different species respond differentially to pressures.

The present study looked at ungulate densities and biomass in the forests of Bhadra Tiger Reserve, Karnataka, using line transects (Anderson et al. 1979, Burnham et al. 1980, Buckland et al. 1993). Density of dung/ pellets, which is a measure of relative ungulate densities and habitat occupancy, was estimated across different habitat and disturbance gradients. Relationships between habitat occupancy and various habitat parameters were then examined to look at the relative importance of natural habitat gradients and disturbance related gradients (cattle grazing, extractive practices, human presence, poaching) as determinants of ungulate habitat occupancy in the study area. Specifically, I was interested to see if low population densities were a result of decline of species around habitation and disturbed areas, or if pressures caused uniformly low densities across the study area, or if animal distribution did indeed follow habitat features.

### **Density and Biomass Estimation**

Past studies in the sub-continent that have addressed this issue are few. Studies that looked at ungulate abundance include those by Schaller (1967), Eisenberg and Lockhart (1972), Berwick (1974), Seidensticker (1976), Dinerstein (1979), Tamang (1982), Johnsingh (1983), Sankar (1994), Varman and Sukumar (1995), Khan et al. (1996), Khan and Vohra (1997), Karanth and Sunquist (1992, 1995), Karanth and Nichols (1998, 2000), Ahrestani (1999) and Kumar (2000<sub>1</sub>).

The results of the studies cited above are presented in Table. 9, where they are compared with the estimates derived in this study.

### **Habitat occupancy**

Fewer still are studies that have considered factors that govern habitat use by ungulates with respect to vegetation, topography and/or disturbance parameters. Though the ungulate fauna of Africa has been relatively well studied, we must realise that their

Indian counterparts are unique and generalisations from the African studies may not apply (Eisenberg and Seidensticker 1976). Though this issue has been well studied outside the Indian sub-continent (e.g. Ben-Shahar and Skinner 1988, Shannon et al. 1975), relatively few investigators have examined these relationships within the sub-continent. These include Eisenberg and Lockhart (1972), Berwick (1974), Dinerstein (1979), Balakrishnan and Easa (1986), Bhatnagar (1991), Sankar (1994), Khan (1996), Bhat and Rawat (1995), Acharya (1997) and Mathai (1999).

Of special relevance to the present study are studies carried out previously on ungulates in Bhadra Tiger Reserve. Population estimation for large herbivores was carried out in 1998 (Ahrestani 1999, Karanth and Nichols 2000). Both line transects as well as pellet group counts were used to determine absolute ecological densities of large herbivores. It was found that dung counts were not a reliable method of estimating animal densities, because of unreliable decay rate and defecation rate correction factors. Dung counts were, however, found to be a useful way of monitoring ungulate populations, as long as conversions to absolute densities of animals were not attempted. In the study, dung counts were used solely as a population estimation technique, and not as a way of studying ungulate distribution.

Absolute ecological densities obtained from line transects indicate that ungulate densities in Bhadra are generally low (see Table. 9). In particular, chital densities were found to be lower than sambar densities, unlike other parks in India. Ahrestani (1999) suggests that this is because the habitat in Bhadra is more suited to browsers than to grazers. By comparing the densities in the northern half of the reserve which has no permanent residents, and the southern half, he goes on to suggest that the presence of people does not negatively affect ungulate densities.

Madhusudan (unpublished) studied human-wildlife conflicts in Bhadra, examining both the extent of crop losses to wild ungulates as well as livestock losses to large carnivores.

Madhusudan and Karanth's (in press) study on the intensity and effects of

hunting of large mammals in Nagarahole and Kudremukh provides valuable insights into patterns of hunting under different protection regimes, intensity of hunting of various species and the impacts on the populations of these species. In Nagarahole, they compared large mammal densities two ecologically similar sites, one with high hunting pressures and the other with very low hunting pressures. Interviews were also held with a number of hunters to gauge the intensity of hunting and the species most sought after. Similarly, in Kudremukh, where protection is lax, relative abundance of large mammals was estimated and interviews were held with several poachers. Results show that with widespread poaching in the absence of strict protection (i.e. in Kudremukh), all large mammals are extremely scarce. In the two Nagarahole sites however, species were affected differentially. Chital and gaur were found at significantly lower densities in the heavily hunted site when compared to the strictly protected site. Muntjac and sambar abundance did not vary between the two sites. This pattern was attributed to the fact that in Kudremukh, where protection measures were negligible, hunting by shotgun was the most common technique employed, leading to declines in densities of all large mammal species. However, even in the heavily hunted site in Nagarahole, the small amount of protection that was followed made daytime hunting with guns risky and traditional methods of hunting were favoured. Thus species such as muntjac and sambar, which are most effectively hunted with guns owing to their solitary habits, affinity for cover and other factors, were not as greatly affected as chital, which are more susceptible to techniques not easily detected by the forest staff, such as snaring.

## **Study Area**

### **General**

The study was carried out in the Bhadra Tiger Reserve, Karnataka. The reserve, (13<sup>0</sup>22'N- 13<sup>0</sup>47'N and 75<sup>0</sup>29'S- 75<sup>0</sup>47'S), which was notified as a Wildlife Sanctuary in 1972, and declared as the 25th Project Tiger Reserve in 1998, is spread over an area of 492km<sup>2</sup>. It is situated in Chikmagalur district of Karnataka (Karanth 1982, IUCN 1990, Manjrekar 2000). Wikramanayake et al. (1999) classify the reserve as a tropical moist forest (TMF) in priority category I

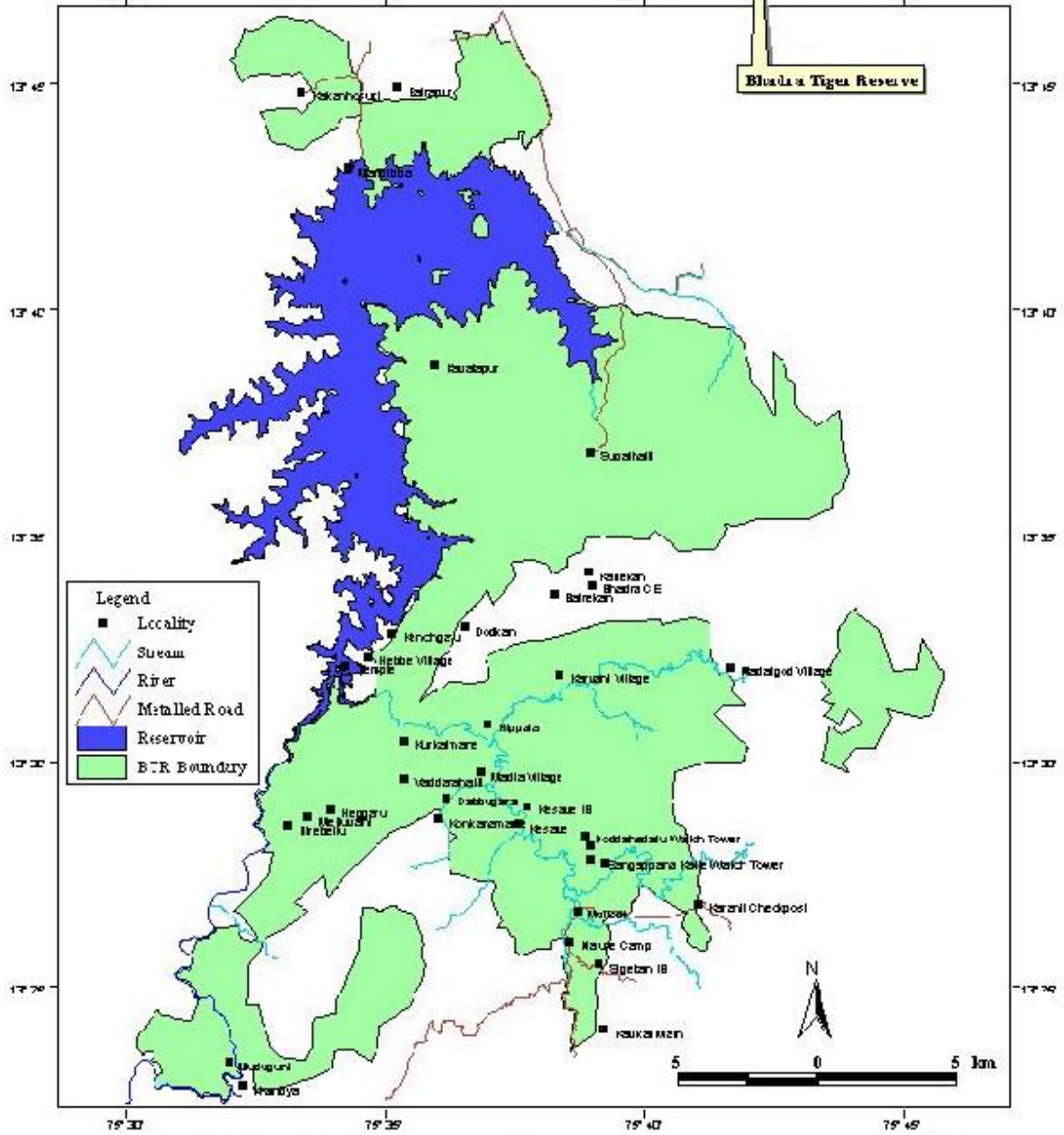
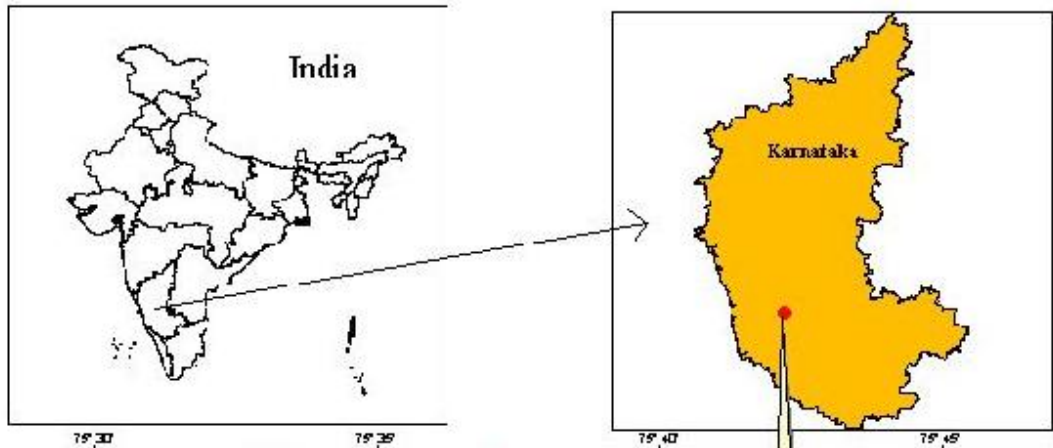
### **Topography**

Bhadra Tiger Reserve (hereafter Bhadra) is bisected into two halves by the Bababudan hills, which encircle the lower half, Jagara Valley (Muthodi Range), almost completely. These hills are the highest in Karnataka and rise to a height of 1927m above m.s.l. Within the crescent formed by the hills, as well as in the northern half (Lakkavalli Range), the terrain ranges from gently undulating to hilly. The altitude is between 670m to 760m above m.s.l. The entire area is dissected by numerous *nullahs* and several perennial streams, such as Somavahini Halla, Tadve Halla, Wate Halla and Hippla Halla. The south-western and western boundaries of the reserve are defined by the Bhadra river. In 1967 the river was dammed near Lakkavalli, on the north-eastern edge of the reserve and the reservoir thus formed submerges large areas of the reserve (map on following page).

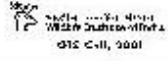
### **Climate**

Temperatures range from 10<sup>0</sup>C to 32<sup>0</sup>C, the hottest months being April and May and the coolest being December and January. Annual precipitation, which occurs mainly between June and September due to the south-west monsoon, is as high as 2000-2540mm (Karanth 1982). The Lakavalli area, being in the rain shadow the Bababudans, receives less rainfall than the Jagara valley.

## Map of Bhadra Tiger Reserve



Source : Centre for Wildlife Studies, Bangalore





## Vegetation

A major portion of the reserve is covered by the *Tectona-Dillenia-Lagerstroemia* Series moist deciduous forests (Meher-Homji 1990), corresponding to type 3B (Southern Tropical Moist Deciduous Forests) in the revised classification by Puri et al. (1983). It gradually merges with Southern Tropical Dry Deciduous Forests (5A) towards the north-eastern edges. The inner slopes of the Bababudans are covered by grassy downs interspersed with evergreen 'sholas' (Karanth 1982).

The most striking feature of the forests, in both the Jagara valley, as well as in the Lakkavalli area is the predominance of bamboo. *Bambusa arundinacea* occurs widely in the area, especially in wide belts along streams and nullahs. *Dendrocalamus strictus* forms an extensive understorey, and is found throughout the reserve. In addition, *Ochlandra readii* is found exclusively along streams, and *Oxytenanthera monostigma* as well as *O.stocki* are found on the steeper hills within the Jagara valley.

The dominant tree species forming the upper canopy include *Tectona grandis*, *Dalbergia latifolia*, *Terminalia tomentosa*, *T.paniculata*, *T.bellerica*, *Pterocarpus marsupium*, *Adina cordifolia*, *Lagerstroemia lanceolata* and several *Ficus spp.* The middle storey comprises of species such as *Randia dumetorum*, *Emblica officinalis*, *Kydia calcina*, *Wrightia tinctoria*, *Dillenia pentagyna* and *Gmelina arborea*. The northern valley, being drier in parts, has species such as *Anogeissus latifolia* and *Dalbergia paniculata*. Even within the deciduous forests, strips of evergreen vegetation with species like *Syzygium cumini* are seen along riparian tracts, often extending down into the valley from the sholas.

Bhadra has, similar to some other south Indian deciduous forests (e.g. Nagarhole), low-lying swampy fallows, locally known as 'hadlus'. These are often perennially moist and covered by luxuriant grass growth. 'Hadlus' are especially important for large ungulates, and help maintain high densities of grazer species (Karanth and Sunquist, 1992). About 6% of the area is covered by Forest Department plantations, mainly teak (*Tectona grandis*), and some parts have been encroached and converted to coffee plantations and paddy fields.

## **Fauna**

Large carnivores in the reserve are tiger (*Panthera tigris*), leopard (*P. pardus*), dhole (*Cuon alpinus*), and striped hyena (*Hyaena hyaena*). Smaller carnivores include several lesser cats (*Felis spp.*), civets (*Viverricula* and *Paradoxurus spp.*) and mongooses (*Herpestes spp.*). Jackals (*Canis aureus*) are common, and sloth bear (*Melursus ursinus*) also occur, though in low numbers.

The ungulates in Bhadra are gaur (*Bos gaurus*), sambar (*Cervus unicolor*), chital (*Axis axis*), muntjac (*Muntiacus muntjak*), Indian chevrotain (*Tragulus meminna*) and wild pig (*Sus scrofa*). Elephants (*Elephas maximus*) are also found in all parts of the reserve and appear to migrate locally within the area. Primates are represented by the common langur (*Presbytis entellus*) and bonnet macaque (*Macaca radiata*) (Karanth 1982).

## **Conservation Issues**

The reserve is subject to several pressures, both from the surrounding areas as well as from within its boundaries. The shape of the reserve is such that several incursions extend well into the reserve, so that various parts maintain only the most tenuous link with each other (e.g. the northern and southern halves, the south-western part of Hebbe range and Jagara valley proper, Bababudangiri State Forest (i.e. Kemmangundi) and the rest of the reserve).

The Bababudans are largely taken over by coffee plantations, and consequently the Jagara valley is almost completely surrounded by these private estates. In addition there are 16 villages, with about 4000 people in the southern half of the reserve. Large tracts of low-lying areas along the Somavahini and Hippla streams have been converted to paddy fields (Ahrestani 1999, Kumar 2000<sub>2</sub>).

The residents own about 2000 heads of cattle, which are grazed in the reserve. Besides competing with the wild herbivores for fodder, domestic cattle also transmit diseases such as Rinderpest to wildlife. Bhadra, which was once known for very high gaur densities, lost several of these animals in a Rinderpest epidemic in 1989 and the

gaur population is yet to recover (Mr. D.V. Girish, pers. comm).

Residents of the villages also extract several forest products such as *Acacia sinuata* pods, firewood and bamboo from the reserve. Poaching (with guns, dogs or by snaring) is a major problem, and is indulged in by coffee planters, estate workers and local residents alike (pers. obs). Not only are animals straying into the plantations/ crop fields removed, poaching also occurs well within the reserve boundaries. Timber poaching is another problem, and is intense in parts of the reserve.

Another problem is the seasonal pollution of all the major streams entering the Jagara valley from the Bababudans by the effluents from coffee pulpers in the surrounding estates. The effluent has a high organic load, high BOD and COD levels, low pH and polyphenols. The effects these have on mammals within Bhadra, which depend on these streams for their water needs, are not known. Aquatic fauna are likely to be greatly affected by it.

These problems continue despite the concerted efforts of the Forest Department and several conservation N.G.Os. The Department has recently initiated a relocation program for the villages within the reserve, with the active and enthusiastic participation of the residents. At the time this was written, the first village was slated to move out within a month. If successful, this move should result in removing a large part of the pressure on the forests. In addition, returning the cultivated areas along the streams to wildlife use, and the subsequent formation of *hadlus* may be expected to greatly benefit the herbivore assemblage.

## Objectives

The objectives of the study were:

1. To estimate ecological densities and biomass of the ungulate prey species of tiger (gaur, sambar, chital, muntjac, wild pig).
2. To study habitat occupancy by the study species across habitat and disturbance gradients.
3. To examine the possible influence of various habitat parameters and human impacts on the habitat use patterns of the study species.

## Significance of the study

Considering the habitat in Bhadra Tiger Reserve, which has high rainfall, excellent availability of grasses (especially in the *hadlus*), abundant bamboo growth and relatively low invasion by weeds, one would expect, *a priori*, that the area supports high ungulate densities. However, previously estimated densities show that ungulate densities are very low (Ahrestani 1999, Karanth and Nichols 2000). Consequently, densities of carnivores are also extremely low: Karanth and Nichols' (2000) estimate for tiger densities in the central, better protected part of Bhadra is 3.42(0.84) tigers 100km<sup>-2</sup> (D(SE[D])). In the light of this, it is important to monitor ungulate abundance and to determine what really restricts habitat occupancy (and therefore, abundance).

The density estimation gains added importance when viewed as a part of a long term monitoring of ungulate populations, especially in the context of the proposed rehabilitation. The estimates will serve as baseline estimates that will help track changes in herbivore populations as disturbances are removed over a period of time. Not only will ungulates benefit from the absence of human induced pressures, the conversion of village sites and agricultural fields into secondary successional sites and *hadlus* may be expected to lead to high ungulate densities, as was seen in Nagarahole (Karanth and Sunquist 1992). If the population monitoring is carried on for several years, it will provide conservationists and managers with invaluable insights into recoveries of herbivore populations with removal of human impacts.

While the long-term changes are taking place, it is also important to consider the present situation and gauge the scale of the problem, by examining how herbivores respond to human pressures. An important question is if patterns of ungulate distribution follow habitat features or if the distribution is explained more by human disturbance.

## **Methods**

### **Density and Biomass**

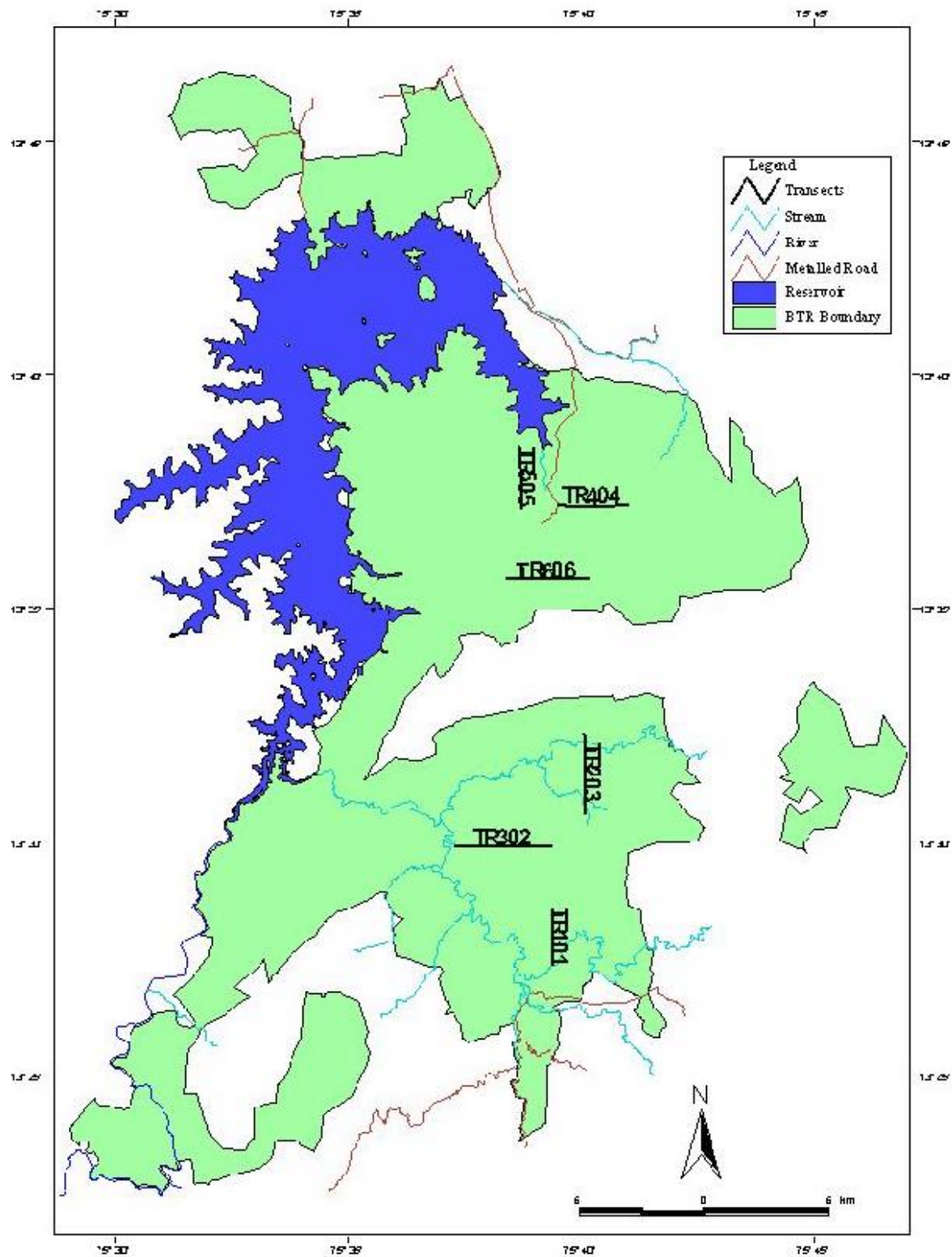
#### Field Methods

Ecological densities and biomass of the study species were estimated using the line transect method (Anderson et al. 1979, Burnham et al. 1980, Buckland et al. 1993). Line transects have been found to be very effective and reliable in estimating densities of ungulates in the Indian sub-continent (Varman and Sukumar 1995, Khan et al. 1996, Raman et al. 1996, Karanth and Sunquist 1992, 1995; Karanth and Nichols 1998) and have also been used for primates (Brockleman and Ali 1987). The strength of this method is largely in its ability to take into account non-detectability of animals and their non-random distribution, by incorporating the detection function  $g(x)$ .

The permanent transects used in the present study were established in 1997 and previously used by Ahrestani (1999) and Karanth and Nichols (2000) to estimate densities of large herbivores. Six transects were established, three in the Jagara valley and three in the Lakkavalli area (map on following page). The transects were between 2.6-3.6km long, totalling 18.2km. The transects were laid so that the various habitat types within the study area were represented proportionally.

Line transect data were collected between 0615hrs–0830hrs and between 1545hrs-1800hrs. Animal clusters were used as the analytical unit since individual data tends to underestimate true variance (Southwell and Weaver 1993). At each detection, data on time of detection, species ID, sighting distance, transect bearing and group centre bearing were collected. Sighting distances were measured using optical rangefinders and a liquid filled compass (SUUNTO Challenger, MCA-D) was used to measure the bearings. The bearings were subsequently used to obtain sighting angles. To obtain a substantial number of detections, suitable for statistical analysis, line transect data were collected with the help of trained transect volunteers. The field protocol followed is as described in Karanth and Sunquist (1992) and Kumar (2000<sub>1</sub>).

## Transect Locations in Bhadra Tiger Reserve



Source: Centre for Wildlife Studies, Bangalore

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## Statistical Methods

The line transect data were analysed using program DISTANCE (Laake et al. 1993). The distribution of the data was first examined by assigning very small cut points to the distance intervals during the curve fitting, to detect evidences of evasive movements by the animals or heaping of data at certain distance intervals. Based on the distribution of the data, data were truncated at suitable distances from the line. After choosing convenient cut-points for the distance intervals, the best key function (with the appropriate adjustment term, where necessary) was selected using the criterion of lowest AIC (Akaike's Information Criterion). The AIC is computed as:

$$\text{AIC} = -2 \log_e(\hat{\ell}) + 2q$$

Where  $\log_e(\hat{\ell})$  is the log likelihood function evaluated at the maximum likelihood estimates of the model parameters and  $q$  is the number of parameters in the model. AIC thus chooses the model with the best fit with the least terms (i.e. the most parsimonious model). The model selection was carried out only after the truncation and distance intervals were decided on since AIC cannot be used to choose between models that have different truncation distances (Buckland et al. 1993).

Estimation of the variance associated with the mean density presented some difficulties, since the theoretical variance estimated by program DISTANCE is likely to be underestimated in biological populations, the underestimation becoming more acute with species that are highly clumped. Therefore, an over-dispersion factor of 3, recommended as a reasonable estimate for most biological populations (Buckland et al. 1993, Burnham et al. 1980), was applied.

Biomass densities of the different species were computed by multiplying the estimated mean numerical densities by the published average weights of the respective species. Since I did not have reliable data on the population structure of study species, the biomass could not be corrected for the actual population structure and the average weights of the species were used instead.

## **Habitat Occupancy**

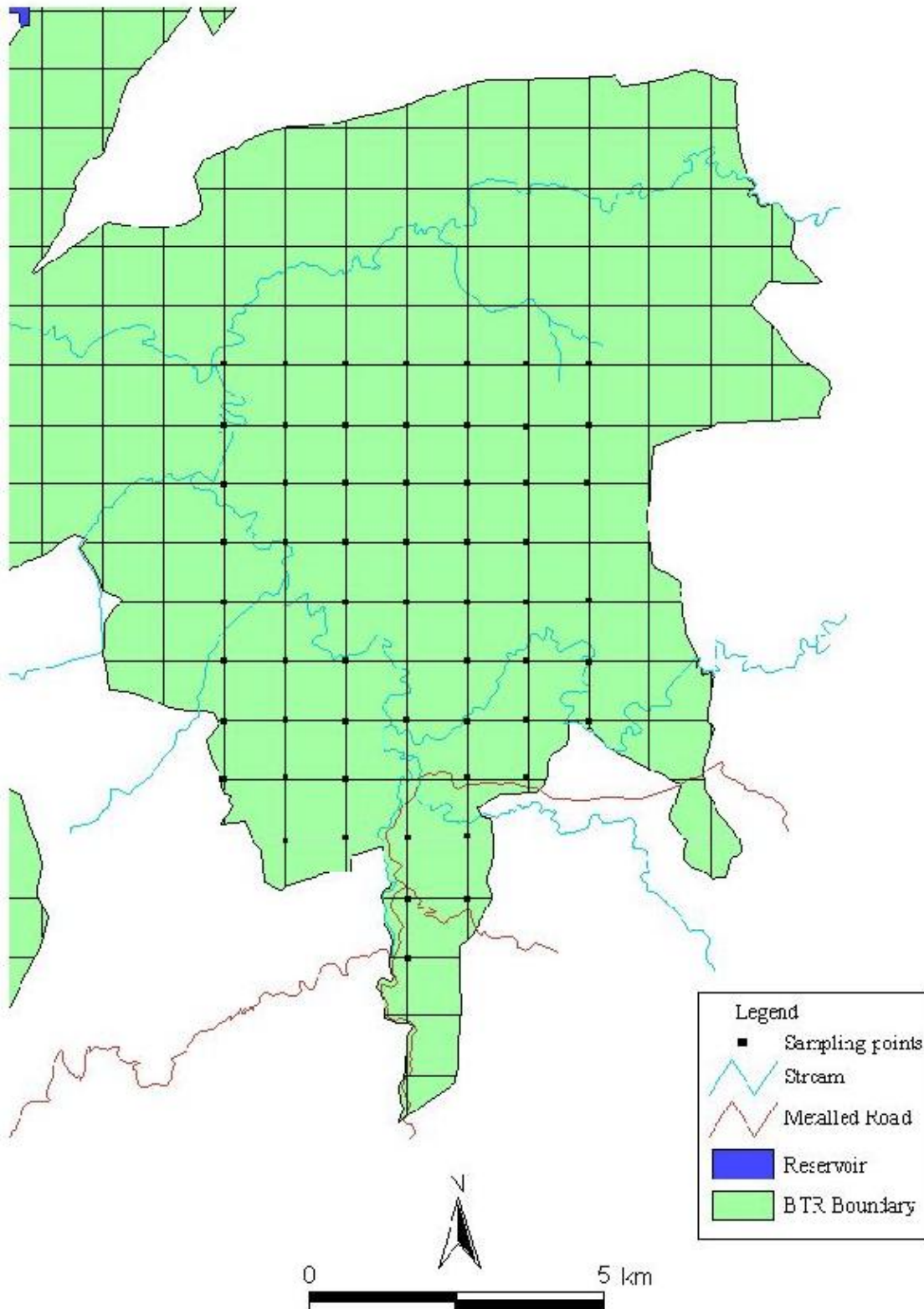
### Field Methods

A different sampling design was adopted to sample for animal occupancy and habitat parameters. This part of the study was restricted to the Jagara valley (Muthodi Range). The area was gridded into 1km<sup>2</sup> grids (map on following page) using the Geographic Information System software package MAPINFO<sup>TM</sup> (MapInfo Corporation, Troy, New York). Each of the grid intersections was thus marked by its co-ordinates. The co-ordinates were entered into a hand held Global Positioning System unit (Magellan<sup>TM</sup> ColorTrack), which helped locate them during the sampling. This systematic random sampling design ensured that the sampling points could be treated as a set of independent data points. At each sampling point, plots were laid to quantify ungulate occupancy as well as habitat parameters as described below.

Dung Density: Dung/ pellet density was used as the indicator of ungulate habitat occupancy. Dung /pellet counts have been widely used to estimate parameters such as absolute ecological densities, relative densities and habitat occupancy by numerous animal species, in a variety of climatic and vegetation conditions (Neff 1968, Kufeld 1968, McClanahan 1986, Case and McCullough 1987, Koster and Hart 1988, Hiby and Lovell 1991, Dawson and Dekker 1992, Barnes et al. 1995, Plumptre and Harris 1995). Some investigators have used the Line Transect Method estimate dung/pellet densities (Koster and Hart 1986, Barnes et al. 1995), rather than census sample plots.


Dung has been found to be a reliable indicator of habitat occupancy by ungulates (Cairns and Telfer 1980, Edge and Marcum 1989, Latham et al. 1997). One needs to assume that defecation is random with respect to habitat type, which may not always hold true. Dung, however, gives a much better indication of habitat use than methods based on direct sighting since inferences from the latter need to be restricted to the actual time of sighting, whereas dung densities reflect habitat use over longer time periods. It is also much more effective when considering differences in animal distribution at the scale at which this study dealt with.

## Sampling Design for Habitat Variables- Ungulate Occupancy



Source : Centre for Wildlife Studies, Bangalore

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The method has seen a lot of changes over the last few decades. It was earlier necessary to assume steady-state (McClanahan 1986, Koster and Hart 1988, Dawson and Dekker 1992, Barnes et al. 1995). Hiby and Lovell (1991) have developed refined techniques using software (Program DUNGSURV) to estimate densities of pellet/ dung piles and pellet decay rates, without having to assume steady state.

Since dung decay rates may differ across habitat conditions even within a study site, which may lead to differential dung densities independent of animal abundance, it was necessary to first find out if decay rates really did differ, and if they did, to estimate the decay rates so that suitable correction factors could be applied to the observed dung densities so that they would be comparable across different environmental conditions.

Dung Decay Rates: In a series of decay rate experiments, dung piles were placed in different cover and slope categories, and their decay was monitored. Only fresh piles were used in the experiments. Piles were collected by intensively searching areas known to be frequented by the study species. In order to obtain reliable estimates of decay rates, attempts were made to collect as many fresh piles as possible. Three cover categories (low, medium and high) and two slope categories (flat and sloping) were chosen, and piles were assigned to each category equally. In each experiment new piles were placed in the respective cover/ slope category, tagged for future identification and piles placed previously were checked and their decay stages recorded.

Five decay stages were identified:

Stage A: Moist with odour

Stage B: Dry, hard and intact

Stage C: Decay/ decomposition discernible in a few pellets

Stage D: More than 50% of the pile decayed/ disintegrated

Stage E: Unrecognisable as belonging to a species/ distinct pile

Initially (late November 2000 through mid-December 2001), the piles were monitored at four day intervals, later on (December to end-February) they were checked at eight day intervals. All the piles were checked again at the end of the study (28th

April 2001).

Ungulate occupancy was quantified by counting dung piles in a 25 x 2m rectangular plot centred at the sampling point indicated by the GPS. The rectangular shape helped ensure that no piles were missed within the plot. Further, this was ensured by intensively searching the ground above and under the litter/grass layer. The decay stage of each dung pile found was recorded and the plot was assigned to the appropriate cover/ slope category.

Habitat Parameters: In the present study, quantification of vegetation and other habitat parameters was carried out using 10m radius circular plots for trees, topography and disturbance, circular plots of 4m radius for shrubs, 3m circular plots for seedlings/ saplings/herbs and a point-intercept lines of 10m, with a 'hit' every 20cm (a total of 50 hits/ sampling point) for ground cover, at each of the sampling points (Hays, Summers and Seitz 1981). The plot sizes were decided on after several trials in the field. A nested design was chosen, with the three circular plots, the line intercept as well as the rectangular dung plot centred on the same point. The rectangular plot was oriented in an east-west direction. The parameters to be quantified were decided upon based on the results of previous studies that looked at ungulate-habitat relationships, especially in the deciduous forests of India.

Parameters recorded in the 10m radius circular plot are:

Mean Canopy Cover: Measured using a spherical densiometer. Four readings were taken at each point (one in each of the cardinal directions) from which a mean was computed subsequently. Expressed as a percentage

Slope: Measured using a clinometer in the direction of maximum slope.

Trees: For each individual tree the species, height (using an optical rangefinder), leaf stage (young/ mature/ yellow-green/ yellow/ yellow-brown/ brown/ leafless) and fruiting stage (flower bud/ flower/ fruit/ seed) were recorded. Mean values were subsequently computed for all the individual tree measurements. The number of trees with foliage below 2.5m, considered to be accessible to sambar (Bhatnagar 1991) was also recorded.

Number of clumps of *Bambusa arundinacea*: Flowering, if present, was recorded.

In addition, nominal variables such as topography and a verbal description of the site were also recorded.

Parameters recorded in the 4m radius circular plots are:

Shrubs: For each individual, the height, average diameter, approximate shape, leaf stage and fruiting stage were recorded. Signs of browsing, if any, were also noted. The measurements taken for individual shrubs were later used to compute mean values for the point.

Number of clumps of *Dendrocalamus strictus*.

Parameters recorded in the 3m radius circular plots are:

Density of seedlings/ saplings/weeds.

The Point Intercept (10m long, along the centre of the dung plot) was used to quantify grass cover, herb cover, litter cover, rock cover, bare soil and other cover types. Since 50 points were covered for each sampling point, the percent cover was obtained by simply multiplying the observed count by two.

Disturbance signs were noted down whenever they occurred within the plots, as well as in the vicinity or while approaching the sampling points. Signs recorded include presence of people, number of tree stumps, signs of firewood removal, signs of bamboo removal, cattle dung, presence of tree climbing notches (used to poach flying squirrels or remove fruits), signs of cooking fires, among others. However, two major problem in quantifying disturbance were that most of the plots did not have disturbance signs *within* them and assigning weightage to different types of disturbances was bound to be arbitrary. Therefore, since it was not possible to obtain a reliable measure of the intensity of disturbance for each of my sampling points, which would be comparable across space, it was decided to use distances to the nearest village and to the reserve boundary as a surrogate. All distances were measured on digitised maps (developed by the Centre for Wildlife Studies, Bangalore) using the GIS software package ARCVIEW

(ESRI, Inc. NY). In addition, distance to water was also measured and included among the habitat variables.

### Statistical Methods

All statistical analyses pertaining to ungulate habitat occupancy were carried out using the statistical software package SPSS, Version 8.0 (1996). The data were first examined using scatter plots matrices, correlation matrices and histograms to detect overall patterns, and to determine what underlying distributions they were likely to have been sampled from.

Decay Rates: The time (in number of days) taken to reach decay stage C was compared between the different cover categories using One-way Analysis of Variance (ANOVA) (Zar 1984) to determine if decay rates differed significantly between the categories, and if it would be necessary to apply correction factors to the observed dung densities before using them as an indicator of ungulate occupancy.

Factor Analysis: A Factor Analysis (Pielou 1984) was performed on the habitat variables to reduce the dimensionality of the data set. Factor Analysis uses the redundancy in the data set (autocorrelations) to create a smaller number of new variables (factors), which can be used in subsequent analyses. An added advantage of this method is that the new set of variables are mutually independent (orthogonal), so that the problem of multicollinearity is taken care of. The Factor Analysis was performed using the correlation matrix, rather than the covariance matrix since the habitat variables were measured on different scales (Pielou 1984). A Varimax (variance maximising) rotation was performed to facilitate interpretation of the factors.

Logistic Regression: To examine relationships between habitat variables and ungulate occupancy (i.e. dung count data), Multiple Logistic Regressions (Hosmer and Lemeshow 1989) were used, since the dependent variable (dung density) had several zero values (plots with no dung of the species of interest). In the case of sambar, plots with two piles or less were designated as zero, and the rest were treated as one. Logistic Regression uses the observed patterns of ones and zeroes (presence and absence) to



construct a predictive model by choosing the habitat variables that best predict the outcome.

Selection of the best set of predictor variables for each species was done using the stepwise backward conditional method. The 'p to enter' was chosen as 0.05, and the 'p to remove' was 0.1 (Hosmer and Lemeshow 1989). Models were constructed using both the factors as well as the original variables, to see which fit the data better.

The models (for each species) were first constructed for all the data points and their fit assessed by an examination of the classification tables and Nagelkerke's  $R^2$ , which approximates the  $R^2$  obtained in Multiple Linear Regression by the least squares method (multiple coefficient of determination), thus indicating the proportion of variance in the dependant variable explained by all the independent variables together.

To examine the effect of disturbance on ungulate occupancy, the data set was then split into points close to habitation (less than 1km from village or boundary) and points farther from habitation (more than 1km away). Logistic Regression models were then constructed using the less disturbed cases (i.e. those more than 1km from habitation), so that the confounding effect of disturbance on the habitat-occupancy pattern was minimised. The same model was then applied to the remaining (more disturbed) cases. The procedure was repeated for each of the study species.

The classification tables and Nagelkerke's  $R^2$  values were compared with that of the original model using the entire data set, to see if the percentage of correct classification and the coefficients of determination improved noticeably for the subset that was less disturbed and decreased for the more disturbed points, as would be expected if disturbance did have an appreciable effect on ungulate presence/ absence.

The predicted group memberships were saved as new variables. Of special interest were those cases that were predicted to have the species present, but were in fact observed as absent. These plots represented sites that, according to the model, were suitable for the species of interest, but were not occupied by that species.

I assigned each case to one of the following types based on the predicted and observed outcomes:

<b>Predicted</b>	<b>Observed</b>	<b>Type</b>
1	1	1
0	1	2
1	0	3
0	0	4

Thus, type 1 sites are those that are predicted to be one (species present) and are indeed one, while type 3 sites are those that are predicted to be one, but are in fact zero (species absent).

The hypothesis that type 3 sites were, on average, significantly nearer to villages and/or boundary than type 1 sites was tested using the distribution free Mann-Whitney U-test (Zar 1984) for each species.

## Results

### Density and Biomass

Each of the six transects were walked 26 times: thus there were 6 spatial replicates, and 26 temporal replicates. The total effort was 472.9km. Data from all temporal replicates for a transect were pooled and treated as one sample. The sample size, therefore, was six. The number of detections was generally very low (chital: 51, muntjac: 68, sambar: 25, gaur: 17); for sambar and gaur well below the 40 recommended by Burnham et al. (1980) and Buckland et al. (1993).

The results of the DISTANCE analysis are presented in Table.1, showing the number of detections, estimated density of clusters, estimated cluster size (mean cluster size where there was no size bias in detection), mean density of individuals, percent coefficient of variation and the 95% confidence interval about the mean.

Based on the criterion of lowest AIC, the half normal key function fit the chital and sambar data with no adjustment terms. Muntjac data were best described by the hazard rate model (with no adjustment terms). The half normal model with cosine adjustments proved to be the best fit for the gaur data.

Biomass density estimates, obtained by multiplying the estimated mean ecological density by the published average weights of each species, are presented in Table. 2.

Table 1: Density estimates for ungulates in Bhadra Tiger Reserve.

n= number of detections,  $D_g$ = density of clusters, Y= mean cluster size,

D= density of individuals,  $Cv(D)$ = coefficient of variation

and 95% CI= 95% confidence interval. Total effort = 472.9km.

Species	N	$D_g$ ( $km^{-2}$ )	Y	D ( $km^{-2}$ )	$Cv(D)$ (%)	95%CI ( $km^{-2}$ )
Chital	51	1.60	2.81	4.50	31.12	2.46-8.25
Sambar	25	0.86	1.08	0.93	39.48	0.42-2.03
Muntjac	68	2.9	1.03	3.01	25.36	1.82-4.96
Gaur	17	0.64	2.31	1.48	55.29	0.51-4.30

Table2: Biomass density estimates for ungulates in Bhadra Tiger Reserve.

Average species weights from Karanth and Sunquist (1992).

Species	Average Weight (kg)	Biomass ( $kg km^{-2}$ )
Chital	47	211
Sambar	134	124
Muntjac	21	63
Gaur	450	666

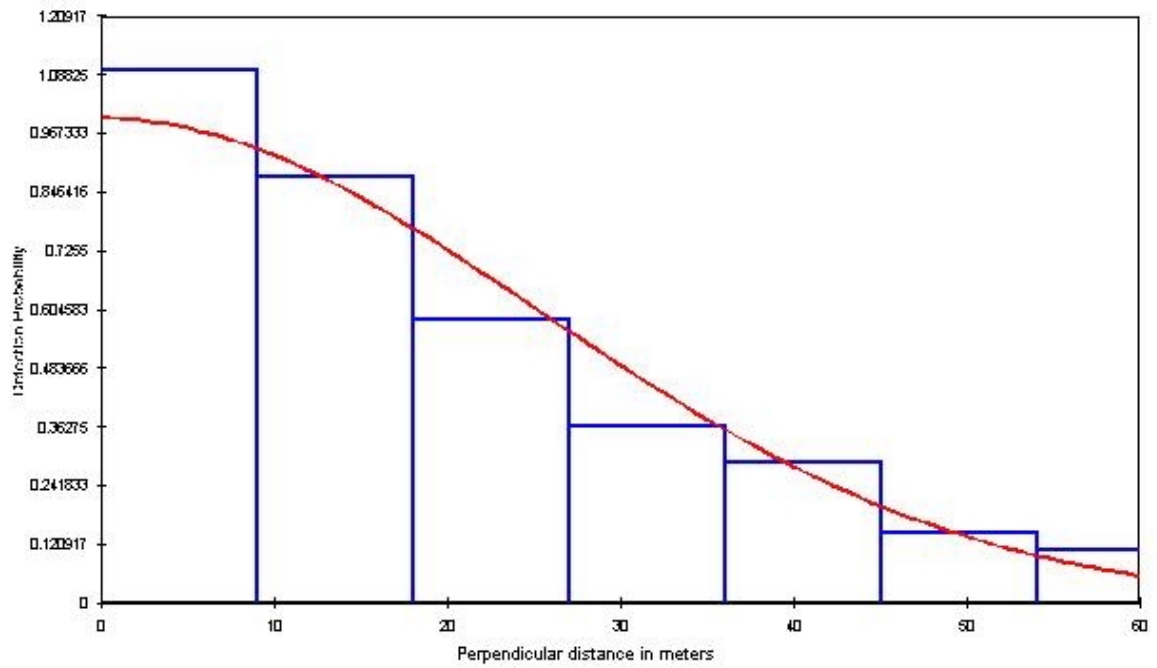


Fig. 1: Probability plot of chital detections from line transect sampling. Model chosen: Half normal

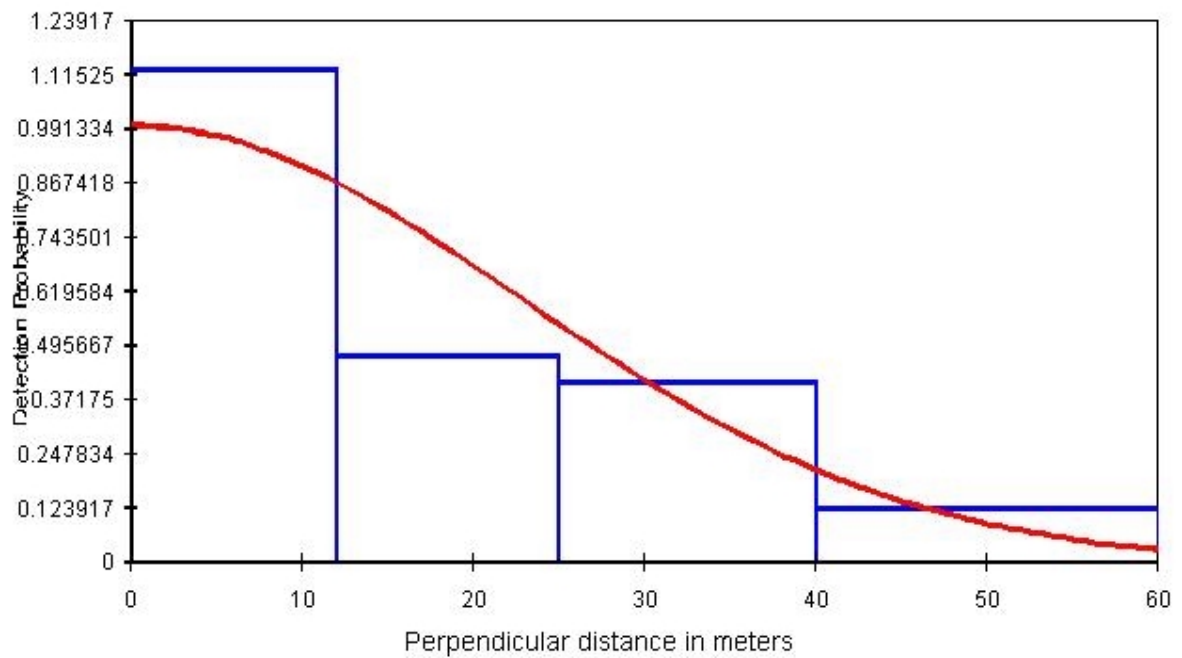


Fig. 2: Probability plot of sambar detections from line transect sampling. Model chosen: Half normal

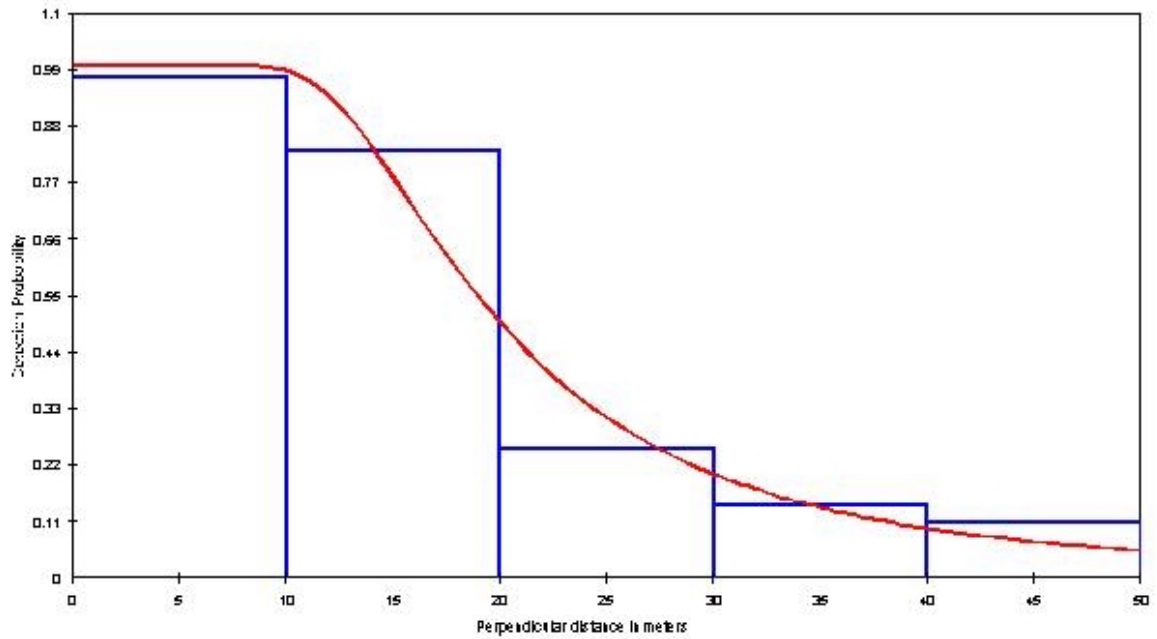


Fig. 3: Probability plot of Muntjac detections from line transect sampling.  
Model chosen: Hazard Rate

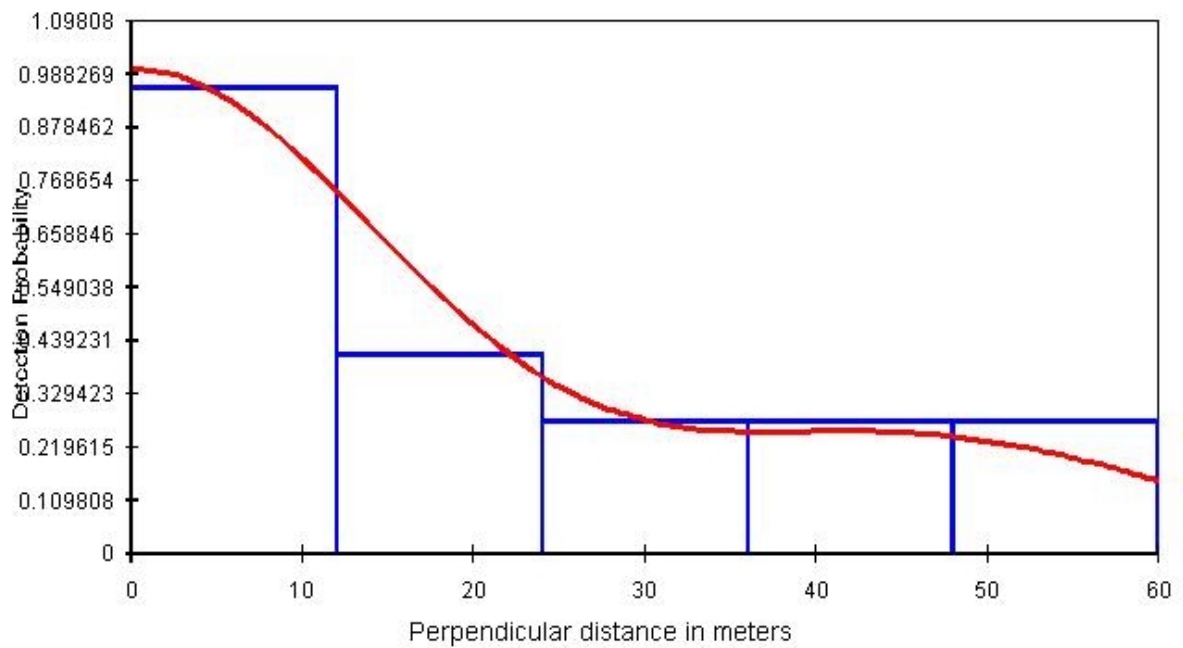


Fig. 4. Probability plot of gaur detections from line transect sampling.  
Model chosen: Half normal with cosine adjustments.

## **Habitat Occupancy**

### Dung Decay Rates

A total of 173 fresh dung piles (chital, sambar, muntjac, cattle and elephant) were placed in different cover categories and monitored in the decay rate experiments. One way Analysis of Variance (on 74 sambar piles) indicated that dung piles in different cover categories did not vary significantly in the time taken to reach decay stage C ( $F = 0.647$ ,  $df = 2,71$ ,  $p = 0.527$ ). Therefore it was not necessary to apply a decay rate correction factor. The standing crop of dung was used as the indicator of habitat occupancy.

### Logistic Regression:

The results of the logistic regression analysis constructed for the different species using the selected cases (1km or more from village/ boundary) are presented in Tables. 3-6, which show the variables chosen by the model, their respective regression coefficients ( $\beta$ ), standard errors and p-values as well as Nagelkerke's  $R^2$ . When the models constructed using the factors were compared with those constructed using the original variables, in every case the original variables gave a better model. Therefore, it was decided to use the original variables after ensuring that moderately to highly correlated variables were not included in the same model.

According to the chital model, chital occupancy is determined by shrub cover, water availability, lower grass cover, less slope, and fewer seedlings. Sambar tend to occupy areas with greater shrub cover, greater number of tree species, fewer seedlings and lower grass cover. Muntjac were found to occupy sites characterised by higher tree densities, higher *B. arundinacea* density, lower canopy cover, lower grass cover, higher densities of seedlings belonging to a few species. The gaur model, based on only eight 'hits', used distance to water as the sole variable to predict gaur presence/ absence. It is important to note that none of the models chose distance to village/ boundary (used here as a surrogate for disturbance) as an independent variable to predict species' presence or absence.



Variable	$\beta$	SE	Sig
Slope	-0.2137	0.1304	0.1012
Shrub height	2.6905	1.2579	0.0324
Grass cover	-0.2893	0.1376	0.0354
Distance to water	-2.6187	1.5666	0.0946
Number of seedlings	-0.1435	0.0622	0.0211
Constant	10.8763	4.7164	0.0211

Nagelkerke's  $R^2 = 0.752$

Table 3: Independent variables in the model predicting chital presence/ absence. Model constructed for cases > 1km from village/ boundary.

$\beta$  = regression coefficient, SE= standard error of  $\beta$ , Sig = significance of  $\beta$ .

Variable	$\beta$	SE	Sig
Tree species richness	0.8243	0.4582	0.0720
Number of shrubs	0.4656	0.3498	0.1832
Number of seedlings	-0.0579	0.0331	0.0804
Grass cover	-0.1283	0.0968	0.1850
Constant	0.9438	1.4028	0.5011

Nagelkerke's  $R^2 = 0.527$

Table 4: Independent variables in the model predicting sambar presence/ absence. Model constructed for cases > 1km from village/ boundary.

$\beta$  = regression coefficient, SE= standard error of  $\beta$ , Sig = significance of  $\beta$ .

Variable	$\beta$	SE	Sig
Mean canopy cover	-0.1105	0.0564	0.0502
Number of trees	0.3896	0.2179	0.0737
Number of <i>B. Arundinacea</i>	0.6147	0.4177	0.1411
Number of seedlings	0.0783	0.0376	0.0373
Seedling species richness	-0.6294	0.2630	0.0167
Grass cover	-0.2631	0.1112	0.0180
Constant	8.5726	3.9451	0.0298

Nagelkerke's  $R^2 = 0.609$

Table 5: Independent variables in the model predicting muntjac presence/ absence.

Model constructed for cases > 1km from village/ boundary.

$\beta$  = regression coefficient, SE= standard error of  $\beta$ , Sig = significance of  $\beta$ .

Variable	$\beta$	SE	Sig
Distance to water	2.3182	0.8675	0.0075
Constant	-4.1152	1.2887	0.0014

Nagelkerke's  $R^2 = 0.397$

Table 6: Independent variables in the model predicting gaur presence/ absence. Model constructed for cases > 1km from village/ boundary.

$\beta$  = regression coefficient, SE= standard error of  $\beta$ , Sig = significance of  $\beta$ .

Examination of the classification tables and Nagelkerke's  $R^2$  for the logistic regression models constructed for the selected and unselected cases showed consistent patterns for all species except gaur (Table 7 a-d). The  $R^2$  showed consistent improvements from the model for the entire data set to the model for the selected cases. Further, the percentage of correctly classified cases improved for the cases farther than 1km from habitation (when compared to the percentage of correctly classified plots for the unselected cases model) and decreased for the cases 1km or nearer. A closer look revealed that the majority of misclassifications in the selected cases 1km or nearer to habitation was in the top right cell of the classification table (predicted -one, observed zero).

For the gaur models, however, the percentage of correct classification for the selected cases farther than 1km from habitation was actually less than that for the entire data set, and more for the cases 1km or nearer.

The Mann-Whitney U test, used to test if the type 3 cases (predicted-1, observed -0: see page 37) were on average significantly closer to villages and/ or reserve boundary, showed that type 3 cases for chital *were* significantly closer to villages/ boundary (M-W U = 75, df = 30,11, p = 0.0035) while type 3 cases for sambar were significantly closer to villages (M-W U = 80, df = 45,7, p = 0.0185) (Fig. 5 and 6). However, no significant differences were found in the case of muntjac and gaur.

**Table 7:** Classification tables and Nagelkerke's  $R^2$  for models with unselected cases, cases farther than 1 km from village/ boundary and cases 1 km or less from village / boundary:

**a: Chital**

Unselected Cases:  $R^2=0.633$

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	17	7
	<b>1</b>	3	33

% Correct = 83.33%

**b: Sambar**

Unselected Cases.  $R^2=0.523$

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	7	6
	<b>1</b>	3	44

% Correct = 85.00%

Selected Cases:  $R^2=0.752$

> 1 km

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	9	3
	<b>1</b>	2	23

% Correct = 86.49%%

Selected Cases.  $R^2=0.527$

> 1 km

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	4	3
	<b>1</b>	1	29

% Correct = 89.19%

< 1 km

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	4	8
	<b>1</b>	4	7

% Correct = 47.83%

< 1 km

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	1	5
	<b>1</b>	2	15

% Correct = 69.57%

**c: Muntjac**

Unselected Cases.  $R^2=0.364$

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	18	8
	<b>1</b>	8	26

% Correct = 73.33%

**d: Gaur**

Unselected Cases.  $R^2=0.402$

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	51	1
	<b>1</b>	6	2

% Correct = 88.33%

Selected Cases.  $R^2=0.609$

> 1 km

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	9	6
	<b>1</b>	3	16

% Correct = 75.68%

Selected Cases.  $R^2=0.397$

> 1 km

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	28	1
	<b>1</b>	4	4

% Correct = 86.49%

< 1 km

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	2	9
	<b>1</b>	1	11

% Correct = 56.52%

< 1 km

		<i>Predicted</i>	
		<b>0</b>	<b>1</b>
<i>Observed</i>	<b>0</b>	22	1
	<b>1</b>	0	0

% Correct = 96.65%

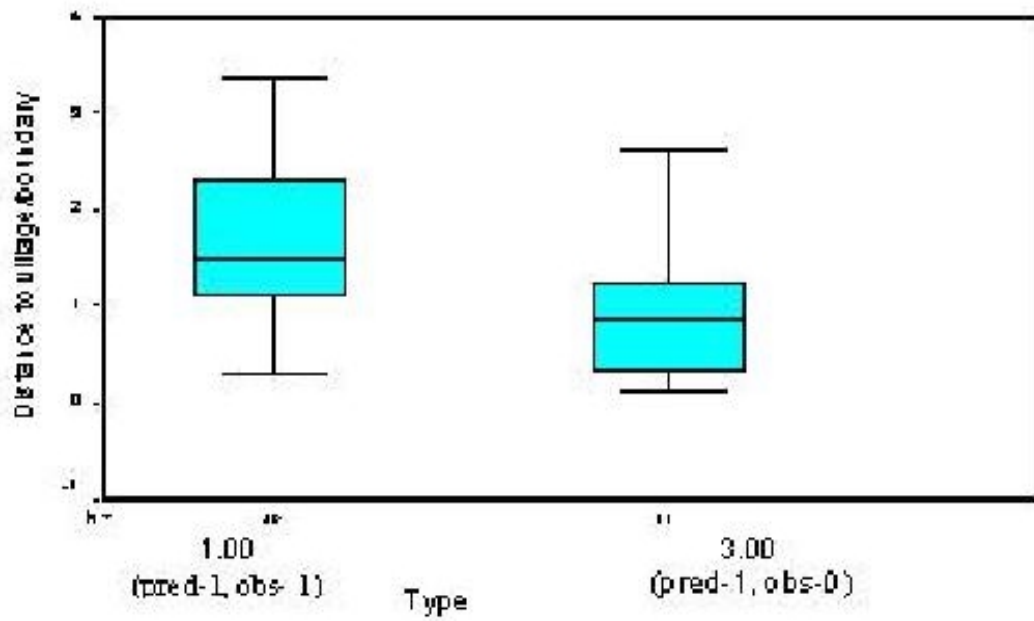


Fig 5: Comparison of median distance to village/ boundary of type-3 chital cases with type-1 chital cases.

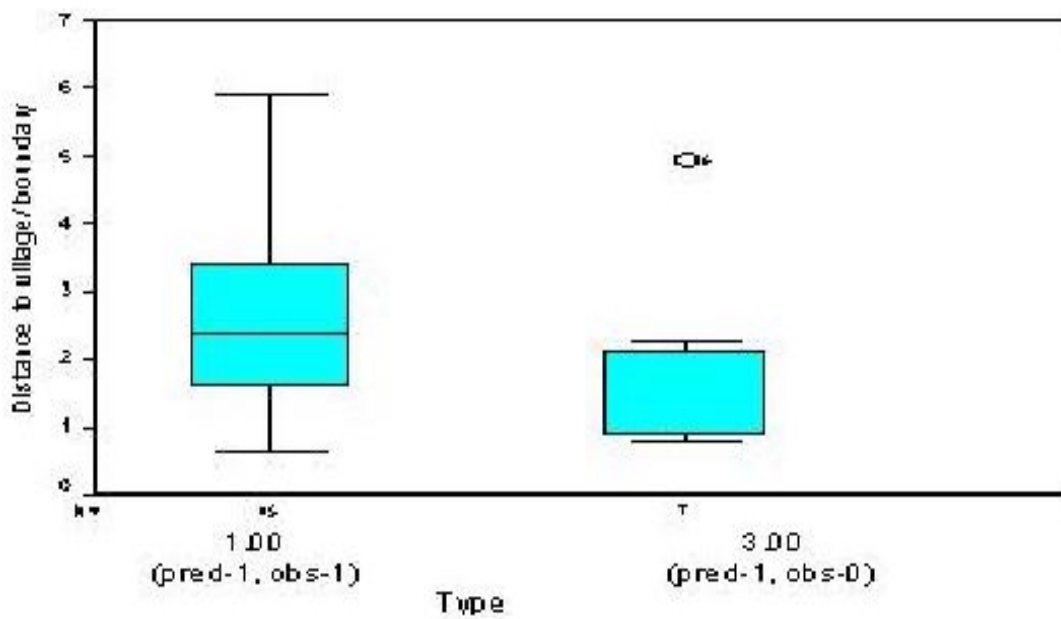


Fig. 6: Comparison of median distance to village for type-3 sambar cases with type-1 sambar cases.

## **Discussion**

### **Density and Biomass**

The high variances associated with the estimated mean densities are likely to be an outcome of the relatively low spatial replication in the sampling design. Most of the variance was seen to have been contributed by the encounter rate component of variance estimation, which captures the variance in the distribution of the animals. This was especially true for chital, which showed a highly clumped distribution within the study area. In addition the low encounter rates may also be expected to contribute considerably to the overall variance.

Extremely low sample sizes (number of detections) precluded the estimation of densities separately for habitat types or even for the two areas (Jagara valley and the Lakkavalli area).

A comparison of the density estimates derived in this study with those estimated earlier in Bhadra (Ahrestani 1999, Karanth and Nichols 2000) shows rather drastic differences (Table 8 and Fig. 7). The estimate for sambar, especially, requires some consideration. It is likely that the current sambar estimates are negatively biased, possibly due to evasive movements by the animals prior to detection, as was suggested by the initial examination of the sambar data by assigning small cut points to the distance intervals. For the other species as well, the point estimates from the two studies appear very different, but the large variances do not permit conclusions that the means really are significantly different. One problem that prevents a formal test to compare mean densities estimated by the two studies by looking at their variances is that the variance estimation was carried out differently by Ahrestani (1999). He treated each walk as a separate sample (as opposed to pooling data for all walks for a given transect), a procedure which underestimates the true variance. Therefore, the variances from the two studies are not comparable.

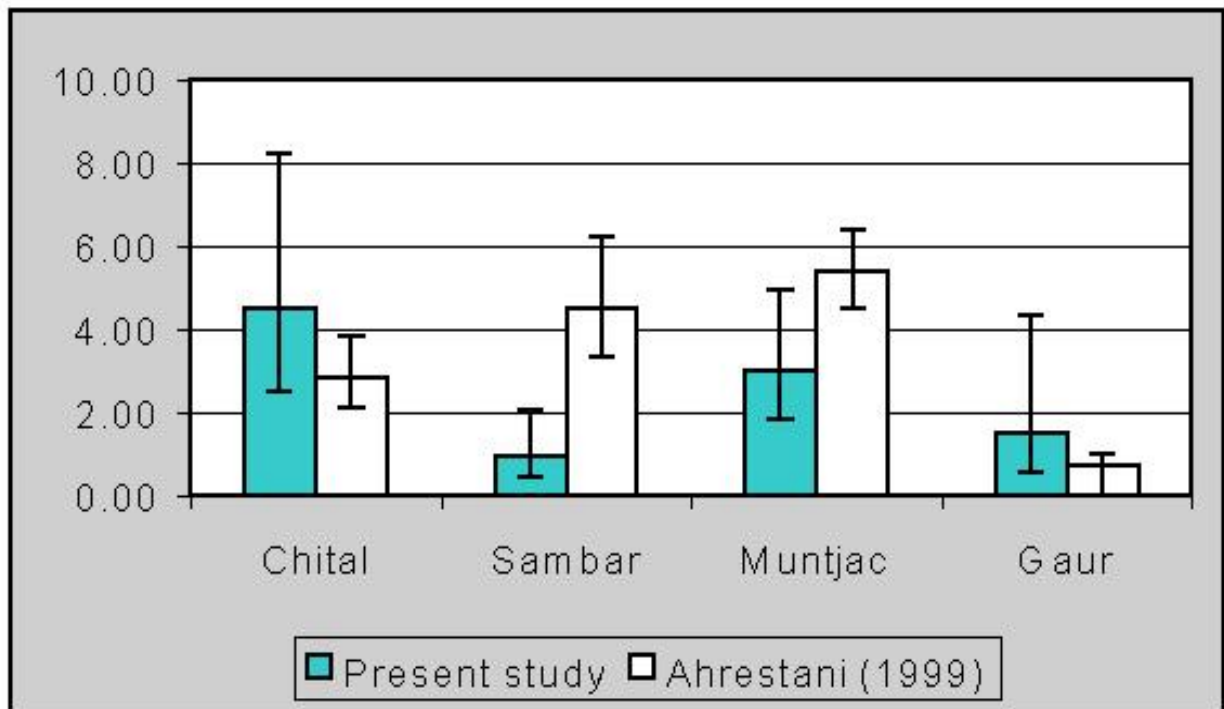
Another possible reason for the discrepancy may be related to the



different seasons in which transect sampling was done in the two studies: in the earlier study, 90% of the transect data were collected in February (Ahrestani 1999), while data for the present study were collected in November. Not only is the visibility poorer (i.e. fewer detections), there is often a marked seasonal movement of animals into valley habitats from surrounding hills during the dry months (pers. obs., A. J. T. Johnsingh pers. comm), which may have led to the higher sambar and muntjac densities in the earlier study.

Whether the mean densities estimated in this study and the previous studies do really differ or not, that ungulate densities in Bhadra are extremely low is evident from a comparison with estimates from other parks (Table 9). Particularly, mean chital density is lower (for both studies) than that estimated in any other deciduous forest. Ahrestani (1999) attributes this to the habitat in Bhadra being unsuitable to chital, which are primarily grazers. This may well be true, but whether that is the only reason leading to the low chital densities is debatable.

Fig 7: Density estimates for ungulates in Bhadra from this and an earlier study



Muntjac densities are comparable to densities in sites such as Nagarahole. The estimate for sambar seems to be rather low compared to other parks, but because of the possible negative bias, it is difficult to comment on this, especially since the estimate from the earlier study was fairly high. Gaur densities, estimated at 1.4 km<sup>-2</sup>, are very low, and even though the estimate itself is not very reliable, being based on only 17 detections, clearly gaur are yet to recover from the Rinderpest outbreak of 1989. The fact that wild pig were recorded only twice on the transect, while precluding any kind of population estimation, clearly indicates the low densities of this species, which is much favoured by local poachers, especially in the neighbouring coffee estates.

Location	Habitat	Method Used	Species			
			Chital	Sambar	Muntjak	Gaur
Bardia	MDF/ Tall grass floodplain	Strip Census	29.7- 33.9 (1440-1644)	----	1.7 (31)	----
Wilpattu	Scrub/ Monsoon Forest	Direct and Pellet Counts	12.09 (544)	1 (135)	0.44 (0.59)	----
Chitawan	Riverine forest/ Tall grass	Belt Transects	17.3 (951)	2 (308)	6.7 (94)	----
Gir	DDF	Roadside counts	50.8	2.0	----	----
Sariska	DDF, Thorn forest	Line Transects (foot and vehicle)	30.7	15.0	----	----
Ranthambore	Semi-arid, DDF	Line Transects	38.4	10.7	----	----
Pench	DDF	Line Transects	51.3	9.6	----	0.7
Kanha	MDF	Line Transects	49.7	1.5	0.6	----
Bandipur	DDF	Line Transects	20.1	5.6	0.7	7.0
Nagarahole	MDF	Line Transects	50.6 (2379)	5.5 (736)	4.2 (78)	9.6 (4311)
Bhadra <sub>1</sub>	MDF	Line Transects	2.8 (130)	4.5 (607)	5.4 (112)	0.7 (329)
Bhadra <sub>2</sub>	MDF	Line Transects	4.5	0.93	3.01	1.48

**Table 8:** Comparison of ungulate densities estimated in this study with other studies. MDF- Moist Deciduous Forest, DDF- Dry Deciduous Forest. Figures in parentheses indicate estimated biomass densities in kg km<sup>-2</sup>.

**Sources:** Bardia- Dinerstein 1980, Wilpattu- Eisenberg and Lockhart 1972, Chitawan- Seidensticker 1976, Gir- Khan and Vohra 1997, Sariska- Sankar 1994, Ranthambore- Kumar 2000, Pench, Kanha, Kaziranga, Bandipur, - Karanth and Nichols 2000, Nagarahole- Karanth and Sunquist 1992, Bhadra<sub>1</sub>- Ahrestani (1999), Bhadra<sub>2</sub>- This study.

## **Habitat Occupancy**

The results of this study broadly agree with earlier studies with regard to the habitat variables that are important in determining the distribution of different species. Chital occupancy patterns concur with other studies, which found that chital preferred flat areas with shrub cover and adequate water (Schaller 1967, Johnsingh 1983, Sankar 1994). Acharya's (1997) findings that chital distribution correlated positively with ground cover is also borne out by my results.

However, a surprising and anomalous result was that chital, sambar as well as muntjac occupancy were apparently *negatively* associated with grass cover, as indicated by the negative slope parameters. This is certainly incorrect (Schaller 1967, Sankar 1944, Acharya 1997) and could have resulted from the fact the habitat sampling was spread over the space of three months (February through April), during which period the grass cover changed considerably, especially after a few showers in mid-April. Therefore, the grass cover in points measured towards the later part of the study may have seemed greater simply because of the fresh sprouts, and may not have reflected the true grass availability at those sites when they were used (or not used, as the case may be) by the animals.

Sambar distribution, as expected from results of the earlier studies, was positively correlated with shrub cover and tree species richness. It is not clear why there was a negative correlation with number of seedlings, but the apparent negative relationship with grass cover may have been an artefact of the sampling, as described above.

Muntjac occupancy correlated positively with tree density, *B. arundinacea* density, number of seedlings and negatively with canopy cover and seedling species richness. The seeming avoidance for grass cover may have been as discussed above.

The model for gaur, based on only eight 'hits' (present plots), is certainly not very reliable. However, it is important to note that the only variable chosen

from amongst the set of potential predictors was distance to water, which had a negative correlation. Schaller (1967) observed that availability of water was an important requirement for gaur.

Analysis using the predictions of the logistic regression models indicated that chital occupancy is negatively associated with proximity to either villages or boundary, and sambar presence, with villages only. It may seem counter-intuitive that chital, which is known to be a species of secondary habitats and mosaics, is adversely affected by habitation. However, several studies have shown that chital are often the most vulnerable to various types of disturbance. Mathai (1999) noted that chital were far more averse to disturbance than sambar and his results showed that they occurred only in undisturbed plateau areas in Panna. Khan's (1996) study showed that chital were being affected the most by the presence of cattle in Gir and showed the most dramatic increase (1320%) on removal of most of the cattle from the park. He attributed this sensitivity to the fact that chital, being largely a grazer, was in direct competition with cattle, unlike the other ungulates, which were also browsers and thus were not competing with cattle as intensely. Sankar (1994) also observed intense competition between buffaloes and chital in the dry months. In addition to competition for forage, both chital and cattle prefer flat areas (A. J. T. Johnsingh pers. comm). Thus presence of cattle not only depletes forage that would otherwise have been available to chital (exploitative competition), inter-specific behavioural mechanisms may also exclude chital from prime habitats occupied by cattle (interference competition).

Chital are also more vulnerable to other forms of disturbance. Madhusudan and Karanth's (in press) study showed that in sites which had even a nominal amount of protection, poaching by silent traditional means, such as snaring, were favoured over the use of guns. As a result, chital, which are easily hunted by these methods, were the most affected by poaching, unlike sambar and muntjac, which are most effectively hunted with guns. I believe that this is the situation in Bhadra, where the presence of the Forest Department does deter hunting with guns *within* the reserve. If traditional methods are in fact favoured, that may contribute to chital being scarcer near habitation. This, and the

competition with cattle within the reserve, may also explain the relative scarcity of chital in Bhadra, which may not just be the result of unsuitable habitat, as suggested by Ahrestani (1999).

Sambar, also being averse to disturbance (Johnsingh 1983, Sankar 1994), were found to be adversely affected by proximity to villages. However, muntjac did not show such patterns. The gaur analysis is not strong enough to draw inferences from.

A few caveats may be in order at this point. In a site where disturbance may play a significant role in determining ungulate distribution, looking at habitat factors that are important for the species may not be very meaningful, for which reason I have not placed much emphasis on the habitat variables important for my study species, considering instead the strength of the relationships between these variables and ungulate occupancy. The inability to separate out the effects of different types of human impacts restricts the kind of conclusions we can draw from the data. Though it may be valid to consider the lack of a strong relationship between habitat variables and ungulate occupancy as possible evidence of the importance of confounding factors such as anthropogenic disturbance (a conclusion further confirmed by the absence of animals in suitable sites close to villages), certain human impacts (e.g. poaching) may not actually show spatial patterns. Even if the removal of animals itself is highly localized and is indeed strongly associated with proximity to habitation, the visible effects may be confounded by animal movement. If animals constantly move into sites from which others have recently been removed, the effect may be of uniformly thinning the density all over the area, rather than forming gradients of density; the extent to which this may occur is some (unknown) function of the mobility of the species as well as the ability to take over newly unoccupied sites.

Though distance to village/ boundary was not among the set of independent variables to predict presence or absence of any of the study species, subsequent analyses did indicate that chital and sambar are affected negatively by habitation. The initial rejection of distance to village/ boundary as a predictor

variable may mean either of two things: that ungulate distribution is not significantly affected by disturbance, or that distance is a poor surrogate for the actual intensity of human disturbances. A negative result in such a case may either occur from lack of effect or lack of power, and without being able to decide which is the case, one must be careful not to conclude that there is no effect.

## **Conclusions**

Having looked at ecological densities of ungulates in Bhadra Tiger Reserve, and their distribution in relation to habitat and disturbance gradients, what take-home message are we left with? Results from the present study draw our attention to two important facts: that ungulate densities in Bhadra are precariously low, and that human impacts do have significant negative effects on the distribution of ungulates. It is but natural to link the two together. It is very likely that the first point is a natural consequence of the second.

An important point to note is that it is not just the proximity to villages that is restricting ungulate distribution but, in the case of chital, the proximity to the reserve boundary as well. Clearly, villages within the reserve do affect ungulates negatively, but pressures from the surrounding coffee estates also have a considerable influence on the reserve's wildlife. What this means in terms of managing the habitat for ungulates is that it would not suffice to simply move the villages out, continued efforts will be required to minimise pressures from the surrounding areas.

Besides reiterating the need for effective protection of both the habitat as well as the wildlife in Bhadra, I would like to stress the need for continued monitoring of ungulate populations. While the present study does indicate the adverse effects humans have on ungulate populations even within the tiger reserve, conclusive evidence can only come from following and recording



population recoveries subsequent to removal of human pressures, as was seen in Nagarahole (Karanth and Sunquist 1992) and Gir (Khan 1996).

The proposed rehabilitation programme provides a unique opportunity to track such changes over a period of several years. The results of this study, and the kind of changes in the habitat that have been seen subsequent to rehabilitation of settlements in other reserves, indicate that chital, especially, may be expected to benefit from the removal of anthropogenic pressures over a period of time, and it would be extremely interesting to see if this really does happen. However, considering the low ungulate densities and, consequently, low sample sizes, future monitoring programmes need to consider issues such as increased effort, increased spatial replication as well as sampling in a suitable season to ensure collection of data that will help us make reliable inferences regarding the health of the system.

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# Recovery of wild large herbivores following livestock decline in a tropical Indian wildlife reserve

M. D. MADHUSUDAN\*†‡

\*Centre for Ecological Research and Conservation, Mysore, India, †National Institute of Advanced Studies, Bangalore, India and ‡Wildlife Conservation Society–India Program, Bangalore, India

## Summary

1. Resource competition is an important process governing the impact of livestock on native wild mammalian herbivores, an issue acknowledged to be of global conservation concern. Resource competition occurs between species when their resources (habitat and diet) overlap and are limiting. Yet the evidence that livestock compete with wild herbivores has remained weak because resource limitation is often difficult to demonstrate in the field.
2. This 2-year field study at Bandipur National Park, India, examined livestock-mediated resource limitation among five wild herbivore species: wild pig *Sus scrofa*, chital *Axis axis*, sambar *Cervus unicolor*, gaur *Bos gaurus* and Asian elephant *Elephas maximus*, by comparing their distribution and densities in adjoining livestock-grazed and livestock-free areas before, and after, a 49% decline in livestock density.
3. During 2001, mean densities of wild grazers, gaur ( $0.11 \text{ ha}^{-1}$ ), chital ( $1.51 \text{ ha}^{-1}$ ) and elephant ( $0.61 \text{ ha}^{-1}$ ), were, respectively, 132, 11 and six times higher in the livestock-free area than in the adjacent livestock-grazed area. Densities of gaur, chital and elephant showed a sharp declining relationship with increasing livestock density, whereas no clear pattern was discernible with wild pig, a non-ruminant generalist, and the sambar, a forest browser. Preferred plant biomass also fell sharply with increasing livestock density.
4. Following the decline in livestock density in the livestock-grazed area in 2002, the densities of gaur, chital and elephant increased by a factor of 57, five and two in the same area, respectively, whereas no changes were seen in the densities of wild pig and sambar or in the preferred plant biomass. Except for a decline in elephant density, the livestock-free area did not show changes in wild herbivore densities.
5. Given the considerable overlap in habitat and dietary preference/requirements between livestock and wild herbivores in the study area, it is suggested that the recovery of gaur, chital and elephant densities following the livestock decline represents their release from livestock-mediated resource limitation.
6. *Synthesis and applications.* These results indicate that resource competition may be intense between wild herbivores and grazing livestock, and if left unchecked could trigger declines of wild herbivores, particularly grazing ruminants and bulk feeders. These results also suggest that, where possible, interventions to reduce livestock grazing may rapidly benefit wild herbivores that have been competitively suppressed. This has important implications for the management of livestock grazing in India's wildlife reserves.

*Key-words:* chital, competition, elephant, gaur, pastoralism, resource limitation, ungulate

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## Introduction

Livestock graze more than one-third of the world's land area, often sharing space and resources with native wildlife (de Haan, Steinfeld & Blackburn 1997).

Correspondence: M. D. Madhusudan, Centre for Ecological Research and Conservation, Nature Conservation Foundation, 3076/5, IV Cross, Gokulam Park, Mysore 570 002, India (fax + 91 821 251 3822; e-mail mdm@ncf-india.org).

Although many authors have voiced concern regarding the impact of livestock grazing on native wildlife (Fleischner 1994; Edwards, Croft & Dawson 1996; Aagesen 2000; Prins 2000), the issue has remained a matter of considerable debate. While some have argued that extant levels of livestock grazing may not adversely affect wildlife (Smith 1992 cited in Saberwal 1996; Prins 2000; Homewood *et al.* 2001), others strongly contest this view (Prins 1992; Mishra & Rawat 1998).



Competition over space and shared resources is an important process governing the potential impact of livestock on wildlife, particularly wild herbivores (Prins 2000). Analyses have pointed out that, although over evolutionary time competition may act as a force promoting co-existence between organisms through character displacement and speciation (Schluter & McPhail 1992), its effects over proximate (ecological) time scales may be markedly different (Abrams 1990). On the one hand, resource partitioning and niche differentiation are seen as evolutionary outcomes of competition, and are reported among guilds of co-evolved wild herbivores in a variety of environments (Jarman & Sinclair 1979; McNaughton & Georgiadis 1986; Green 1987; Murray & Illius 1993; Bagchi, Goyal & Sankar 2003). Recent analyses from Africa further suggest that long-term competitive interactions yield patterns of proportional regularity in body mass within wild grazer guilds (when species are ordered from light to heavy) and such competitive interactions, together with facilitation (Bell 1971), are important determinants of species richness of wild herbivore assemblages (Prins & Olf 1998).

On the other hand, from the time of Gause (1934), many field studies and theoretical analyses have also shown that, if two interacting species are sufficiently similar in their resource-use patterns and one has a competitive advantage (e.g. lower resource requirement or higher resource consumption rate), the other will be excluded. Termed competitive exclusion, this ecological consequence of competition has been elaborated in the theory of limiting similarity (MacArthur & Levins 1967; Abrams 1983) and effectively applied in the context of livestock–wild herbivore interactions (Prins 2000; Mishra *et al.* 2002). Specifically, earlier work (Fritz, de Garine-Wichatitsky & Lettesier 1996; Voeten & Prins 1999; Prins 2000; Mishra 2001) has shown that, because livestock species (i) are derived from wild herbivore ancestry, they are similar to wild herbivore species in their resource requirements; (ii) have a relatively recent history of co-occurrence with wild herbivore species, they show inherently less resource partitioning with wild herbivores (than wild herbivores would among themselves); and (iii) are often buffered against resource depletion and fluctuation through supplemental feeding, they have a competitive edge over wild herbivore species. When livestock species are ‘introduced’ into a co-evolved assemblage of native wild herbivore species, they may therefore compete with, and even exclude, native wild herbivores (Mishra *et al.* 2002).

Evidence for competition between livestock and wild herbivores has, however, remained weak (Putman 1996; Prins 2000) because one of the necessary conditions for establishing interspecific competition, resource limitation, is often difficult to demonstrate in the field (Prins 2000). Moreover, it is also difficult to detect interspecific competition under natural conditions because it is always advantageous for a species to avoid or reduce competition when possible (Pianka 1976). Under such circumstances, ‘competition should

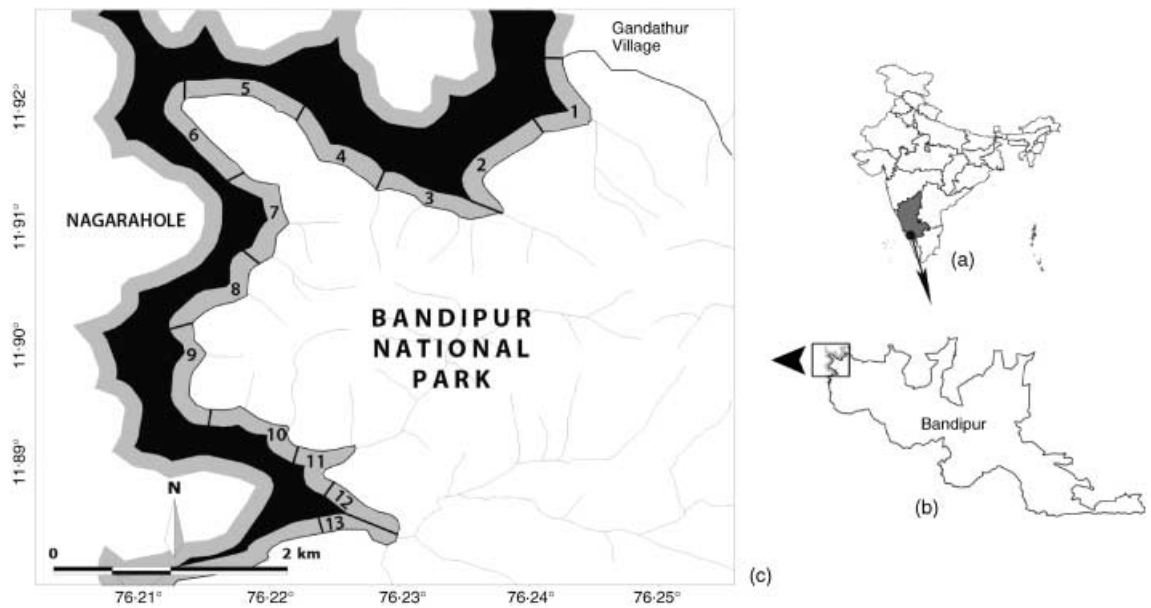
become apparent only when an established system is challenged by some perturbation of species composition or relative density’ (Putman 1996). Indeed, perturbation ‘experiments’ involving the measurement of species’ responses to the introduction, removal or altered abundance of a potential competitor have provided a useful means to study competition (Pianka 1976; Diamond 1978; Schoener 1983). Studies have shed light on interspecific competition in wild herbivore assemblages by measuring changes in species abundance and population growth rates in relation to perturbations in the abundance of a potential competitor (Prins & Olf 1998). Such perturbations include reintroductions of locally extinct species (Penzhorn 1971; Novellie & Knight 1994) and selective removal of a certain species through poaching or culling (Prins 1996). This approach has also been used to infer competition between livestock and wild herbivores (Runyoro *et al.* 1995; Fritz, de Garine-Wichatitsky & Lettesier 1996; Khan *et al.* 1996).

Seven species of native large mammalian herbivores, the four-horned antelope *Tetracerus quadricornis* (Blainville 1816), Indian muntjac *Muntiacus muntjak* (Zimmermann 1780), wild pig *Sus scrofa* (Linnaeus 1758), chital *Axis axis* (Erxleben 1777), sambar *Cervus unicolor* (Linnaeus 1758), gaur *Bos gaurus* (Smith 1827) and Asian elephant *Elephas maximus* (Linnaeus 1758), occur in the deciduous forests of Bandipur National Park, southern India, at high biomass densities (> 18 000 kg km<sup>-2</sup>; this study). The region along the northern fringes of Bandipur is also extensively grazed by *c.* 100 000 livestock (mostly cattle *Bos taurus* Linnaeus 1758) residing in the adjacent villages (Lal *et al.* 1994). In this study, whether interspecific resource competition occurred between local livestock and native wild herbivore species was examined by comparing the densities of five wild herbivore species in livestock-grazed and livestock-free areas before and after a 49% decline in livestock population in shared grazing areas. Further objectives of the study were to determine to what extent livestock affect the distribution and abundance of native wild herbivores in the intensive study area, and discuss the role of body size and feeding ecology in determining the differential effects of livestock decline on the wild herbivore species in the study area. A discussion of the implications of this study for the conservation of India’s endangered wild herbivores, which are increasingly forced to share space and resources with the nation’s half-a-billion livestock animals, is presented.

## Materials and methods

### STUDY AREA

The 880-km<sup>2</sup> Bandipur National Park and Tiger Reserve (11°57′02″N, 76°12′17″E–11°35′34″N, 76°51′32″E) is located within the districts of Mysore and Chamara-janagar of Karnataka State in southern India (Fig. 1). Bandipur receives between 600 and 1000 mm rain



**Fig. 1.** (a) The location of Bandipur National Park in India. (b) Location of the intensive study area (dark square) in Bandipur National Park. (c) The intensive study area on the backwaters of Kabini Reservoir, showing the location of segments sampled for livestock, wild herbivore and forage. The region bounded by segments 1 and 5 was designated the livestock-grazed area, while the area between segments 6 and 13 was designated the livestock-free area.

annually, most of it during the monsoon (June–September), and is dominated by dry deciduous forests of the *Anogeissus latifolia* (Wall.)–*Tectona grandis* (Linn.)–*Terminalia tomentosa* (W. & A.) series (Pascal, Sunder & Meher-Homji 1982; Prasad & Sharatchandra 1984). Anthropogenic pressures on the biomass resources of Bandipur primarily originate along its northern boundary, within 5 km of which are 156 agropastoral villages with a human population of 126 000 (Lal *et al.* 1994) and a livestock population of more than 116 000 (1997 data). An intensive study of the impacts of livestock grazing was carried out along the Kabini backwaters lying within the Gundré Range on the western boundary of Bandipur (Fig. 1).

Seven wild herbivore species, four-horned antelope, Indian muntjac, chital, wild pig, sambar, gaur and Asian elephant, occur in the forests of Gundré Range. Of these, chital, wild pig, sambar, gaur and Asian elephant also occur along the Kabini backwaters, whereas four-horned antelope and Indian muntjac are restricted to the forests. The wild herbivores are variable in their feeding ecology and digestive strategies. Among the ruminants, chital and gaur are grazers and the sambar a browser (Schaller 1967; Krishnan 1972a, 1972b), whereas among the non-ruminants, elephants are bulk-feeding hind-gut fermenters (Sukumar 1990) and wild pigs are extreme generalists (Krishnan 1972b).

#### SELECTION OF STUDY AREAS

During the marked dry season between November and May, the forest canopy in the study area is totally open (due to total leaf fall), temperatures are high, the mostly

seasonal water sources in the forest dry up, there is no fresh primary production, and the ground vegetation in the forest is extremely sparse. At this time, the backwaters of the Kabini Reservoir, which penetrate more than 13 km into the park, begin to recede, exposing a fertile, well-drained and productive pan where mostly grassy forage grows adjacent to a permanent source of water. The ready availability of green forage and water on the backwaters at a time of general scarcity in the landscape leads to dense seasonal congregations of wild herbivores. Although small in area, the seasonal importance of this habitat for wild herbivores (and livestock) is disproportionately high. These pastures, with green grassy forage, occupy an area of 187 ha on the backwaters, stretching 13 km along the contours from the park boundary into the Gundré Range of Bandipur (Fig. 1).

Livestock, comprising almost entirely cattle from the adjoining village of Gandattur (human population 1019, number of households 149, cattle population 504), enter the park and graze along the backwaters only up to the 5-km segment (Fig. 1), beyond which they do not occur. This is because livestock return to the village every evening and, given this constraint, the 5-km segment is the farthest they are able to travel from the village to graze. Wild herbivores, on the other hand, are able to access and use the entire 13-km stretch of the backwaters. But for the grazing by village livestock, virtually identical ecological conditions (including topography, rainfall, moisture regimes, etc.) prevail over the 'livestock-grazed' and 'livestock-free' areas. Other forms of anthropogenic biomass removal are absent from this zone, and incidental disturbance to wild herbivores from humans is negligible because the livestock are not

herded and the area is officially closed to tourism. With the onset of the monsoon the draw-down pastures are completely submerged for more than 6 months. This, in effect, resets the initial environmental conditions in this habitat every year. Thus, this site offered a natural experiment with which to isolate and examine the effects of livestock grazing on wild herbivores while controlling the influence of other ecological and anthropogenic factors.

#### SAMPLING AND DATA ANALYSES

##### *Livestock and wild herbivore censuses on the Kabini backwaters*

Livestock and wild herbivore species were censused along the backwater pastures once the waters of the Kabini reservoir had receded and the draw-down areas became available to grazers. The 13-km stretch of backwaters extending over a total area of 187 ha was treated as a sequence of 13 1-km segments and mapped using a global positioning system (GPS) to obtain the precise area under each segment. Driving along a road that passed through these segments, livestock and wild herbivore species grazing in each 1-km segment along the backwaters were periodically censused. The censuses were carried out from a quiet, slow-moving vehicle in the mornings and afternoons. Pilot surveys showed that livestock are most active and graze along the backwaters during the morning hours, and begin to return to the village by early afternoon. On the other hand, wild herbivores were not encountered during the mornings in either the livestock-grazed or livestock-free areas, their general activity on the backwaters peaking only towards late afternoon and evening. A total of 17 and 56 censuses were carried out in the mornings, and 21 and 32 censuses in the afternoons, during 2001 and 2002, respectively. The censuses were carried out at least once a week between February and June in 2001, and between December and June in 2002. Given the characteristic activity patterns of livestock and wild herbivores, data from the morning censuses were used in the estimation of livestock densities, whereas densities of wild herbivores were calculated only from the afternoon censuses.

Pellet and dung counts were carried out in four 50-m<sup>2</sup> rectangular plots within each segment. This was done in order to cross-validate the patterns of segment use by wild herbivores obtained from sighting-based methods. It was assumed that the census of wild herbivores based on direct sightings was indicative of their diurnal distribution patterns, whereas dung/pellet densities were a measure that also incorporated patterns of nocturnal distribution and use of the different segments by wild herbivores.

Biomass density was derived by multiplying mean segment-wise densities of each species with their unit body mass (data from Karanth & Sunquist 1992); a unit weight of 150 kg was estimated for livestock. Con-

sidering that the total area along the backwaters was about 1.87 km<sup>2</sup> and each segment was roughly 15 ha in extent, animal density and biomass density were expressed per ha. As the data for livestock and wild herbivore densities came from repeated censuses of 13 adjacent 1-km segments, statistical independence of data from adjacent segments within each temporal replicate was tested using a first-order autocorrelation by examining correlation coefficients in a lagged scatterplot, where counts in a one segment were plotted against counts from its adjacent segment (Brown & Rothery 1994). Serial dependence was inferred if the lag-correlation coefficients were significant. Similar analyses were also carried out with vegetation data gathered along the 13 adjacent segments. The significance of the difference in mean density and biomass of wild herbivores and mean biomass of forage between strata and season was tested using Monte Carlo procedures (Manly 1991; Crowley 1992) because the data did not meet assumptions of normality and homoscedasticity in traditional parametric ANOVA analyses (Sokal & Rohlf 1995).

For the years 2001 and 2002, the mean density of livestock and each wild herbivore species in the 13 segments was used in a null model analysis (Gotelli & Graves 1996) to examine whether the observed extent of spatial overlap between livestock and each wild herbivore species deviated significantly from values obtained by chance alone. Overlap was computed as  $(1.0 - B)$  (Wolda 1981), where  $B$  is the Bray–Curtis distance measure, because it used absolute abundance in its computation, unlike other measures of overlap (Krebs 1999) which utilized only proportional abundance. This measure of overlap ranged from 0 (no overlap) to 1 (complete overlap). Expected values of spatial overlap were generated after shuffling row values in a species (in rows) by sample (in columns) matrix. Randomizations were constrained to take into account the fact that livestock did not occur beyond the fifth segment, whereas wild herbivores could occur in any of the 13 segments. Using the Microsoft® Excel add-in PopTools (Hood 2004), 1000 simulations were carried out to generate a distribution of expected spatial overlap, against which the observed spatial overlap was compared to obtain its statistical significance.

##### *Village livestock census*

Door-to-door surveys were carried out in Gandattur during October–November of 2000 and 2001 to ascertain the population dynamics of livestock that grazed in the park along the backwaters. These data were used in conjunction with livestock censuses along the backwaters to estimate the proportion of village livestock using the backwaters within Bandipur for grazing. Although livestock regularly grazed here, occasionally, in response to intensified vigil by the staff of the wildlife department, livestock were not let out into the park to graze. Data from such days were omitted from the samples.

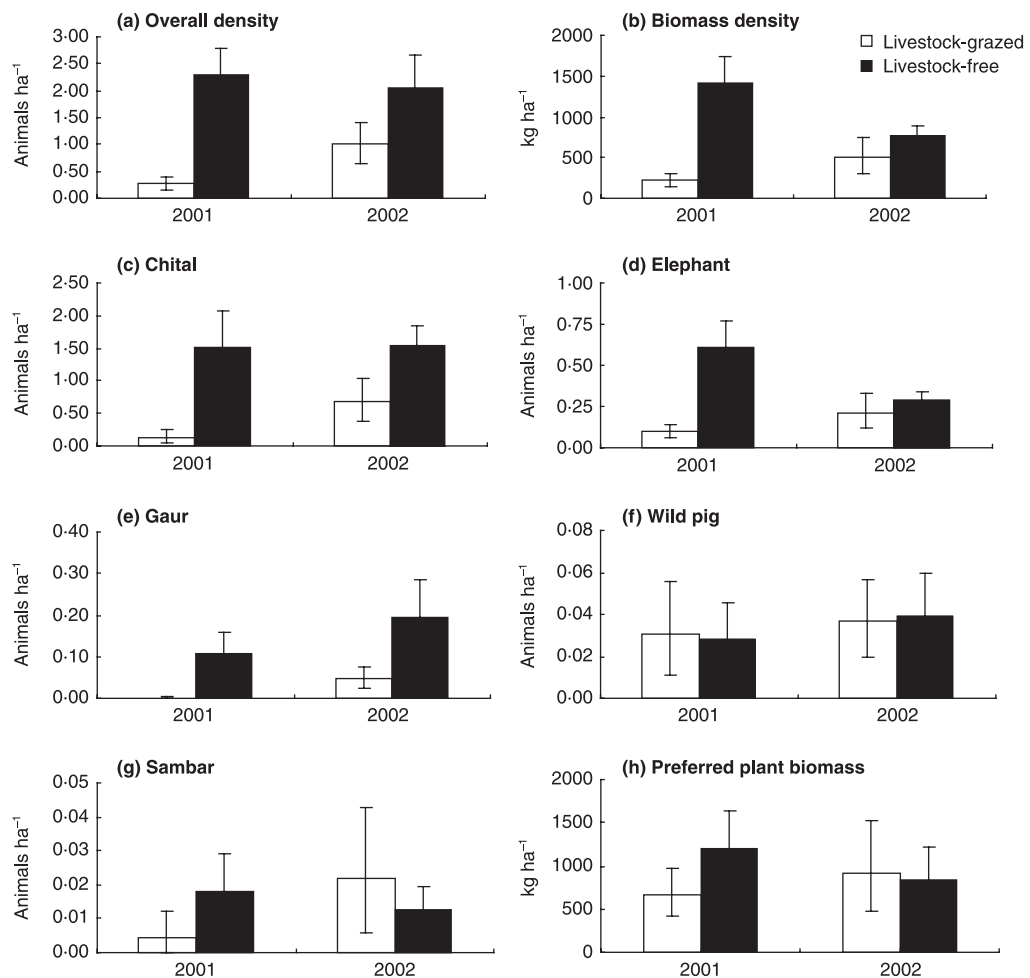
In each segment, the standing biomass of vegetation was measured, species-wise, in 1-m<sup>2</sup> plots placed on 30-m offsets flanking a trail. The plots were spaced at regular intervals of 250 m along the trail, thereby yielding eight plots in each 1-km segment. Plants in each plot were classified into preferred and avoided species based on *ad libitum* feeding observations on different wild herbivores; a plant was classified as preferred by a herbivore species when the herbivore was observed feeding at least once upon that plant. Given the low forage species richness in the study area and the long periods of observation, misclassifications of plant preference by herbivores due to uneven sampling effort was unlikely. Samples were sun-dried to constant weight to estimate dry biomass. Further, in order to investigate if the levels of inorganic nutrients varied by area or season, laboratory analyses were carried out on all preferred species from each segment for 2001 and 2002, and levels of six inorganic elements, nitrogen, calcium, potassium, phosphorus, zinc and magnesium, were estimated.

Chemical analysis followed methods outlined in Allen (1989).

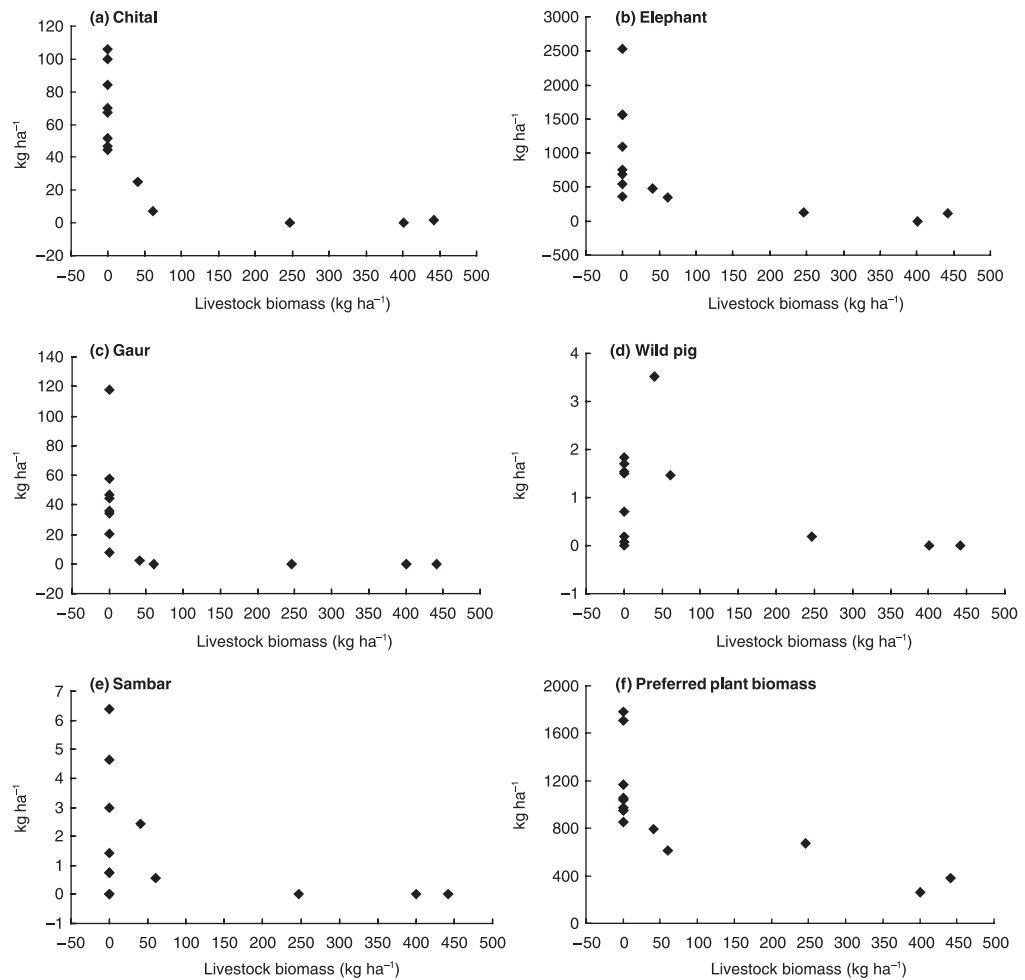
## Results

### LIVESTOCK PRESENCE AND THE ABUNDANCE OF WILD HERBIVORES: SPATIAL PATTERNS

In 2001 and 2002, the overall density (Fig. 2a) as well as biomass density (Fig. 2b) of wild herbivores was significantly higher in the livestock-free area compared with the livestock-grazed area (in all cases, Monte Carlo analysis,  $P < 0.01$ ). This broad pattern of greater wild herbivore density and biomass in the livestock-free area was also observed at the species level. Densities of chital (Fig. 2c), elephant (Fig. 2d) and gaur (Fig. 2e) were significantly higher in the livestock-free area than in the livestock-grazed area, although elephant density did not differ between the areas in 2002. The densities did not differ between the areas in the case of wild pig (Fig. 2f;  $P = 0.55$  and  $0.46$ , in 2001 and 2002, respectively) and sambar (Fig. 2g;  $P = 0.81$  in 2002), although during 2001 sambar density was higher in the livestock-free area ( $P = 0.02$ ).



**Fig. 2.** Overall density (a) and biomass density (b) of wild herbivores in the livestock-grazed and livestock-free areas during 2001 and 2002 on the Kabini backwaters. (c–g) Densities of wild herbivores by species, and preferred plant biomass (h), in the livestock-grazed and livestock-free areas. Density is given as individuals ha<sup>-1</sup> and biomass density as kg ha<sup>-1</sup>. Error bars denote non-parametric (bootstrapped) 95% confidence intervals. Sample sizes are given in the text.



**Fig. 3.** Scatterplots showing the relationship between livestock biomass density in a segment (on the  $x$ -axis) and the biomass density of different wild herbivore species (a–e) and preferred plant matter (f) there (on the  $y$ -axis). Data are presented only for the year 2001.

Correlation coefficients from lag scatterplots of data from livestock and wild herbivore censuses and plant biomass estimation were not significant, suggesting that there was no serial spatial or temporal dependence in these counts. Therefore, every temporally replicated count for each species in a segment, and plant biomass from every plot in a segment, was treated as an independent data point when obtaining segment-level estimates of parameters such as animal and plant biomass.

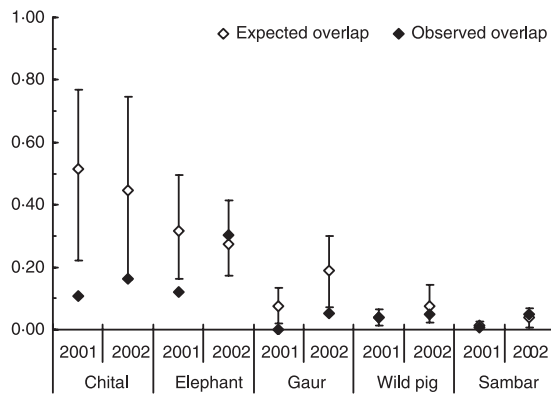
Across the 13 segments, wild herbivore biomass density declined steeply with increasing biomass density of livestock (Fig. 3a–e). Although this was true for both years (2001 and 2002), data are presented only for 2001, when the density of livestock on the backwaters was higher and its effect on wild herbivores more pronounced. The wild herbivore species differed in their response to livestock density: chital (Fig. 3a), elephant (Fig. 3b) and gaur (Fig. 3c) showed a monotonic decline in their biomasses with increasing livestock presence, while the responses of wild pig (Fig. 3d) and sambar (Fig. 3e) were more variable. In the case of chital and gaur, the extent of livestock impact was also evident from the fact that, although variable, the range of densities

they achieved in the livestock-free segments was always higher than in segments where livestock grazed.

There was a positive correlation between pellet/dung density and biomass density within a segment in the case of chital (Spearman rank order correlation coefficient  $r_s = 0.64$ ,  $P = 0.02$ ,  $n = 13$ ), elephant ( $r_s = 0.61$ ,  $P = 0.03$ ,  $n = 13$ ) and gaur ( $r_s = 0.64$ ,  $P = 0.02$ ,  $n = 13$ ), whereas this relationship was not significant in the case of wild pig ( $r_s = 0.21$ ,  $P = 0.48$ ,  $n = 13$ ) and sambar ( $r_s = 0.28$ ,  $P = 0.34$ ,  $n = 13$ ). This suggested that, for chital, elephant and gaur, there existed a close correspondence between their diurnal and nocturnal distribution patterns along the backwaters.

During 2001, the observed spatial overlap of livestock with chital (0.11), elephant (0.12) and gaur (0.0), respectively, was significantly lower than expected from chance alone, whereas in the instances of sambar (0.04) and wild pig (0.01) it did not deviate from random expectation (Fig. 4). Also during 2002, the observed spatial overlap of livestock with chital (0.16) and gaur (0.05) was significantly lower than expected, whereas with elephant (0.30), pig (0.05) and sambar (0.05) it did not deviate from expectation.





**Fig. 4.** Observed values of pairwise spatial overlap between livestock and each wild herbivore species (on the y-axis) during 2001 and 2002 shown against their expected distributions (mean  $\pm$  95% confidence intervals) obtained from simulations (see Materials and methods for details). Overlap was computed as  $(1 - B)$ , where  $B$  is the Bray–Curtis distance measure (Krebs 1999).

#### LIVESTOCK PRESENCE AND FORAGE CHARACTERISTICS: SPATIAL AND TEMPORAL PATTERNS

A total of 29 and 11 plant species occurred in the vegetation plots on the backwaters during 2001 and 2002, respectively. Of these, there were 12 preferred species during 2001 and six during 2002, among which grasses, sedges and dicotyledonous species comprised, respectively, 94.8%, 2.8% and 2.4% of the preferred biomass in 2001. The grass *Cynodon dactylon* alone contributed, on average, 87% of the preferred biomass available along the backwaters. Forage characteristics also differed between the livestock-grazed and livestock-free areas between 2001 and 2002. Monte Carlo tests showed that the biomass of preferred species was significantly higher in the livestock-free area during 2001 than in the livestock-grazed area ( $P = 0.014$ ), whereas no differences in preferred biomass were apparent ( $P = 0.59$ ) between the areas during 2002 (Fig. 2h). With increasing livestock density, the biomass of preferred plants declined monotonically, with values achieved in each livestock-free segment being consistently higher than those in each livestock-grazed segment (Fig. 3f).

Chemical analysis for inorganic nutrients carried out on preferred species showed similar values between areas. In the main preferred species, *C. dactylon*, which accounted for over 87% of the preferred biomass on the backwaters, levels of nitrogen, potassium, phosphorus, calcium, zinc and magnesium did not differ significantly either between areas or across years.

#### RESPONSES OF WILD HERBIVORES AND FORAGE TO RELEASE FROM LIVESTOCK GRAZING

During 2001, up to 208 of the village's 460 livestock grazed along the backwaters inside the park. Between

2001 and 2002, the number in the livestock-grazed area declined sharply owing to an outbreak of black quarter fever, a form of anthrax, to which 31% of the village livestock succumbed. However, no unusual mortalities were observed among wild herbivores during this period in the adjoining forests and backwaters. By the onset of the dry season in 2002, this epidemic among the village livestock had reduced their biomass density in the livestock-grazed area by 49% to  $116 \text{ kg ha}^{-1}$ .

Following the decline of livestock in the livestock-grazed area in 2002, the density and biomass density of wild herbivores in that area increased by 2.8 and 1.3 times, respectively (Fig. 5a,b;  $P < 0.01$  in both cases). In the livestock-free area, which served as a temporal control, the density of wild herbivores (Fig. 5a) did not vary between the years, although the biomass density (Fig. 5b) was significantly lower in 2002, owing mainly to a decline in elephant density.

With the exception of the wild pig and sambar (Fig. 5f,g), there was a consistent and significant (at  $P < 0.05$ ) two- to fivefold increase in the mean density of wild herbivores (Fig. 5c–e) in the livestock-grazed area following the decline in livestock biomass in 2002. This increase was particularly pronounced for gaur, which, from being virtually absent from the livestock-grazed area during 2001, increased more than fivefold following the decline in livestock density. Wild herbivore densities did not vary between years in the livestock-free area, except in the case of the elephant (Fig. 5d), the density of which declined by 53% between 2001 and 2002.

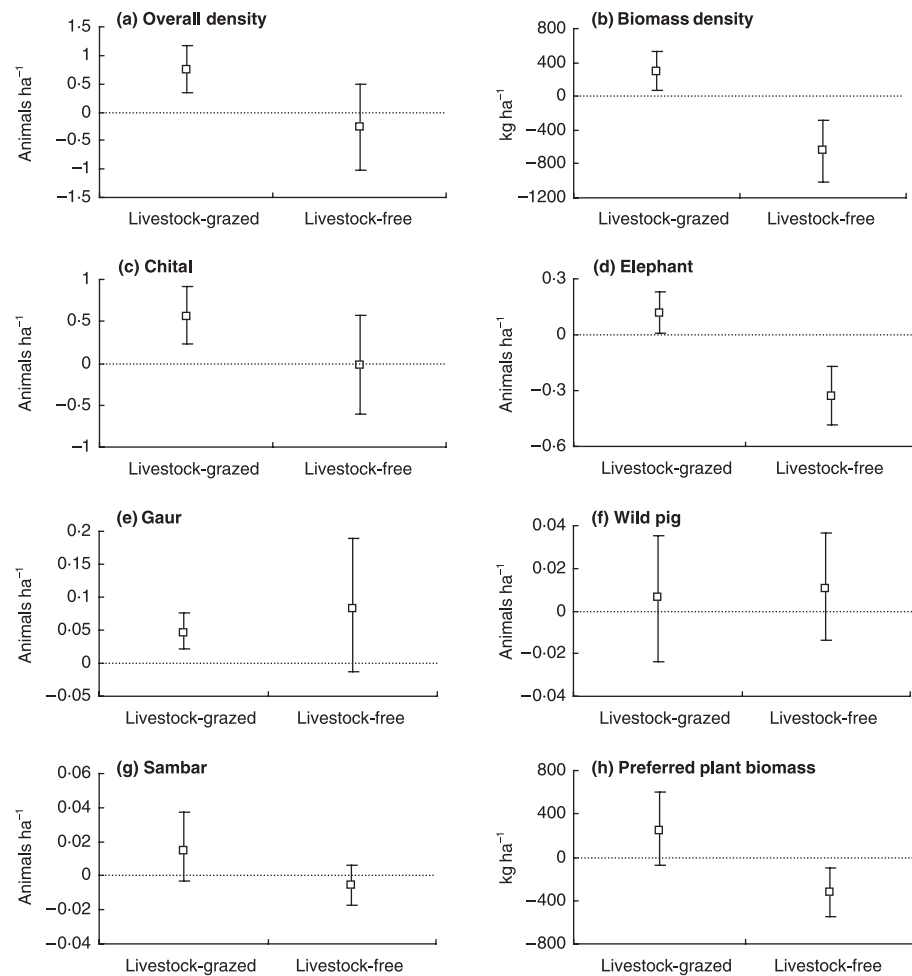
The decline in livestock biomass in the livestock-grazed area between 2001 and 2002 also affected the extent to which wild herbivores overlapped with them; all wild herbivores consistently showed an increase in observed overlap values with livestock across these years (Fig. 4).

Preferred plant biomass density tended to increase in the livestock-grazed area following the decline of livestock, although the increase was not statistically significant at the 95% level (Fig. 5h;  $P = 0.07$ ). In the livestock-free area, however, there was a significant decline in preferred plant biomass density between 2001 and 2002 (Fig. 5h).

## Discussion

#### LIVESTOCK AND WILD HERBIVORES IN BANDIPUR: THE CASE FOR RESOURCE COMPETITION

The results showed that, during 2001, wild herbivores, particularly chital, gaur and elephant, tended to segregate spatially from livestock (Fig. 4). They used the livestock-grazed area to a significantly lesser degree than they did the livestock-free area (Fig. 2c–e), furthermore their densities showed a sharp decline with increasing livestock density (Fig. 3a–c). The observed segregation between livestock and wild herbivores was not thought to be an artefact of any other anthropogenic, environmental



**Fig. 5.** Changes in the overall density (a), overall biomass density (b) and density by species (c–g) of wild herbivores, and preferred plant biomass (h), in the livestock-grazed and livestock-free areas between 2001 and 2002. Note the significant increases in the densities of chital, elephant, gaur and sambar in the livestock-grazed area between 2001 and 2002. Density is given as individuals ha<sup>-1</sup> and biomass density as kg ha<sup>-1</sup>. Error bars denote non-parametric (bootstrapped) 95% confidence intervals. Sample sizes are given in the text.

or ecological gradient because the overall extent of the backwater habitat itself was rather small (187 ha), topographically homogeneous, and had negligible human activity. Two mechanisms of interaction, one behavioural and the other resource-mediated, between the wild herbivores and livestock could explain such segregation. Under the former, the mere presence of livestock in the livestock-grazed area could deter wild herbivores from using these segments, whereas under the latter, the effects of livestock grazing on shared forage resources could affect use of the segments by wild herbivores.

The data recorded in this study offer little support for a behaviour-mediated segregation between wild herbivores and livestock. First, in the many instances when livestock and wildlife were seen together, direct aggression or supplanting by livestock was never observed; an aggressive encounter occurred once when an elephant charged approaching livestock. Secondly, the close correspondence between data from sighting-based density and pellet/dung density for chital, elephant and gaur

suggested that these species, all of which also forage at night (M. D. Madhusudan, personal observation; Krishnan 1972a,b), did not show temporal partitioning of habitat with livestock. There was no increase in nocturnal use of segments grazed by livestock during the day. This suggests that the segregation between livestock and wild herbivores was not a proximate behavioural response to the presence of livestock.

On the other hand, evidence for resource-mediated segregation between wild herbivores and livestock was strong. First, the low diversity of preferred plants along the backwaters, together with the dominance of a single preferred species, *C. dactylon* (> 87% of preferred biomass), a well-known nutritious grass species, suggests a high level of dietary overlap between livestock and wild herbivores in the draw-down pastures of the study site. Secondly, the livestock-grazed area contained a significantly lower preferred plant biomass (Fig. 2h), the value of which declined steeply with increasing livestock density (Fig. 3f). It is therefore plausible that grazing by livestock in segments of the livestock-grazed

area could deplete forage for wild herbivores. This hypothesis is supported by the observation that the preferred plant biomass increased in the livestock-grazed area after the decline of livestock in 2002 (Fig. 5h). Finally, the associated increase in wild herbivore numbers in the livestock-grazed area during 2002 (Fig. 5a–e) strongly points to a resource-mediated, rather than behavioural, mechanism driving the spatial segregation between livestock and wild herbivores.

In the light of the above data and analysis, an important question remains: do the patterns shown in this study present sufficient evidence to infer a livestock-mediated resource limitation and, hence, resource competition, between livestock and wild herbivores in Kabini? As De Boer & Prins (1990) note, resource competition between two species may be inferred only when all the following necessary conditions are met: (i) habitat overlap, (ii) diet overlap and (ii) resource limitation. The data from this study show that Kabini backwaters constitute a homogeneous habitat that is used both by livestock and wild herbivores. Within this habitat, the depauperate nature of the preferred plant community, and the preponderance of one preferred species, indicates a high dietary overlap among the herbivores grazing there. Further, in this study compelling evidence for resource limitation via livestock grazing comes from the striking recovery of chital, gaur and elephant densities in areas where livestock numbers declined between 2001 and 2002. Thus, it appears that livestock do impose a resource limitation on wild herbivores in the Kabini backwaters. However, it must be noted that, in this study, the observed effects of resource limitation on wild herbivores (i.e. lower densities in the livestock-grazed areas and density increases following livestock declines), rather than being population-level numerical responses, are perhaps the outcome of a redistribution of wild herbivores along the Kabini backwaters.

As ruminant grazers (Schaller 1967; Krishnan 1972a, 1972b), chital and gaur are perhaps the most similar to cattle in terms of their feeding and digestive strategy, unlike the sambar (a forest ruminant browser), elephant (a hind-gut fermenter) and wild pig (a non-ruminant omnivore). The data reported here show that, as expected, chital and gaur were indeed the species showing the most striking response to livestock, both in terms of spatial exclusion in the presence of livestock grazing as well as in their recovery following livestock declines. However, it must also be noted that, despite a 49% decline in livestock densities in 2002, the two species continued to occur at significantly lower densities in livestock-grazed area in comparison with the livestock-free area. Elephants, as bulk feeders, also appeared to respond noticeably to the depletion in forage associated with livestock grazing (Fig. 2d). Interestingly, they were also the only species to show declines in the livestock-free area in 2002 (Fig. 5d), where the preferred plant biomass declined significantly between the two years (Fig. 5h). The sambar, although a ruminant and closest in body size to cattle, showed rather muted responses both to

livestock presence (Fig. 2g) and decline (Fig. 5g), which is explained by the fact that it is predominantly a forest browser, using the backwaters only occasionally. Finally, the wild pig, as would be expected of a non-ruminant omnivore, responded neither to livestock presence nor decline on the backwaters (Figs 2f and 5f). In fact, such divergent responses of the different wild herbivores to the presence and decline of livestock underlines the role of feeding ecology and digestive strategy in determining livestock impacts on wild herbivores.

The beneficial effects of livestock removal for wild herbivores, as well as variable responses to it, have also been reported by other studies. In Gir, India, Khan *et al.* (1996b) reported a 13-fold increase in chital populations in 19 years following the removal of 57 pastoral settlements, whereas species like the nilgai *Boselaphus tragocamelus* declined. Similarly, Runyoro *et al.* (1995) reported an increase in buffalo *Syncerus caffer* numbers following the removal of pastoralists from the Ngorongoro Crater, while numbers of mixed feeders remained unchanged. In the pastoral trans-Himalayan region of Spiti, recent work has also reported a steady increase in bharal *Pseudois nayaur* numbers in a set-aside area protected from livestock grazing for more than 4 years (Mishra *et al.* 2003; Mishra *et al.* 2004).

Although this study sheds some light on the nature and extent of interactions between livestock and wild herbivores, additional data are needed to explain certain observed patterns. It remains an open question as to why, during 2001, preferred biomass was lower ( $660 \text{ kg ha}^{-1}$ ) in the livestock-grazed area where total herbivore (domestic and wild) biomass was low ( $437 \text{ kg ha}^{-1}$ ), whereas it was greater ( $1230 \text{ kg ha}^{-1}$ ) in the livestock-free area where herbivore biomass was high ( $1406 \text{ kg ha}^{-1}$ ). To explain the underlying processes better, it may be necessary to supplement information on density and biomass with species-specific data on time spent grazing in the different segments and consumption rates. Further, vegetation responses to grazing might also influence the observed pattern. It is known that primary productivity may be stimulated by moderate levels of grazing, whereas intense grazing may lower productivity (McNaughton 1979). Clearly, more data are needed to test these hypotheses.

#### DESIGN AND ANALYTICAL ISSUES

It is important to discuss this study briefly in terms of its design and analysis because it is open to the criticisms that these data and inferences are derived from a single, large, unreplicated experiment (Hurlbert 1984). While the value of well-replicated manipulative experiments in isolating and measuring effects of a treatment factor can hardly be overemphasized, it must also be recognized that experiments seeking to understand human impacts on natural communities at real-world scales often face serious limitations with manipulation and replication (Buttolph & Coppock 2004). This is particularly the case where levels of anthropogenic



factors, such as livestock grazing, that are associated with human livelihoods are often impossible to manipulate over space and time. It therefore becomes important to identify and exploit 'natural experiments', where treatment effects may be tested based on natural variations in treatment levels, as, for example, when adjacent sites vary in livestock grazing levels (Buttolph & Coppock 2004). Given their fortuitous nature, obtaining true spatial replicates for such natural experiments may not always be possible. However, despite these limitations, large-scale natural experiments on human impacts offer the important advantage of assessing effects at realistic scales, which is critical in understanding and managing human impacts on natural communities. The absence of replication in large-scale natural experiments does limit the extent to which their inferences may be generalized, but emerging methods of meta-analysis (Osenberg *et al.* 1999) may help circumvent this problem. In the absence of true replication in large-scale natural experiments, pseudoreplication does remain a concern (Hurlbert 1984). Although methods such as autocorrelation analysis and randomization used here may help identify and address potential problems of statistical non-independence in data, the fundamental problem of biological non-independence must be explicitly acknowledged.

#### CONSERVATION IMPLICATIONS

The issue of livestock grazing impacts on wild herbivores attains a unique seriousness in India. At 499 million animals, India's livestock population is the largest in the world, and has risen by 44% between 1971 and 2000 despite an 18% decline in the extent of permanent pastureland (Food & Agriculture Organization 2004). India's wild herbivores, on the other hand, have become increasingly confined to wildlife reserves covering less than 5% of the country's land area (Madhusudan & Karanth 2002). Today, livestock graze in more than three-quarters of India's wildlife reserves (Kothari *et al.* 1989), providing goods and services for livelihood and commerce (Mishra 2001). The desirability of livestock grazing in India's wildlife reserves has been debated on the basis of its societal ramifications (Saberwal 1996, 1999) with a glaring absence of ecological data on the impacts of livestock grazing on wildlife (for exceptions see Mishra 2001; Bagchi *et al.* 2002; Mishra *et al.* 2004).

Three specific findings from this study have a significant bearing on wild herbivore conservation in India. First, the study shows that existing levels of grazing by livestock in Bandipur do appear to limit resources for wild herbivores, and are responsible for lowered wild herbivore densities and even exclusion in livestock-grazed areas, as with the gaur in 2001. Such exclusions could mean an effective reduction in the extent of suitable habitat available to wild herbivores, and a greater vulnerability to stochastic extinctions. Secondly, livestock-mediated resource limitation, in particular, appears to affect those wild herbivore species that are most similar to livestock in terms of body size and feed-

ing ecology. Thirdly, this study strongly suggests that, proximately, wild herbivores like chital and gaur may benefit considerably from management interventions designed to reduce livestock presence in areas from where wild herbivores may have been previously excluded by livestock. Finally, the success and durability of efforts to conserve India's remaining wild herbivores hinge on our ability to design interventions that are robust reconciliations between the societal benefits of livestock grazing and its ecological impacts.

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# Displacement and Rehabilitation of an Adivasi Settlement

## Case of Kuno Wildlife Sanctuary, Madhya Pradesh

*This paper describes the process of relocation and rehabilitation of villages populated primarily by sahariya tribals in Sheopur district of Madhya Pradesh. It examines the rehabilitation package offered, the process followed for relocation and resettlement and the impact that this shift has had on the livelihood of the affected people. While the rehabilitation package and the general attitude of the agency that carried out the relocation has been a significant improvement over previous such experiences, the shift has nevertheless had a negative impact on the livelihood of the people, at least in the short run.*

ASMITA KABRA

### I Introduction

Wildlife Protected Areas (PAs), comprising of national parks and wildlife sanctuaries, now constitute about 5 per cent of the land area of India, while their core areas cover about 1 per cent of the land mass [Kothari et al, WII, 1989]. The designation of wildlife protected areas has been the principal conservation strategy adopted in most parts of the world, including India. Protected areas were meant to create spaces relatively or even wholly free of human presence or biomass extraction, where evolutionary processes could carry on uninterrupted [Rangarajan 2001a]. This conservation paradigm has had significant implications for communities that derive their sustenance from designated protected areas, as also for the conservation of the PAs. Firstly, restrictions have been placed on resource use from PAs. Apart from such restrictions, there have also been instances of people being asked to vacate areas that they had traditionally inhabited, and that had been designated subsequently as PAs. Provisional estimates put the number of people living in and around PAs at around 4.5 million [Kothari et al 1996]. According to a survey of national parks and wildlife sanctuaries carried out by the Indian Institute of Public Administration (IIPA) in 1999-2002, 21 of the 30 PA managers (70 per cent) responding to a question on displacement stated that people had been relocated from their PA [IIPA 2002].

Thus, on the one hand, PA managers are increasingly taking recourse to displacement as a tool for safeguarding PA from pressures on resources that are generated by forest-dependent communities, and this method is strongly supported by many conservationist and wildlife biologists [Kothari et al]. On the other hand, supporters of movements for social justice and rights of marginal communities, particularly tribals, have been emphasising the destitution that such conservation-induced displacement wreaks on forest-dependent communities, particularly adivasis.

They stress on the well-documented fact that the state apparatus in India has been incapable of adequately looking after people who have been uprooted from their original places of residence. This school of thought has also questioned the very rationale of relocating people from PAs and has urged for a more inclusive conservation paradigm that would permit latitude for local communities as well as wild flora and fauna to coexist [Saberwal 1994, Rangarajan 2003].

These two polar schools of thought have frequently been at odds on the issue of displacement and its ecological and social impact. Wildlifers have stressed how displacement has had a beneficial impact on PAs and how it has offered to hitherto isolated communities the opportunity of integrating with mainstream society. Some have even argued that such relocations, if planned and executed efficiently and transparently, can improve rural livelihoods while simultaneously helping habitat recovery. The anti-displacement viewpoint, on the other hand, has stressed that the urge to 'integrate' rural communities, particularly adivasis, with the so-called mainstream is a patently urban and paternalistic phenomenon that exhibits ignorance about the lifestyles of such communities. These lifestyles are intricately linked to their surrounding landscapes and have over time developed a fine balance with nature. Any disruption of this equilibrium, they argue, irreparably damages not only the livelihood of these communities, but also natural systems of the area. Further, the track record of official attempts at recreating livelihoods for displaced people is so poor that this alone is cited as reason enough to abandon any further plans for relocating people [Kothari et al 1996].

Subsequently, attempts have been made to reconcile the two approaches. For instance, the Indian Board of Wildlife tried to reach for a middle ground by accepting there would be no forced displacement from PAs in India [Rangarajan 2001: 111]. However, a major lacuna in this discourse is that there is still a lack of site-specific independent studies of the social impact and consequence of relocation. These are essential not only to provide sound

empirical foundations for the debate but also to help test views against the evidence. Moreover, even the ongoing debate about the impact of involuntary displacement has tended to focus on displacement generated by industrial and infrastructure projects, and very little material is available on conservation-induced displacement.

The present study is a step towards addressing this lacuna, and to take forward the debate on the complex inter-linkages between conservation, development and displacement. In this study, we examine the social costs and benefits arising from the relocation of sahariya tribals from the Kuno wildlife sanctuary in northern Madhya Pradesh. The study touches upon the relief and rehabilitation (R and R) package offered to the displaced community, the processes adopted by the forest department (specifically the Kuno sanctuary management), and the lessons and best practices emerging from the implementation of this package. An attempt is also made to shed light on reasons for deviation from the original plan and/or best practices. We then attempt to evaluate the impact of this R and R programme on the livelihood of the displaced community, and also briefly touch upon the other social and political impacts of the displacement. It must be pointed out right at the outset that our work does not focus on the biological impact of the displacement on the protected area itself, which, despite its importance, lies beyond the scope of the present study.

### Background of Displacement

The ministry of environment and forests (MoEF), upon the recommendation of the Wildlife Institute of India [WII 1995] took up an ambitious project to translocate a pride of Asiatic lion from the Gir national park in Gujarat to the Kuno wildlife sanctuary in MP. Through this project, it was hoped to establish a second free ranging population of Asiatic lion,

which would serve as insurance against various extinction threats that face the Gir lions. Kuno was part of the area chosen for the first ever lion introduction in India, in the early 20th century by the then Maharajah of Gwalior. The experiment failed as the lions and their offspring attacked cattle as well as people. In the 1950s, predation on cattle by lions was possibly the major reason for poisoning incidents in Chandraprabha wildlife sanctuary, Uttar Pradesh, where lions were translocated from the Gir forest [Rangarajan 2001b]. The MP forest department is executing the present project with financial assistance from the MoEF at the centre. According to the Wildlife Institute of India, the proper resettlement and rehabilitation of the people living inside the Kuno sanctuary was a precondition for introduction of lions into the sanctuary. This was considered vital for minimising the probability of conflicts (in the form of cattle depredation and attacks on human beings) between a large predatory carnivore like the lion and the local people. Predation on domestic cattle has been a persistent feature of large carnivore-human interaction in many parts of India [Madhusudan and Mishra 2003], and the recommendations of the WII were aimed at avoiding or minimising a repeat of failures of lion relocation in the past.

### Kuno: The Region

Kuno wildlife sanctuary is located in Sheopur district in north-west Madhya Pradesh. Madhya Pradesh has a sizeable scheduled tribe population, constituting 23 per cent of the total population of the state. The concentration of the tribals is mainly in the undulating hilly districts in the southern parts of the state.

The newly constituted district of Sheopur was created in the year 1998 through the bifurcation of the district of Morena. The district is 43rd in the state terms of population. The recent census data states that the district has a total population of 5,59,715, which works out to 0.93 per cent to the total population of the state.

The Lion Reintroduction Project being implemented in Kuno wildlife sanctuary has resulted in relocation of 24 villages to the outskirts of the sanctuary. Over 5,000 people resided in these 24 villages inside the sanctuary prior to the initiation of this project. A majority of these inhabitants comprised of sahariya tribals, a primitive tribal group that has historically been almost completely dependent upon forests for survival. In addition to the sahariya, the affected villages were also home to other caste groups, including jatav (SC), brahmin, gujjar, kushwaha, yadav, etc.

The sahariya tribals, who have been the prime focus of Samrakshan's interventions in this region, have historically inhabited the belt along the Rajasthan-Madhya Pradesh border, especially the districts of Gwalior, Shivpuri, Morena (including Sheopur) and Bhind. Traditionally forest-dependent for meeting their livelihood needs primarily through food gathering and hunting, the sahariya have begun, for the past generation or two, to undertake marginal agriculture to meet a part of their livelihood needs, particularly for items that cannot be directly obtained from the forest. Their agricultural practices have predominantly been primitive and rain fed, and precarious as far as livelihood security is concerned [Debnath and Yadav nd].

**Table 1a: The BoTD Package Offered**

Heads	Specified Norms (Rs Per Family)	To be Spent by
Land development (for 2 hectares per family)	36,000	Forest dept
House construction (on 5,000 sq feet per house)	36,000	Beneficiary
Community facilities	9,000	Forest dept
Fuel and fodder plantation	8,000	Forest dept
Pasture development	8,000	Forest dept
Transport of household goods	1,000	Beneficiary
Cash incentive for shifting	1,000	Beneficiary
Miscellaneous expenses	1,000	Forest dept
<b>Total</b>	<b>Rs 1,00,000</b>	

**Table 1b: Break-Up of Expenditure under Land Development Head**

Items of Works	Expenditure (in Rs)
Clearance, deep-ploughing and bunding of the crop-land	20,000
Farm-yard manuring	5,000
Sinking of dug-wells (one among five families)	10,000
Other miscellaneous works in this head.	1,000
<b>Total</b>	<b>Rs 36,000</b>

## R and R Package Offered

Rehabilitation was carried out in accordance with the provisions of a scheme of the ministry of environment and forests (MoEF) called the Beneficiary Oriented Scheme for Tribal Development (BoTD). As part of this package, every male above the age of 18 years is considered a separate family and is entitled to services worth Rs 1 lakh, as described in Table 1a and b.

The package adopted for Kuno is a significant improvement over many other relocation packages adopted so far in various R and R projects across the country. It does not suffer from the obvious lacunae of 'land for land' type compensation packages, which have had a history of marginalising the most vulnerable strata of rural society, particularly the landless.<sup>1</sup> Moreover, in the implementation of this package, the Kuno sanctuary management has also managed to address some gray areas that the BoTD guidelines are not very clear about, for instance, treatment of female heads of the family. It has been found that at the ground level, many of these problems have been and are in the process of being addressed through suitable modifications and inclusions in the list of displaced families to include eligible families.

The BOTD package fixes the compensation for each affected family at Rs 1 lakh. This is an arbitrary figure, and when it is applied at the ground level under varying circumstances, this amount may or may not be sufficient for re-establishing access of each family to various livelihood resources lost due to relocation. In the present case, for instance, the total amount earmarked for 'land development' is Rs 36,000 which is meant to pay for various activities like clearing and deep-ploughing of land, removal of stones and boulders, bunding of plots, as well as provision of irrigation facilities. However, given the prevailing cost of these activities in this region, the earmarked amount leaves little or no surplus for the provision of irrigation facilities. This leaves the government in a situation where it has promised irrigation facilities to the displaced community as part of the relocation package, but is unable to finance it from the budget allocated to it for relocation.

As a stopgap measure, the Kuno sanctuary management has tapped other funds from the central government schemes of the ministry of environment and forests for provision of irrigation in the form of wells and lift irrigation schemes. However, a more permanent solution to such problems needs to be found, which could involve modification in R and R policy/package, as well as efforts to dovetail regular development schemes of the state to meet some unfulfilled rehabilitation needs. In the case of the rehabilitation exercise in Kuno, the latter part, that is, coordination between the developmental efforts of multiple state agencies to ensure service delivery without duplication has been most challenging and difficult.

## II Impact of Schemes

This section focuses on the social impact of relocation and displacement and not the biological effects, which are significant but outside the scope of this paper. Our work has focused primarily on looking at the impact of relocation on the livelihood of the affected community. Due to limitations of time and resources, we have only peripherally addressed other areas of

impact, particularly those related to social and political aspects, which remain areas for future investigations.

### Impact on Livelihood<sup>2</sup>

Livelihood impacts have been assessed in terms of : (i) Land possession, quality and encroachment; (ii) agriculture; (iii) NTFP; (iv) hunting; (v) livestock; and wage labour

*Land:* Inside the sanctuary, the villagers possessed title deeds or 'patta' for a part of the land that they were cultivating. Thus, these villages came under the purview of the revenue department by virtue of owning patta land. However, they also habitually cultivated non-patta land that was cleared and brought under the plough [IIFM undated]. The degree of such encroachment depended upon need, as well as availability of manpower with a household. The agricultural land available to villagers inside the sanctuary was of a very high grade in terms of soil depth, fertility and moisture content. Drainage inside the sanctuary was excellent, as is also shown up in GIS studies of the area commissioned by the forest department [MPCST 1999].

Most of the villages that have shifted out have already been allotted land, and in most cases, they have also started cultivating this land. An immediate consequence of relocation has been the emergence of complete equality of landholdings, due to the very nature of the rehabilitation package (which provides for two hectares of land per family). Thus, the situation can be compared with a sweeping land reforms exercise, where landlessness, as well as inequality in size of landholdings has largely ceased to exist.

There is no homogeneity in quality of land allotted, and even within the same village, often different grades or quality of land can be found, depending on factors like slope, soil and rock formation, degree of degradation and soil erosion, proximity to source of water and so on. This has been documented extensively by the local voluntary agency, and also by the committee appointed by the collector to look into problems of poor quality land. The quality of land allotted to the displaced families is by and large low, especially when compared to the land in their original villages. Although agricultural experts have certified most of this land as potentially cultivable, in general the soil depth and soil moisture conditions are much poorer than what was available inside the sanctuary. While there are instances of allotment of alternative land in lieu of poor agricultural plots, the forest department finds this an uphill task, since the number of such cases is quite large and there is very little extra land available.

### Land Changing

The process of changing rocky plots has been controversial right from the start. There have been instances of four or five plots having been changed in a village, but other villagers were left out of the process because things were proceeding on a case-by-case basis and many people either did not come forward or their claim did not get due attention [Samrakshan Trust 1999]. Effectively, despite assurances, very little was actually done on this front till the end of August 2001. Matters came to a head by early September 2001, when five of the worst affected villages served notice to the sanctuary management of their intention to return to their old villages inside the sanctuary for collecting non-



timber forest produce to ease their economic distress. The important thing to note here is that the desperation to go back to the sanctuary was found to be the greatest in villages where problems relating to land quality are more severe.

To redress these complaints, in September 2001, the district collector instituted a committee consisting of officials from three departments (forest, revenue and agriculture) as well as village representatives to look into complaints of poor land quality arising from the displaced villages. The committee surveyed all the villages and conducted detailed visits to each agricultural plot for which complaints had been received. In its report, the committee officially identified over 300 families that have been suffering from very poor to zero agricultural output for the past two to three years due to allotment of poor quality land. Meanwhile, the sanctuary management began clearing fresh land to re-allot to those individuals recommended by the committee. However, due to various administrative delays, the actual process of land changing could not take place before the onset of rains in 2002. As a consequence, the affected families have lost another rainy season without appropriate land for their livelihood, and this may result in irreparable indebtedness or even permanent distress migration away from the relocation site.

## Agriculture

The main source of livelihood inside the sanctuary was agriculture. Most farmers depended on rainfall, but a few that had fields along rivers or streams also used diesel pumps to meet irrigation needs. The main crops grown were bajra and tilli (kharif), and mustard, black gram, wheat, corn and some pulses (rabi). While a part of the food crop output was used for self-consumption, the rest, as well as the cash crop output was either exchanged for cash or bartered for other commodities. Crops were usually sold to the village middleman (who also doubled up as the shopkeeper and moneylender). However, some villagers also sold their surplus at village Agraa or the mandi at Vijeypur town (both of which lie outside the sanctuary).

A majority of people inside the sanctuary, particularly the tribals, followed primitive agricultural practices that were not necessarily geared towards maximising agricultural yield and surplus. This can be understood in the context that the sahariya are traditionally not an agricultural community. It is only over the past 40-50 years that they have begun to take to agriculture [Debnath and Yadav: 45], mainly as a consequence of their increasing exposure to the money economy outside the sanctuary.

After relocation, the crop-mix has not changed much in the displaced villages, as emerges from PRA studies as well as surveys. Our studies indicate, however, that the yield of most crops has gone down significantly after relocation. For instance, in a survey of 14 displaced villages in November-December 2002, it was found that only 19 out of 715 families (2.6 per cent) have been able to produce more than 40 kg of crop output on their plots of two hectares each. Two factors likely to have contributed to this are lack of soil moisture and irrigation facilities, as well as poor quality of land. This is largely because the land allotted to the displaced families was under scrub forest, or was degraded forestland.

*Hunting:* Anecdotal accounts reveal that in earlier years, hunting and gathering was a major source of nutrition and sustenance. The evidence generated through PRA exercises also corroborates this. Though there is no definitive information available on poaching by the sanctuary dwellers, either for self-use or for sale outside, anecdotal information on the sahariya reveals their affinity for a meat diet. It has been reported that prior to declaration of the sanctuary in 1981, both the local tribals as well as game hunters from outside used to regularly hunt animals. However, after the area was notified as a sanctuary, punitive action was taken against a number of sanctuary dwellers for hunting wild animals, and it is reported that since then, gradually, poaching by at least the locals has diminished. However, one could still find snares and traps meant for wild animals if one left the main road and ventured into the forest. Interactions with the sahariya also reveal that trapping and hunting of small game was prevalent on a fairly large scale even till the time of relocation of villages.

*NTFP collection:* A vast variety of non-timber forest products (NTFP) like honey, tendu (leaves, sal gum, honey, 'safed musli', 'ber' (zizyphus), 'bilaiya', 'hadjudi' and so on were harvested extensively. This activity was engaged in mainly by tribals, who used the NTFP both for self-consumption as well as to supplement their income. The sahariya are known to have exhaustive knowledge about medicinal plants. However, since none of this knowledge is documented, a lot of it is being lost due to rapid depletion of forests throughout the range of the sahariya. The Kuno wildlife sanctuary and its surrounding areas are probably the only healthy forests that the sahariya of this region have access to. It is interesting to note that almost all of this forest area is under some sort of legal protection, ranging from reserve forests to protected forests to a wildlife sanctuary. Along with NTFP, the other significant dependence of the people (both tribals as well as non-tribals) on forest resources was for firewood and fodder.

A major change that has occurred after relocation of villages is the highly reduced access of the community to the forest. As a result, many of NTFP collection activities have now disappeared from the activity chart of the community, and this has resulted in significant loss of livelihood.

In addition to agriculture, people also kept livestock in order to meet their needs of milk, ghee, etc. Milk yield was restricted to the monsoon months, when fodder was abundant. Cattle were left to graze freely in the forest, and this meant that there were no limitations as such on the number of livestock that people kept. However, as far as the tribals were concerned, the produce throughout the year was sufficient only for meeting their own consumption needs. Thus, sale of milk and allied products was not an additional source of income in the tribal economy. Here again the difference between the resource use practices and lifestyles of the tribals and the non-tribals is stark. Some non-tribal families reared livestock as an additional source of income and regularly sold dairy products in Vijeypur and Karahal [Personal communication, Debnath and Yadav nd]. For this segment of the displaced population, loss of access to the sanctuary is likely to represent a greater loss of livelihood.

Our PRA studies and surveys reveal that after relocation, most families have had to leave their cattle inside the sanctuary, because of lack of immediate sources of fodder at the relocation

site. At best, some families have been able to get their bullocks with them to the new settlements, and in some cases, even this has not been possible. Moreover, most families have had to shift from cows to goats as their source of milk. This has had an additionally damaging impact on the surrounding natural resource base of the relocation site, due to greater damage caused by goats to small trees, shrubs and so on.

### **Wage Labour**

A regular pattern of seasonal migration has emerged from our studies as far as tribal families are concerned. After harvesting the monsoon crop, many tribal families migrated regularly to neighbouring areas like Sheopur and Karahal as casual/agricultural wage labourers for the rabi harvest. This system is known in local parlance as 'chait' (in reference to the months of March-April in the Hindi calendar). A well-established system of sharing of agricultural produce existed between the chait cultivator/landowner and the tribal labourers. Contracts were taken for harvesting a fixed area of land, irrespective of the number of person days of labour involved. In return, the landowner gave the labourer a fixed amount of wheat (the main rabi crop) as wage (the current rate is around 40 kg of wheat per bigha of land harvested), irrespective of the total amount harvested. Again, the degree of dependence of a family on income from such migratory labour depended mainly upon whether they were engaged in taking a second crop on their land inside the sanctuary. This in turn was mainly a function of availability of irrigation/soil moisture in their fields inside the sanctuary, degree of indebtedness and so on.

Wage labour generated locally the forest department was another important source of employment frequently availed of by the villagers when living inside the sanctuary.

After relocation, seasonal migration for agricultural labour has continued to be important, but the motives and the pattern have shown some changes. For instance, two villages, Laddar and Chapraith migrated for a much longer duration than the chait period during 2000-01, because of poor quality of agricultural land allotted to them. Other factors operating in this case were poor availability of water for drinking as well as irrigation purposes in these villages, as well as non-availability of NTFP as an additional source of income. As far as employment generated in the sanctuary by the forest department is concerned, there has been an obvious decline in this now, because of the much greater physical distance between the habitation of these villages and the Kuno sanctuary.

An important point to note here is that the relocated villages have access to some ready cash from activities like digging wells, instalments for house construction and so on, they tend not to migrate. This implies that once the forest department utilises the rehabilitation funds, the possibility of tiding over the lean season without migration would recede, and the problem is likely to re-emerge with severity.

### **Broad Social Impacts**

Social impacts have been assessed very sketchily in terms of access of the displaced community to social infrastructure such as law and order, communications, education, health, electricity and so on, prior to and post relocation.

Kuno sanctuary is a part of the infamous Chambal region and dacoity was a major problem faced by the people inside the sanctuary. There were frequent instances of violence against the villagers in the event of their failure to meet the demands of the dacoits. After relocation, the more compact nature of settlements and proximity to other villages like Agraa has resulted in some improvement in the law and order situation. However, a clear regression can be observed during periods of economic distress, when there are increased instances of looting and intimidation by dacoits. Moving away from the isolation of the sanctuary and in proximity of the Agraa police station has also reduced the threat perception of the community.

Modern health care facilities were virtually non-existent in the villages inside the sanctuary [Debnath and Yadav undated]. This was a specifically articulated concern of the people prior to relocation. This problem became particularly severe in view of the near absence of transport facilities connecting the sanctuary villages to the nearest medical centre, especially during rains. This situation was further aggravated because of the unreliability of local health traditions. Although a few elderly local healers do possess knowledge about the curative powers of some herbs, mortality on account of relatively innocuous ailments was visibly high.

On this front, relocation has made a distinctly positive impact on the community's access to the formal health care system. However, it needs to be stressed that even now, accessibility of medical facilities is difficult for the villages that have been settled at a distance from Agraa. Moreover, the quality of medicines made available through the PHC at Agraa is abysmally low, as a result of which the efficacy of the medical officer is severely constrained.

Transport and communications facilities inside the sanctuary were very poor, and people had to depend on a dirt track to access the 'outside world'. Inhabitants had to walk at least 20 km to catch buses in the open season, while during rains this distance increased to over 35 km on an average. The impact of this was felt on all spheres of life inside the sanctuary, and particularly on education, health and the economy.

In this sphere too, there has been a marked improvement after relocation. However, a major problem in connecting the area to the nearest tehsil town of Vijaypur is that there is only a fair-weather road from Agraa to village Arrod, which is 9 km from Agraa en route to Vijaypur. During monsoons, bus services on this stretch come to a standstill, thus reducing the region's connectivity by a significant extent.

None of the villages inside the sanctuary were electrified, and people depended on kerosene lamps and wood for illumination and heating. However, as part of the relocation package, electrification of villages has been progressing at a slow but steady pace.

Inside the sanctuary, only two villages had school infrastructure. Even where physical infrastructure of schools was available, access of children to education was hampered by the absence of regular teaching staff in the schools, attributable to the isolation of these villages. After relocation, these villages have come closer to the formal education system, and there has been a gradual improvement in access of the community to schools. Village Agraa, which lies at the nucleus of the relocation site, has education facilities up to the high school level. Moreover, some primary schools are also under construction in the relocated



villages. Additional education facilities are also being made available by the locally active voluntary organisation.

## Conclusion

The most significant question that the present study tries to address relates to the impact of relocation on the living standards and livelihoods of the affected community. Our experience suggests that in the short run, there has been a very significant decline in livelihood security, directly attributable to displacement from a resource-rich forest, and disruption of a well-established livelihood pattern. While the rehabilitation package offered in this case, as well as the overall attitude of the agency that carried the relocation out seems to have been a significant improvement over previous recorded instances of such exercises, it emerges that displacement has nevertheless had a significant negative impact on the livelihood of the people, at least in the short run. Serious efforts would need to be undertaken by all relevant state agencies to address this issue urgently. It would require sustained investments by government and non-government agencies, in the medium to long run, for the displaced community to be able to reconstruct livelihoods and regain levels that prevailed inside the sanctuary (and perhaps even improve upon them). Another important lesson emerging from the Kuno experience is that trauma to the community could be mitigated if the implementing agency concentrates right from the start on genuine mobilisation of the community, and investment in building its capacity to deal with the drastic changes that displacement entails. Participation and continuous dialogue with the community would be critical to this process.

Linked to this is the issue of low capacity within the implementing agency for handling a R and R programme. Rehabilitation in the present case has generated significant lessons for the implementing agency, which have been accumulated through trial and error, causing numerous avoidable hardships to the displaced community. Thus, the need to suitably equip and train the concerned personnel prior to initiating projects of this nature emerges as a most salient lesson from this experience. Another finding of our work is that selection of a competent officer to lead the entire exercise, and ensuring autonomy, continuity and back-up support to the officer goes a long way towards success in carrying out a complex task like rehabilitation.

Clearly, unless the issues outlined above are addressed, the 'voluntary' displacement based conservation paradigm will succeed in relocation but not really rehabilitation of forest-dependent communities. Such displacement will, often for reasons that are eminently avoidable, fail to enable the relocated persons to have a materially better life than they did before. Forest-dependent communities whose livelihoods are dependent on rainfall-reliant agriculture, animal husbandry, wage labour and NTFP collection are especially vulnerable, given the fact that traditionally, they have anyway tended to be marginalised from the mainstream economy and polity. Ensuring sustainability of livelihoods of these communities after relocation is crucial not just from a humanitarian perspective, but is also intricately linked in the long term to success of wildlife conservation in India. [EWW]

Address for correspondence:  
asmita@samrakshan.org

## Notes

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- 1 For an assessment of other R and R packages and their implementation in India, see Dreze, Sampson and Singh (eds), *The Dam and the Nation*, OUP, Delhi
- 2 This section is based on the findings of the team from Samrakshan Trust that has worked in the villages displaced from Kuno wildlife sanctuary since 1999. An account of these findings is available in Samrakshan Trust (1999): *The Kuno Project: Progress Report I—December 1997- September 1999*; Samrakshan Trust, New Delhi, as well as subsequent Progress Reports released by the Trust.

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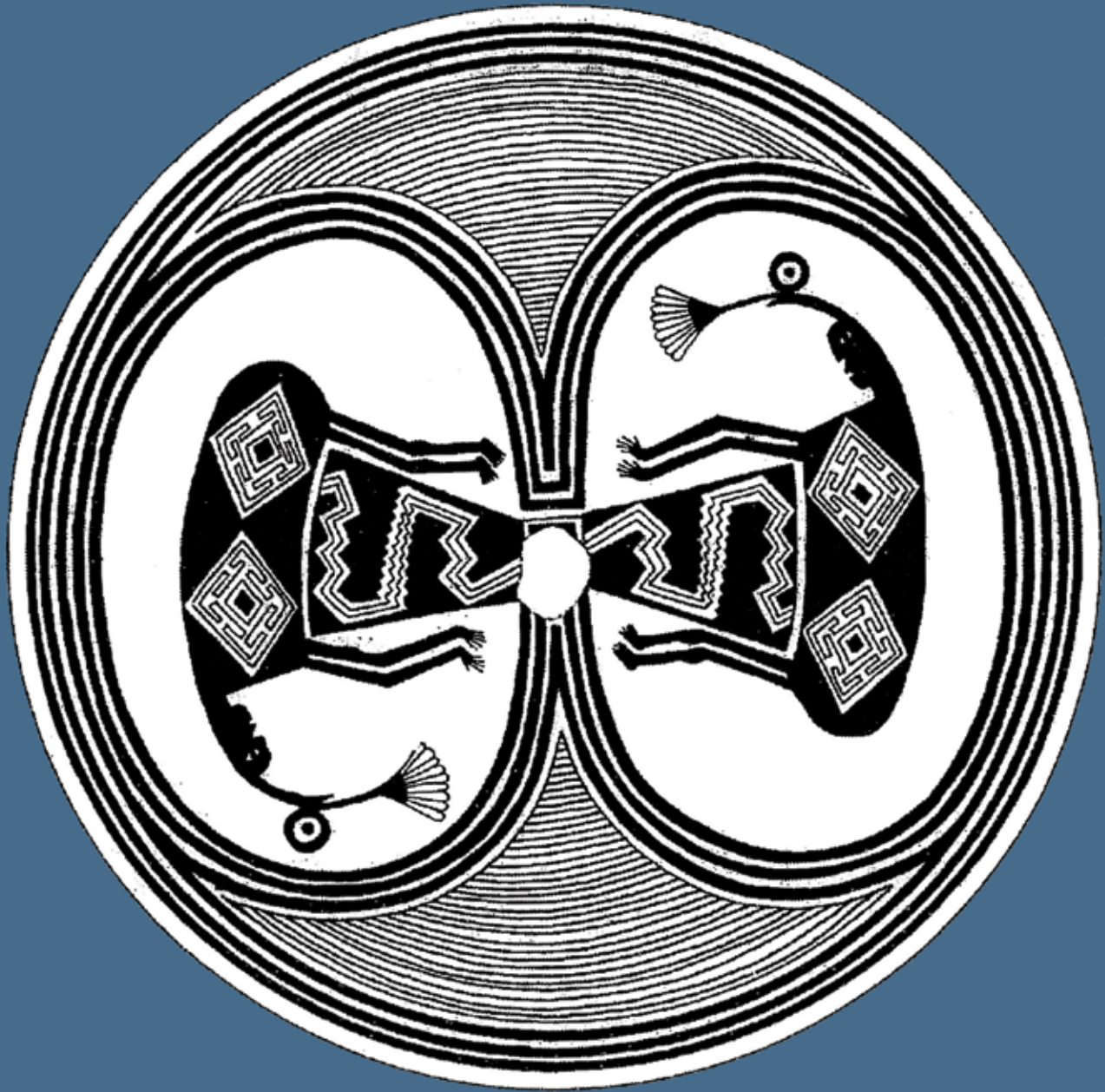
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# PROTECTED AREAS AND HUMAN DISPLACEMENT: A CONSERVATION PERSPECTIVE

Edited by Kent H. Redford and Eva Fearn

**WORKING PAPER NO. 29**  
**APRIL 2007**

# **PROTECTED AREAS AND HUMAN DISPLACEMENT: A CONSERVATION PERSPECTIVE**

**Edited by Kent H. Redford and Eva Fearn**

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



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# INTRODUCTION

Decisions that affect how people use land are among the most fraught that any enlightened society has to grapple with. Those decisions are responsive to historical precedence, the relative power and economic influence of different interest groups, ethical and moral considerations, as well as the greater aspirations of that society. There are those that argue that the economic needs of the nation state, especially in the developing world, should always take precedence in determining land use. Others argue that land use should be determined by the legal land owner. More egalitarian arguments promote the greatest good for the greatest number, while others argue to prejudice land uses towards the most marginalized and disenfranchised people. Stressing historical precedence, some argue that indigenous or traditional claims to land use have greater standing. Finally, stressing humankind's stewardship obligations, still others argue that where nature is threatened, the best use consists of setting areas aside for non-human species.

Two claims that typically come out on the short end of the land-use debate are the claims of indigenous people and claims for non-human species. Sometimes claims for indigenous people are generalized to include economically marginalized and politically disenfranchised people, and even to local rural people writ large. Claims for non-human species are sometimes extended to include those people who benefit (economically, intellectually, socially, or politically) from the establishment of parks and protected areas, locally and/or globally. It is ironic that some of the most heart-felt disagreements in recent years have been between these two claims – who generally have the weakest political and economic standing and tend to lose out to industrial users and more powerful immigrants.

The Wildlife Conservation Society (WCS) is a conservation organization whose mission is to save wild lands and wildlife, and we work in parts of the world where the human footprint is lightest – areas where the forces of globalization, economic development, and land transformation are less felt. These areas are the last bastions for the survival of many species, and they are frequently areas inhabited by the rural poor, by marginalized and disenfranchised people, or by long-term traditional, indigenous inhabitants. We are thus confronted and challenged by opposing claims for different land uses in the areas where we work.

As part of a broader effort to engage with this issue, we convened a meeting in May 2006 at the White Oak Conservation Center that brought together WCS field-based staff, other WCS staff with strategic and policy responsibilities, representatives from other conservation organizations, and social scientists. We wanted to avoid the sterile arguments of whether people are a part of nature or extrinsic to it, whether “wilderness” exists outside of the human context, whether traditional management benefits biodiversity or not, or whether human presence is always detrimental to certain species. Instead we focused on the impact of conservation areas on local people.

Are parks and protected areas of benefit to local people, or are they costly to them? WCS is keenly aware of the cresting wave of sentiment concerning the attributed role of protected areas in causing human displacement. We wanted to evaluate the situation in our own field programs and discuss some of the larger questions that face the conservation community: What has been the history of protected area establishment on local people? What is the current nature of this impact – positive and negative? How is it possible to evaluate the nature of costs and benefits? If there are benefits, how should they be allocated? If there are

costs, especially if people are relocated, who is responsible for addressing those costs? What should WCS' institutional response be? How are other institutions, both governmental and non-governmental, responding?

Historically, many protected areas were created as recreational areas for elites, but modern conservation has, for the most part, argued that there was a natural alliance between local people and conservationists, especially in the face of external threats to local livelihoods, cultural traditions, and wildlife conservation. Protected areas are portrayed as sustaining local livelihoods and promoting national development. In addition, a pragmatic argument advanced by some conservationists is that in most parts of the world, in the absence of good governance at the national level, effective protected area management *requires* the active participation and support of local people. These notions have been challenged in recent years by the argument that biodiversity conservation is not always concordant with economic development and by statements that conservation areas disenfranchise local people from land and resources, leaving them without compensation or alternatives. But what is striking is how little scientific information is available to refute these competing pronouncements, and how much of the discussion is purely emotive. We wanted this meeting to be the first step in a more considered and rational engagement.

In those cases in which protected areas *do* negatively impact local people through either active displacement or through the denial of access to resources, we asked participants to consider what policies conservation organizations (and specifically WCS) should assume towards local people. Rarely do conservation organizations make actual land-use decisions, but they frequently advise or assist local and national authorities in making decisions about access to land and natural resources. As such, conservationists must also face the ethical and moral questions involved in balancing the needs of conservation and the needs of people, and they ought to incorporate the local and national constraints and opportunities in their analysis. These constraints include working with the varied constituencies in rural settings with differing claims to resources, claims to legitimacy, and political power. Favoring one constituency will invariably disfavor another. Conservation organizations must navigate these shoals within the context of their own missions.

The conservation community is seeking to clarify general ethical and moral standards that should influence an organization's policies in those cases where conservation actions negatively affect local people. Such standards might include: seeking to ensure that governmental authorities, when making land-use decisions, obtain free prior informed consent from all people denied access to land or resources; and working with authorities to ensure that local people are provided with viable or equivalent access to land, resources, or opportunities if they lose legitimate access. And if an organization is not convinced that the minimum standards are met, then perhaps it should not participate in the conservation effort.

The pursuit of equitable balances between different human constituencies, and between people and the natural world, has to be grounded in the realities of specific places, peoples, histories, and opportunities. The chapters in this volume provide a set of rich and varied perspectives that show how complicated is this pursuit. They help to lead us to a greater understanding of the relationship between protected areas and local people, and towards policies that are informed and appropriate.

John G. Robinson  
Joan L. Tweedy Chair in Conservation Strategy  
Executive Vice President, Conservation and Science  
Wildlife Conservation Society



# PART 1

## AN OVERVIEW

### 1.1 Conservation and Displacement

Arun Agrawal\* and Kent H. Redford\*

\*University of Michigan, \*Wildlife Conservation Society

Contemporary efforts to protect biodiversity internationally are beset by multiple problems. Growing consumption pressures are contributing to ever faster declines in species and the systems they depend on. Available funds for conservation have declined. High visibility issues such as global climate change have attracted significant attention in the past decade, and perhaps contributed to lower interest in biodiversity conservation. Accusations regarding a lack of synergy between conservation and other social goals such as poverty alleviation, disease eradication, economic growth, and social equity have been advanced by many different scholars.<sup>1</sup>

Faced with these constant challenges, the response of international conservation organizations has been to try to occupy a higher ground by arguing, among other things, that biodiversity conservation is an ethical necessity (Angermeier 2000; Ehrlich 2002); that the operational obstacles the above threats pose to conservation need to be addressed by sharpening the message of conservation and persuading others of the importance of biodiversity (Balmford and Whitten 2003; Perrings et al. 1992); that conservation can be accomplished together with poverty alleviation (Wells and McShane 2004); that biodiversity conservation is important in utilitarian terms for human well being in the long run (Burton et al. 1992); and that an exclusive concern with human development often leads to undesirable impacts on biodiversity conservation (Redford, Robinson, and Adams 2006). These protestations vary in the evidence, conviction, and passion with which they are made.

The criticism that blunts the moral and ethical focus on biodiversity conservation is that which highlights the misery conservation programs impose on people. If conservation strategies distress human populations, especially those who are less powerful, politically marginalized, and poor, little that conservationists argue on behalf of biodiversity makes sense.

A spate of recent publications appearing in both the academic and the popular press overwhelms conservation precisely on this ground (Chatty and Colchester 2002; Choudhary 2000; Geisler 2003a, 2003b; Geisler and Letsoalo 2001; Pearce 2005: 16). Conservation, the argument goes, has led to the displacement of tens of millions of people who formerly lived, hunted, fished, and farmed in areas now protected for wildlife, watersheds, reefs, forests, or rare ecosystems. The critiques compare the magnitude of human evictions and suffering to that caused by civil wars, mega-development projects, and high modernist state interventions (Schmidt-Soltau 2005; Brockington et al. 2006: 250; West and Brockington 2006: 613). These types of articles began to appear in the late 1980s and early 1990s (Albert 1992; Brechin and West 1991; Peluso 1993), but recent accusations are more assured, more caustic, and more sweeping. Perhaps as they amplify each other, they have found more traction (Adamson

2006; Dowie 2006a, 2006b; Lal 2003; Schmidt-Soltau 2003; Veit and Benson 2004).

Despite these damning accusations against the widespread strategy upon which much conservation work is based – protected areas – it is remarkable that none of the major international conservation organizations has formulated a coherent, systematic, and/or effective set of guidelines to address conservation-induced displacements. This gap between the severity of accusations and the lack of response stands in stark contrast to similar arguments in relation to development-induced displacement. Major development-focused international organizations such as the World Bank (IBRD), the Asian Development Bank (ADB), the Inter-American Development Bank (IADB), and the Organization for Economic Cooperation and Development (OECD) have each formulated some set of guidelines to shape their actions in the face of development-induced displacement, although several have done so only in the past few years (Thomas 2002).

This paper examines displacement in a historical light and compares conservation-related displacements to human displacements caused by development projects. It examines some of the justifications advanced in favor of displacing humans for conservation, and the extent to which these justifications survive in the face of vociferous human rights criticisms. It ends with a review of the different potential responses conservation organizations can adopt in the face of what is one of the most critical problems confronting conservation worldwide, especially conservation that relies on territorial set-asides, and at a critical time in global conservation.

### **What is Displacement? Nature, Scope, Impacts**

A large number of words signify the physical dispossession of peoples from their lands: displacement, dislocation, eviction, exclusion, and involuntary resettlement are routinely used. Analogously, other terms have been used to describe the loss of access to resources that accompanies physical displacement, but which can, of course, occur without physical dispossession. “Displacement” has been used as an omnibus term to cover a range of phenomena in the literature on displaced peoples, including loss of access or restrictions on livelihood opportunities or future income related to environmental resources (Cernea 2005). Such an expansive meaning actually obscures the plight of those who are physically separated from their land and homes. Indeed, the dictionary meaning of displacement, “removal of a thing from its place, putting out of place,” (OED 1989) corresponds closest to the idea of physical removal of people from a place. Here we use “displacement” to signify the involuntary physical removal of peoples from their historical or existing home areas as a result of actions by governments or other organizational actors. We use “exclusion” or “loss of access” to denote the restriction of access to resources that may occur even without physical removal from place.

### **Development and Displacement**

Even if the more familiar images of involuntary refugee-style displacement and resettlement are associated with conflicts and natural disasters, it is large development projects that have led to the most human displacement.<sup>2</sup> In the case of international movement of refugees, the United Nations High Commission for Refugees estimates their numbers to be around 14 million in 2000, of which six million are Palestinians (UNHCR 2001). Another 30 million people have been displaced within national borders (Robinson 2002). In contrast, displacement because of development interventions – typically related to infrastructure proj-

ects such as dams, which flood massive areas, roads, state-owned plantations, mining, pipelines, and urban reconstruction – is estimated to be between 100 and 200 million people since 1980,<sup>3</sup> and continues to be in the neighborhood of an additional ten million people annually. It is likely true that the reasons for development-induced displacement may be changing: from being related primarily to the construction of dams and in rural areas to other high-technology infrastructure projects (Koenig 2002: 2; see also Baviskar 2003, Bunnell 2002). But the violence development projects inflict upon people continues to be stunningly commonplace (Morvaridi 2004).

The juxtaposition against displacement by development projects can inform the ethical, socio-political, and economic analyses of conservation-related displacements and resettlements. For one, studies of development-associated displacement and compensation for the displacees have been growing for three decades: contrast this to work on conservation-related displacement, which is far more recent and sparse.<sup>4</sup> There is greater historical detail and accuracy in studies of internationally-funded development-induced displacement, and more evolution of consideration of harm and how to mitigate it. There is also better quantitative information and qualitative knowledge about the scope, nature, and impacts of displacement induced by development – not true for conservation-related displacement.

Large development projects typically generate winners and losers on a significant scale, especially in countries such as India and China and countries in Southeast Asia. But even in smaller countries where fewer people are displaced, the proportionate impact on the population can be significant (Rew et al. 2000, cited in Koenig 2002: 2). The usual defense of displacement lies in arguments about how critical those projects are to national economic growth. Progress in achieving economic growth is viewed as capable of generating a sufficient surplus for the entire population that will offset losses by those who are displaced. Such faith in the capacity of project planners is especially likely to be displayed by project authorities and government officials, and likely was more assured two decades ago than it is today.

The human rights and displacement debate is fuelled by the devastating impacts of some mega-development projects and the increasing evidence that economic redistribution and adequate compensation seldom occur. The majority of those displaced by development projects fare badly long after such projects are launched, as do the minority who officially received compensation. As Cernea puts it, the idea that “full compensation for losses would be adequate to...restore the incomes and livelihood of those displaced and relocated...is unwarranted and unproven. It is in fact contradicted both by logical and historical analysis...and by massive bodies of empirical evidence” (2003: 39). Indeed, the continuing destitution of millions upon the pillory of development projects is striking (World Commission on Dams 2000).

The policy response to development-induced displacement and resettlements is depicted well in what Cernea (2000) calls his “Impoverishment, Risks, and Reconstruction (IRR) Model.”<sup>5</sup> Building upon earlier work by Chambers (1969), Nelson (1973), and Scudder and Colson (1982), Cernea identifies eight sources of risks – primarily economic in nature – that contribute to the impoverishment of displaced people. Cernea locates the possibility of reconstruction to address each of the eight risks and argues strongly against a program of rehabilitation based on compensation.<sup>6</sup> Cernea’s analysis has four different functions: predictive, diagnostic, problem-resolution, and research.

Two important gaps can be noted with respect to his framework. In viewing each source of risks as independent of other sources, the framework lacks a con-

certed approach to reconstruction. Thus the analysis hints at but is ultimately silent on how a focus on land, or health, or assets can affect outcomes related to other sources of risks, or strategies to address risks. Additionally, in focusing primarily on economic risks to livelihoods it fails to consider the political and ethical context within which displacement occurs. It can appropriately be classified into a “reformist-managerial” mode of responses to displacement rather than a “radical-movementist” set of responses (Dwivedi 2002).

The first gap is in part addressed, at least in terms of policy responses, by Kanbur’s proposal in favor of generalized social safety nets in addition to project-specific safety nets. Since it is unlikely that compensation to the poor and marginalized displaced households will address the adverse impacts of a development project (Heming and Rees 2000), Kanbur suggests that project-specific compensation should be supplemented by social safety nets designed to address the plight of those people likely to be affected by development projects: “small farmers, rural landless, urban informal sector, etc.” (2003: 33). However, Kanbur does not outline how such social safety nets might be constructed and implemented, and indeed, one must question the practicality of such options given the competing demands on the budgets of most developing countries.

The distinction that some have drawn between the managerial and the social movement response to development is in part a recognition of the fact that even a painstakingly planned and sincerely implemented compensation package will never be equal to the task of ensuring that those displaced by development projects end up “no worse off” than their situation before the project was implemented (De Wet 2001). But it is also the result of the suspicion that mega-development projects, especially large dams and infrastructure projects, are undertaken because of their positive outcomes for a select few rather than their aggregate benefits for the national society.<sup>7</sup>

Scholars focused on the human rights of the displaced and the accountability of the corporate and state actors who allow that displacement tend to reject the developmentalism inherent in Cernea’s assumptions, and focus instead on grassroots organization, mobilization, and resistance to displacement-in-the-name-of-development (Dwivedi 1999; Escobar 2003; Routledge 1993). Their vision of just development focuses instead on concrete examples of successful or quasi-successful efforts to undermine development policies leading to displacement. As Dwivedi (2002: 710) argues, the 1980s were the decade of displacement, but the 1990s were the decade of popular resistance to displacement!

## **Conservation and Displacement**

Displacement is a consequence of conservation projects because conservation, like development, is inherently spatial. Conservation of species and ecosystems requires restrictions on human influences – local, state, and corporate – in areas where species or ecosystems are to be conserved.<sup>8</sup> The most popular strategy is protected areas. However, the global picture about the size and complexity of protected area classification and the impacts of different types of protected areas on human activities is at best unclear.

The number and total area of protected areas has grown enormously in the postcolonial period: more than 105,000 listed PAs covering approximately 20 million km<sup>2</sup>.<sup>9</sup> Of these, terrestrial protected areas cover 15.3 million km<sup>2</sup>, or over 10% of the land surface of the planet.<sup>10</sup> The growth rate of protected areas has been steady over the past five decades, with faster growth in the 1990s (Naughton-Treves et al. 2005). Some of the growth in the area under protection may reflect better reporting and record keeping and the inclusion of areas that are semi-protected.

Most protected areas fall under six different IUCN categories corresponding to specific management objectives that permit increasing human use – from Category Ia and Ib (strict reserve) to Category V (managed resource use). The actual presence and influence of human beings in a given protected area location depends on the extent to which management objectives and laws assigned to that category are put into effect (Ravenel and Redford 2005: 387; West et al. 2006).

Indeed, the tension between human presence/use and conservation success means that the management objectives associated with particular classifications and their translation into practice are deeply contested. This uncertainty, and lack of systematic data about what actually happens in particular categories of protected areas, is relevant for five reasons: 1) we do not know how particular management objectives translate into practices that lead to displacement; 2) the magnitude of displacement consequent upon the creation of protected areas – particularly Categories Ia and Ib to IV – is unclear;<sup>11</sup> 3) the social impacts of displacement, clearly negative and highly significant, are known specifically only in the case of a few detailed studies; 4) there is no systematic evidence of the extent to which governments and other agencies have attempted to address the condition of those who have been evicted; and finally, 5) existing knowledge about the extent to which such efforts at redress have been successful is astonishingly poor.

What knowledge we do have regarding these five issues is based mainly on more or less informed speculation and case studies. Nearly all of what we can say about the overall magnitude of conservation-induced displacement depends upon heroic extrapolation. Typically, such speculation suggests that the magnitude of conservation-related displacement is lower than what has been produced by development projects, and is possibly in the neighborhood of ten to twenty million people.<sup>12</sup> But given the major gaps for even basic information in the World Conservation Monitoring Centre (WCMC) database, we simply do not know how many people have been displaced as a result of the establishment of protected areas.<sup>13</sup> Certainly, there has been no attempt to build a picture of the magnitude of conservation-related displacements using micro-level data (but see Brockington and Igoe 2006 for a significant start), and any attempt to do so will flounder upon the shoals of spotty and unreliable generalizations inevitable in case-based studies.

Our knowledge about these questions is based primarily upon case study evidence. In an extensive review of the impact of protected areas on people, West et al. (2006) suggest that somewhere around 50 to 60 studies provide some careful information about the impact of some protected areas upon the livelihoods of people living within them, and displaced since their establishment. Many of these studies are geographically clustered, with better information being available for some protected areas in India, Nepal, southern and East Africa, and the United States than for most other protected areas, and most other parts of the world.<sup>14</sup> What these studies do tell us about the economic and social impacts of eviction from protected areas is limited but in consonance with the far larger literature on the social, economic, political, and cultural effects of development-induced displacements.

Because the provisions relating to particular categories of protected areas are applied unevenly even within a country, residents of protected areas (or those who utilize the protected areas' resources) face uncertainty as to whether, when, and how they will be displaced, and with what effects. Emblematic of such uncertainty are loud headlines in newspapers that announce the potential eviction of four million people in India as a result of amendments to and pos-

sible enforcement of protected areas policies (Sekhsaria and Vaghlikar n.d.). We also know that the use of force is typically critical to displacement from protected areas and that displacement has caused impoverishment, social disarticulation and political disempowerment.<sup>15</sup> Few of the displacees have been compensated (Schmidt-Soltau 2003) and, in many cases, displacements are not legally recognized despite being pursued both under the authority of law and through the use of extra-legal force.<sup>16</sup> Given the limited base of information about the process of displacement, its impacts, and compensation policies, the absence of knowledge about whether compensation produces sustained positive effects is not surprising.

The consequences of displacement on human welfare are difficult to state with precision even though they can be inferred. By the same token, it is also difficult to know exactly how much the setting aside of protected areas has contributed to biodiversity conservation. Various studies of protected areas provide general indications of their effectiveness. But this general conclusion hides a wealth of details and variations that prevent precise statements about the marginal gains from strict conservation, gains from partial protection, and how such gains can be balanced against the losses to those displaced from protected areas (Hayes 2006). For example, some quantitative studies covering a significant number of protected areas focus more on conservation of forests rather than wildlife (Naughton-Treves et al. 2005). Many other studies focus more on the extent to which existing protected areas represent biological diversity rather than the actual effective protection.<sup>17</sup> Analogously, there are few established metrics on the basis of which the management effectiveness of protected areas can be compared (Chape et al. 2005). A large number of studies point to the numerous threats to protected area effectiveness (Bruner et al. 2004; Struhsaker et al. 2005), including the fact that many established protected areas are expected to contribute to poverty alleviation (Naughton-Treves et al. 2005). And finally, a large number of conservationists agree that effective biodiversity conservation must include conservation outside the boundaries of protected areas, especially in the case of marine biodiversity (Allison et al. 1998).

It is clear that international conservation organizations must choose to act in relation to displacement in a relative vacuum of reliable information. At best, we can infer from the limited evidence that the people displaced as a result of conservation projects are as poor or marginal as the ones displaced by development projects. Conversely, it is also likely that policies designed to address the plight of displacees (or the potential protests and mobilization that might emerge among them) may be similar for both types of displacement.

On the other hand, the extent to which the protected areas responsible for displacement have reliably contributed to biodiversity conservation gains is also uncertain. Lack of systematic information about how management objectives associated with particular categories of protected areas are translated into practice, cross- and intra-state variations in the implementation of protected area provisions, paucity of quantitative or broadly comparative studies that provide information on actual effectiveness of protected areas, and lack of consensus on the metrics along which conservation effectiveness should be compared across sites means that it is impossible to balance the human costs and conservation benefits associated with protected areas in a global sense.

### **Justifications and Counter-Arguments**

The core arguments for biodiversity conservation are its ethical necessity and its critical importance for future sustainable survival. Even if one general measure of biodiversity decline – species extinction rates – is not well established, most

observers believe it to be orders of magnitude – 100 to 1,000 times greater than pre-human rates.<sup>18</sup> Soule and Wilcox underline the exceptional ethical stakes involved in biodiversity conservation when, referring to species extinction, they say, “Death is one thing; an end to birth is something else” (1980: 8). Analogously, Myers argues for the economic importance of conservation in suggesting that the treasures of biodiversity “can make a significant contribution to modern agriculture...medicines and pharmaceuticals, and to industrial processes...especially in the advanced world with its greater capacity to exploit genetic resources” (Myers 1976: 119). More generally, attempts to put a value on biodiversity suggest that the economic costs of extinction may be astronomical (Edwards and Abivardi 1998; Losey and Vaughan 2006; Pearce and Moran 1994).

But the extent to which these important arguments justify human displacement is unclear. To become relevant in the context of displacement, they need to be coupled with two assumptions: that human presence has a negative impact on conservation, and that there is a calculus of gains and losses through which the worst effects of involuntary displacement on humans can be balanced by gains for conservation through displacement (see below).

In addition to these core arguments for conservation, some conservationists hint at other justifications of displacement – that there is a lot of injustice in the world, and conservation-related injustice is mild. These justifications are merely rationalizations and fail to address the significant ethical and rights-based criticisms, sidestepping them instead. If conservation-related displacement is an injustice, its character doesn’t change simply because there are other greater injustices in the world. Whether only a few people have been displaced because of conservation projects is an empirical question. The evidence necessary to answer it has not been collected either by critics of conservation, nor by conservationists themselves.<sup>19</sup> The inability of conservation organizations to provide clear answers regarding the magnitude of displacement even in the case of specific protected areas can be contrasted with development projects. Most major development projects that might lead to displacement are now preceded by social impact assessments and cost-benefit analyses. Whatever one might think of these methods and their utility, they are at least an integral component in assessing the feasibility of development projects.

The most important critique against displacement is the injustice involved in the involuntary removal of disadvantaged peoples from their homes and lands: Few elite or rich households have been displaced because of protected area creation. If conservationists do not attend to this, then they strengthen the perception that conservation is a concern of the wealthy and the powerful (see Brosius in this working paper). Such justice-linked criticisms undermine the moral high ground that conservationists attempt to occupy. There is a vast incongruity in the position that simultaneously attempts to protect non-human life and ignore the livelihoods of humans. Critics of conservation can emphasize the unethical basis of conservation simply by pointing to the incongruities related to displacement. Indeed, the increasing emphasis on poverty alleviation among international donors and aid organizations has often come at the expense of a concern with conservation. In any direct confrontation between poverty alleviation and biodiversity conservation, this tension suggests, advocates of poverty alleviation are likely to get greater attention.

Critics of conservation and displacement gain further ammunition for their arguments from studies that attempt to demonstrate the historical structuring role of people in natural landscapes (Barthel et al. 2005; Gajaseni and Gajaseni 1999; McSweeney 2005; Sponsel et al. 1996). If certain small-scale human

actions have contributed to biodiversity conservation, the reasoning behind protected areas that exclude all human presence is demonstrably flawed, according to these arguments. However, such counter arguments favoring human residence in protected areas need to be more precise about the limits within which human actions can coexist with biodiversity, and the means through which such limits on human actions can be ensured – a free-for-all of human use is generally not compatible with biodiversity conservation.

Finally, other scholars argue that conservation projects that lead to displacement are likely to create anger and bitterness that lead to conservation failures (see Bodmer in this working paper). Displaced peoples have strong incentives to destroy the wildlife and resources within protected areas. Given the limited capacity of most governments in developing countries to enforce existing regulations, especially in the peripheral locations where many important protected areas are located, conservation success is likely dependent on local acceptance or resistance. Ultimately, it is an empirical question, but it is quite likely that a conjunction of strong local resentments caused by displacement or restrictions, feeble enforcement capacity, and organized poaching pose major obstacles to conservation.<sup>20</sup>

### **A Program of Action for Conservationists and Conservation Organizations**

Conservationists and conservation organizations have four broad potential courses of action open to them in relation to ongoing displacements of human populations. We denote them as negative, neutral, positive-future, and positive-historical. These are not mutually exclusive and different courses of action may be chosen by the same conservation organization in different situations.

A negative program of action signifies a more aggressive pursuit of conservation through protected areas, especially those in IUCN Category Ia. Efforts to increase the size of protected areas and the rigor with which they are protected would likely result in even higher rates of displacement than is the case at present.

The neutral course of action would simply change nothing in the way conservationists currently create protected areas, and do nothing about displacement that may or may not ensue.

A positive program of action would address the core criticisms of conservation-induced displacements. It would focus on specific examples in which displacement-related grievances are addressed in an exemplary manner, adopt a policy to avoid involuntary displacements as far as possible, convert involuntary displacement into voluntary agreements to move, and where such options are impossible, design compensation packages that would ensure that those suffering displacement are left “no worse off” as a result of protected area creation.

Such a positive course of action could be more or less expansive in its coverage. If the focus were primarily on displacements that would occur in the future, then conservationists would need to identify the distribution of interests among those likely to be displaced, work with national/local governments and human-aid agencies to create appropriate compensation packages for those who might get displaced, and involve local populations to determine a balance between compensation and concessions concerning the strictness with which conservation objectives would be enforced.<sup>21</sup> There is no ethically satisfactory way to address the needs of those who are likely to be displaced by conservation projects if their voices and needs are not included in a consultative manner.<sup>22</sup>

The fourth avenue – positive-historical – would be a more comprehensive effort to address displacement not just in future cases, but also to retroactively



cover and compensate for past conservation-induced displacements. This option would necessarily mean that negotiations would cover many more people, and in many cases the best that conservation organizations could do would be to offer compensation to the displacees. (Actually returning physically displaced peoples to protected areas would likely be difficult.) Under this option, conservationists may also consider whether it is reasonable to convert some protected areas out of strict protection so that their resources become available for development. If some protected areas are redundant in terms of the biodiversity conservation they provide, de-gazetting them may result in better allocation of the scarce funds available for conservation, or even make them available for constructing compensation offers.

Choosing among the four outlined options requires striking a balance across: a) ethical appropriateness, b) monetary costs, and c) political feasibility. It appears relatively easy to rank the options along the first two criteria: The first, negative course of action is ethically the least attractive option. It countenances displacement in the belief that the interests of non-human species deserve greater recognition than is currently the case. Option 2, the neutral course of action, is a little better, but perhaps only marginally. Option 3, which focuses on future cases of displacement, is ethically laudable. Option 4, under which retroactive compensation is coupled with a commitment to address all future conservation displacees, is easily the most attractive option for critics of conservation-induced displacement.

The ranking of these four options is also straightforward with regards to their costliness. Option 2 – neutral – is perhaps the least costly of the four because it merely assumes the status quo. Option 1 is likely to be costlier than option 2, because conservation organizations will have to spend more resources expanding and enforcing protected areas. Depending on the numbers of those who have been displaced, options 3 and 4 are likely to be costlier still, in that order, but by how much is difficult to assess. But the cost of option 4, even if the lower bound on the number of current conservation displacees (ten million) is close to accurate, may easily run upwards of 5 billion dollars (assuming an average compensation amount of \$500 per displaced person).<sup>23</sup>

While ranking these four options on ethical and monetary criteria is easy, the difficulties are greater in assessing their political feasibility. Even option 2 – maintaining status quo – faces no small difficulties, as suggested by current controversies and critiques on the issue. It is, however, politically feasible in the short run. The ranking feasibility turns on the question of the ease with which coercive conservation can continue. Although some have argued that coercive conservation is resilient in the face of numerous challenges (Brockington 2003), the political landscape has already changed compared to the 1990s, and seems especially inhospitable to conservation displacement today. In a news article, Dowie (2005) writes, “It’s no secret that millions of native peoples around the world have been pushed off their land to make room for big oil, big metal, big timber, and big agriculture. But few people realize that the same thing has happened for a much nobler cause: land and wildlife conservation. Today the list of culture-wrecking institutions put forth by tribal leaders on almost every continent includes not only Shell, Texaco, Freeport, and Bechtel, but also more surprising names like Conservation International (CI), The Nature Conservancy (TNC), the World Wildlife Fund (WWF), and the Wildlife Conservation Society (WCS). Even the more culturally sensitive World Conservation Union (IUCN) might get a mention” (Dowie 2005). One must ask by what alchemy have the names of those who see themselves as the defenders of the planet’s biological heritage come to be linked in the same breath with the names of those who are more appropriately seen as its degraders.

Dowie is not alone in these sentiments. An increasingly vocal group of authors will likely continue to rake international conservation organizations over the coals for their alleged indifference to the plight of human beings, particularly those humans who already face the dust heap of history. Consider the following testimony from Joy Ngoboka: “We were chased out on the first day...the police ran into my compound. They all had guns. They shouted at me, told me to run. I had no chance to say anything...I was frightened for the children...but we just ran off in all directions. I took my way and the children took theirs. Other people were running, panicking, even picking up the wrong children in the confusion. I lost everything. I had 31 cows and some goats and hens. They were killed – 20 cows were killed and the rest taken. They burned everything, even the bed and furniture and the kitchen. We’re poor now” (cited in Ozinga 2003). If one did not know that this woman was displaced by the Kabile Game Corridor, one might believe this was a testimony from a refugee displaced by war.<sup>24</sup>

What emotional testimonies like these suggest is that determining the precise numbers of displaced peoples is not the most important issue. Larger numbers simply indicate that displacement-related injustices are common, but whether the number is a million or ten million is less important. But the identification of striking negative images with conservation is highly prejudicial for conservation organizations from a public relations perspective. The storyline in reports on conservation-related displacements is especially juicy because it focuses on the underbelly of what is mostly seen as a noble cause – the preservation of species and landscapes. It allows an unlikely combination of actors – left-wing intellectuals, conservative economists, and populist politicians, each for very different reasons – to unite against wildlife and biodiversity conservation.

In light of the above discussion, we suggest that option 1 (pursue conservation more aggressively) may be the least politically feasible course of action available to conservationists. Options 3 and 4 (more or less comprehensive compensation to those who are displaced) are both ethically and politically more attractive because they show the willingness of conservationists to do something. Option 2 (maintain status quo) is likely the one with the lowest monetary costs, at least in the short run. For that reason it may appear quite attractive because it does not deviate from current conservation strategies. But it should be viewed as politically the least feasible for the long term. Indeed, a different, more compensatory choice will ultimately be forced upon conservationists if they do not respond to concerns about displacements.

This quick thought experiment shows the range of currencies – ethical, monetary, and political – that need to be integrated in order to assess these four options. A global integration across all three is complicated, though it suggests that option 3 would be most likely in most cases.

The example of large dams and development-related displacements is instructive in this regard where after years of doing nothing, all major international donor organizations have been forced to adopt a policy on how to address the needs of those who are displaced by their funded activities. Large dams are far more attractive to national governments and often have a significant constellation of politically potent economic actors in their favor. Nonetheless, because of human rights claims, it has become trickier to construct large dams in the past decade. It has become incumbent upon governments and relevant international actors to carry out studies that incorporate costs of displacement and compensation as part of the project. If conservationists are unwilling to go where their moral compass should take them, their political future will drive them there.

## A Summary by Way of Conclusion

A review of existing writings and available evidence suggests that there is no easy way for conservation professionals and organizations to defend conservation when it leads to forcible displacement of humans from areas that are to be protected, even if it is to stave off extinction of several species. Although there is clear evidence that the establishment of protected areas has been critical to the conservation of rare species and endangered habitats, there are very few studies that establish a relationship between the displacement of humans from the protected areas and the *marginal* gain such displacement confers on biodiversity conservation. Arguments in favor of displacement are built upon the assumption that human presence *invariably* impacts wildlife and biodiversity negatively. But studies have seldom focused on the extent to which this assumption is systematically correct. Therefore, generalizations asserting an inescapable conflict between biodiversity conservation and human presence in protected areas are no more accurate than those that suggest that a harmonious and sustainable relationship can and will prevail.

If the scientific basis for displacing all humans from protected areas on conservationist grounds needs additional work, the impact of images showing humans being displaced by conservation projects has undeniable negative impacts. The ethical grounds for displacement, whether pursued in the name of a larger national interest or a general social good, have always been specious. The history of development-induced displacements is a useful guide in this regard. Rather than studying the negative social impact of protected areas on displaced peoples only once the political pressures for doing so makes it unavoidable, conservation organizations can take the lead in setting the agenda on how to address conservation-induced displacements, and by doing so follow the path that is both ethically appropriate, and good for conservation in the long run.

- <sup>1</sup> As Sanderson (2002: 162-63) puts it, “Global losses in biodiversity and wild places are not the stuff of environmental alarmism; they describe our world today, as detailed in volumes of hard scientific evidence... All these impending losses have a human origin. Economic expansion, population growth, urbanization, and development lead to greater consumption. In turn, growing consumer demand fires competition for fresh water, energy, arable land, forest products, and fish. And globalized production permits the harvesting of nature at ever more rapid rates.” See also Chapin 2004, Sanderson 2005.
- <sup>2</sup> It is also worth noting that “unlike some of the effects of natural disasters or wars, displacement undertaken for development purposes is always permanent” (Brand 2001: 962). The permanency of displacement is also equally true of conservation-related origins.
- <sup>3</sup> Cernea (2000: 6) estimates the total number of people displaced as a result of development-related projects between 1980 and 2000 to be close to 200 million. Others have provided numbers that range closer to 100 million (Koenig 2002; McDowell 1996).
- <sup>4</sup> For a recent important set of cases and reflections, see the 2003 special issue of the *International Social Science Journal* 55(1).
- <sup>5</sup> Cernea’s model might more appropriately be viewed as a framework for analysis. Ostrom (1999: 39-40) distinguishes among frameworks, theories, and models. Frameworks identify the elements and relationships among elements for guiding analysis; theories specify the important assumptions for answering questions related to relevant phenomena; and models state the precise relationships among the variables that lead to outcomes. In many ways, Cernea’s framework for analyzing displacements does little more than state the relevant elements that affect impoverishment. It fails to provide much insight into how these different elements may themselves be related, or the extent to which their impacts on poverty depend on varying contextual conditions, despite Cernea’s recognition that the context plays an important role.
- <sup>6</sup> The impoverishment risks, according to Cernea, are landlessness, joblessness, homelessness, marginalization, food insecurity, morbidity and mortality, loss of access to common property and services, and social disarticulation. The strategy to address each risk is to counter it specifically – provide land to those rendered landless, create jobs to deal with joblessness, construct homes to remove homelessness: the prescription has a directness in relation to the diagnosis that is immediately pleasing in relation to policy. See also Cernea 1999.
- <sup>7</sup> For an especially cogent articulation of this position, see Roy 1999.

- <sup>8</sup> The literature on this theme is so complex as to brook no easy summary. For a relatively rosy assessment of the ease with which humans and wildlife species can coexist and prosper, see WWF 2006. Agrawal and Redford's (2006) survey of 37 projects attempting joint achievement of biodiversity conservation and poverty alleviation finds little systematic evidence in favor of synergies between these two goals.
- <sup>9</sup> For details, see <http://sea.unep-wcmc.org/wdbpa/>. The official classification and information in the World Conservation Monitoring Center (WCMC) database does not include areas covered by private and informal arrangements for wildlife protection that are common in many parts of the world.
- <sup>10</sup> (Ravenel and Redford 2005). Chape et al. 2005 estimate that close to 12% of the land surface of the planet is covered by more than 100,000 protected areas. It is worth noting that this proportion is already beyond the target of 10 percent of land surface proposed more than a decade ago at Caracas during the fourth World Congress on national parks and protected areas (World Conservation Union 2003).
- <sup>11</sup> Category V permits sustainable use of protected area resources, and is the least likely of the six IUCN categories of protected areas to lead to displacement.
- <sup>12</sup> One such example is representative. Geisler (2003) arrives upon a figure of 8.5 to 136 million humans displaced as a result of conservation projects by taking the total area of protection under different IUCN categories (8.5 million square kilometers), and multiplying it with an assumed population density of 1 to 16 persons per square kilometer. Using this procedure, Geisler's estimate today would have ranged between 10.8 million to 173 million. Others have taken Geisler's estimates of 1 to 14 million displaces for Africa, and asserted a figure of 14 million displaced peoples in Africa as fact (Dowie 2005).
- <sup>13</sup> The WCMC database lacks size information on 12 percent of the listed records, and the establishment date for 35 percent of them (West et al. 2006).
- <sup>14</sup> See, for example, the essays by Rangarajan and Shahabuddin (2006), Redford and Sanderson (2006), Goodall (2006), McElwee (2006), and Brockington and Igoe (2006) in a recent special issue of the journal *Conservation and Society*. The absence of studies from many regions may be interpreted as the absence of significant displacement in understudied regions, but it would be equally easy to suggest that the absence of evidence is not evidence of absence.
- <sup>15</sup> Some of the worst, and long-recognized, impacts of the creation of protected areas concern the adverse effects on the incomes of those who are displaced, even if they live within or in the vicinity of newly formed protected areas. Numerous studies have documented significant direct losses to livelihoods and agricultural incomes, human-wildlife interactions, and indirect losses because of loss of access to areas set aside for conservation (Ghimire and Pimbert 1997; Hulme and Murphree 2001; McLean and Straede 2003; Rao et al. 2002).
- <sup>16</sup> Much of the case work on this aspect of conservation-induced displacements is only available in the gray literature rather than as published materials. See, for example, the report on coercive conservation practices prepared by Hebert and Healey (n.d.) for the International Human Rights Advocacy Center, and reports published by the Legal and Human Rights Center on the Serengeti killings ([http://www.humanrightstsz.org/humanrights/serengeti\\_reports](http://www.humanrightstsz.org/humanrights/serengeti_reports), accessed on April 20, 2006).
- <sup>17</sup> The well received studies by Parrish et al. 2003 and Rodrigues et al. 2004 constitute important illustrations of this assertion.
- <sup>18</sup> Balmford et al. 2003; Hughes et al. 1997; Pimm et al. 1995. See Colwell and Coddington 1994 and Purvis and Hector 2000 for different assessments and measures of biodiversity. McKinney 1997 reviews lessons from writings on theories of extinction.
- <sup>19</sup> As the recent Tiger Task Force Report argues in relation to tiger conservation efforts in India, "there is virtually no compilation of data on firstly, the number of habitations within these [tiger] reserves or on the fringes of the reserves; and secondly, the impact of these habitations on the tiger population" (GOI 2005: 89). Similar complaints about the lack of any reliable data are voiced by West and Brockington (2006).
- <sup>20</sup> One of the most striking illustrations of the adverse impact of the conjunction of these three forces in recent times is surely the extinction of the Indian tiger from the Sariska Wildlife Sanctuary as reported in major Indian newspapers and summarized and analyzed in a report by the Tiger Task Force established by the Government of India (2005).
- <sup>21</sup> The kind of private contracts between governments and individual households described by Frank and Muller (2003) are unlikely ever to be the main mechanism for ensuring voluntary participation in conservation in the developing world. It is far more likely that conservation organizations would create schemes for compensation in consultation with government agencies rather than deal with specific landowners or local residents individually.
- <sup>22</sup> For a discussion that depicts the complexity of involving those displaced by development projects in discussions related to compensation, see Garikipati (2005). Further, even if conservation organizations create compensation mechanisms that appear satisfactory to them, their plans will always be open to criticisms if they are not formulated in consultation with (potential) displaces.
- <sup>23</sup> This is not considered an excessive dollar amount even in a poor country such as India (GOI 2005).
- <sup>24</sup> A description of displacement provided by Fred Pearce (2005) in the *New Scientist* is equally distressing.

# PART 2

## LATIN AMERICA

### 2.1 Working with Local People to Conserve Nature in Latin America

Avecita Chicchón  
Wildlife Conservation Society

Despite many years of trying to promote informed participation of indigenous peoples in the management of protected areas, there is still a big gap between conservationists and indigenous peoples in Latin America. To a large extent, this gap is due to different values and cultural and social characteristics that guide how conservationists and indigenous peoples engage with each other. The history of physical displacement of local people and/or the curtailment of their participation in decision making regarding the land contributes to this gap in understanding.

People have been forcefully displaced from their land by wars and resource scarcity throughout history. For example, the Incas forced the resettlement of local peoples that could rebel against them through the establishment of the *mitimaq*, or permanently resettled worker groups (Rostorowski 2001). When the Incas took over Cochabamba in Bolivia, the locals were displaced, and *mitimaq* established in the town. The Saraguros from Ecuador were originally *mitimaq* from Southern Peru. As the Spanish consolidated their rule in the Americas in the 1500s, indigenous peoples who lived in scattered areas were concentrated in *reducciones*, or settlements that became the basis of peasant communities (Marzal 1989). Indigenous people lost access to the most fertile valleys as rich resources were awarded to the new Spanish elite. The properties were handed over from one generation to the next for centuries, even after countries became independent from Spain and Portugal.

It was only in the early 1900s that social movements began to succeed in claiming land reforms. The Mexican Revolution in 1910 focused on the re-distribution of land from the wealthy to the poor and became an example for the rest of Latin America (Sanderson 1981). After 1917, *ejidos* (collective farms) became the basis of agricultural development for the rural poor. The process of land re-distribution intensified between the 1950s to 1970s as a response to social unrest and recommendations from multilateral agencies. Agrarian reforms transformed the access and control of natural resources, but local peoples did not necessarily benefit from these changes (Stavenhagen 1973).

In some countries, agrarian reform was coupled with the colonization of wilderness areas, particularly in Brazil, Peru, and Ecuador in the 1980s (Schmink and Wood 1984). Land conversion policies were based on the notion that wilderness areas were empty spaces that could provide a development opportunity for the poor and dispossessed. New settlements pushed indigenous peoples away from their original territories and constricted them in smaller areas. In Peru and Ecuador, native communities were officially established in the Amazon and included agricultural land but not traditional hunting or fishing territories. In Bolivia and Brazil, larger collective territories were established as “nations”

within a larger nation, causing management challenges for the central government but better opportunities for indigenous self-determination.

As newcomers expanded the agricultural frontier into wilderness areas, they displaced indigenous peoples. In Latin America, the creation of protected areas was a relatively minor problem for indigenous people faced with ineffective land reform. As a result, the late 1980s and early 1990s became a critical time for alliances between indigenous peoples and conservation advocates as both groups were interested in maintaining wilderness areas, albeit for different long-term purposes (e.g., COICA-Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica). Some alliances succeeded, but most did not.

We examine causes of failure and success to learn from the past and build for the future. When developing alliances for conservation, it is critical to begin by understanding the interests and value system of each stakeholder group. At the heart of the relationship is the understanding that no social group wishes to be “displaced” – neither physically excluded from a familiar place nor excluded from the decisions on natural resource allocation. The challenge of achieving biodiversity conservation in tandem with social justice is complex due to the varying meanings of social justice in different contexts. In remote places, where no government or development organization is present, conservation organizations have been pressed not only to fulfill their conservation mandate but also to advocate for disadvantaged people. Over the years, the Wildlife Conservation Society’s Latin America Program has tried different models to achieve conservation, and those that have been more successful and long-lasting in remote areas are those that combine local peoples’ interests with sound resource-use planning.

### **Partnerships with Indigenous Peoples**

WCS currently works with indigenous peoples in many projects across Latin America with a varying degree of engagement and impact. For example, we work in the small community of Puerto Edén, located within the large O’Higgins National Park (3.5 million hectares) in southern Chile, with 240 inhabitants from the Kaweshkar (Alacaluf) and Huilliche-Mapuche indigenous groups. We also work with the Ioseño-Guaraní organization, CABI, that represents 9,000 people and has management control of the Kaa-Iya National Park (3.4 million hectares) in Bolivia. In almost every case, the relationships with indigenous groups have developed in the context of mutual respect following an initial stage of mistrust. Mistrust was usually overcome by making the conservation objectives explicit and making sure that the indigenous perspectives were incorporated in biodiversity conservation efforts through land/resource-use planning. Overcoming mistrust can take a long time or it can happen overnight. We advocate transparent partnerships and we realize that they have to be nurtured and often re-negotiated. The terms of the partnership need to be re-assessed, for instance, when the larger social context changes, or when new indigenous representatives are elected. WCS commits to specific landscapes for the long term and our indigenous partners recognize this dedication.

While at early stages, scientists considered indigenous people mainly as informants or guides because of their knowledge of the wildlife, the relationships between WCS scientists and indigenous people gradually evolved into true partnerships. Small scientific projects grew into comprehensive conservation programs, and alliances were established in order for them to be more effective. It became clear that it is not enough to document biodiversity and its use; it is also important to contribute to the empowerment of the direct users to manage biodiversity in sustainable ways.

In Bolivia, WCS has worked closely with the Isoseños-Guaraní in the Gran Chaco since 1991 and with the Tacana in Madidi since 1999. In both cases, partnerships were developed from the outset with the legitimate representatives of these indigenous groups (see Arambiza and Painter 2006). Throughout, WCS has supported the Guaraní and the Tacana in securing legal rights over their indigenous territories which buffer the core protected areas. Both groups have a subsistence economy based on small-scale agriculture, hunting, fishing, and gathering. They have been in contact with the national society and have maintained a distinct social organization and culture. When the Kaa-Iya National Park was created, the Guaraní were key players in drawing the boundaries of the Park, and this protected area is now under their direct management. The Guaraní have a clear mandate to manage the Kaa-Iya National Park. The Tacana participate in the management of the Madidi National Park through the *Comité de Gestión* (Management Committee), a recently developed governance structure that allows local stakeholders to recommend best practices to Park officials. Each group aims to achieve an adequate standard of living, health, shelter, and education based on access and control of resources. Conservation, as Western society understands it, is a foreign concept to them, so it was important to clearly establish the terms of partnership and goals. As a conservation organization, WCS does not and cannot have human welfare as its primary goal. Nevertheless, conservation of natural resources ultimately contributes to quality of life locally, so it was important to agree upon this with the indigenous partners at the outset. The partnerships focus on the common aspects of conserving natural resources, and one of the main tools offered by WCS is scientific information for better management of wildlife resources.

In the case of the Guaraní, the partnership with WCS has been beneficial when the Guaraní were negotiating with corporations that sought to develop their land for the Bolivia-Brazil gas pipeline. The partnership successfully negotiated with the pipeline sponsors to ensure that environmental and socio-economic impacts were minimized. The agreement included the establishment of a trust fund as a permanent source of revenue for the protected area (Redford and Painter 2006).

In 2000 WCS started monitoring wildlife populations in Yasuní Biosphere Reserve in Ecuador. The two main indigenous groups in that region, the Kichwa and the Huaorani, were not fully consulted when the Yasuní National Park was created in 1979. At that time, the Huaorani, a hunter-gatherer group that functions in family groups, received an indigenous territory, the Huaorani Ethnic Reserve. Some Huao did not have contact with the outside world until the late 1980s, then spurred when Texaco opened the Via Auca road into their territory for oil extraction (Cabodevilla 1999).<sup>1</sup> There are still two Huao clans that have remained isolated. The Huao formed a representative organization to deal with the impact of oil companies and they are currently dealing with the company Repsol that controls Via Maxxus, a road crossing Yasuní National Park and extends into the Huaroani Ethnic Reserve.<sup>2</sup> It has been more challenging to work with the Huao as those communities are dependent on oil revenue and many Huao distrust outsiders. We aim to work more closely with the group of Huao women who have expressed interest in sustainable development activities.

The Kichwa, who migrated to the Upper Amazon from the Andes hundreds of years ago, have been in contact with Ecuadorian society for a while. Their subsistence is based on agriculture, hunting/fishing, and gathering, and they effectively negotiate with officials through their representative organiza-

tions. WCS has developed a solid partnership with six Kichwa communities to develop wildlife management plans. WCS advises them on how to use biological indicators to monitor the impact of oil development.

Looking at the whole picture in Latin America, human displacement due to the creation of protected areas is small compared to the magnitude of the displacement by infrastructure and industrial development in natural areas. In fact, in several cases, the creation of protected areas has benefited indigenous people because they have established alliances that have brought more national attention to their situations. In many cases the creation of protected areas has allowed for better ecological zoning, the development of conservation-based income-generating activities, and has attracted international attention and funding that have benefited indigenous and local people. WCS has contributed to help title indigenous lands, support sustainable wildlife use, and generate information for sound development activities, all of which provide a political advantage to indigenous and local people when they negotiate with other international entities.

Admittedly, WCS and conservationists have stumbled along the way, but we are learning and incorporating more social science in our work. We now incorporate a stakeholder analysis in any new conservation initiative, realizing that some stakeholders may be more powerful (corporations), some may be absent (uncontacted Indians), and others are transitory (squatters). Indigenous peoples and those local people that have strong ties to the land are the best allies for conservation as they will stay in the region. The “human footprint” left behind by indigenous peoples is much less than environmental impacts left by other groups. Most indigenous groups understand that their way of life depends on maintaining the services that their ecosystems provide.

The challenge remains in finding the long-term balance of biodiversity conservation in partnership with the state while making sure not to negatively affect indigenous access to and control of the territories in which they live. A necessary change for the future would be a comprehensive land/use reform allowing indigenous people to gain access to productive agricultural land. A focus on effective land-use planning in several countries in Latin America would allow for both protected areas and for indigenous and local people to have access to natural resources. Conservation organizations have the funding and connections to facilitate and implement comprehensive land/resource use plans at specific locations. In the future, we have the responsibility to include indigenous and local peoples as equal partners in conservation.

<sup>1</sup> Unlike other countries, Ecuador allows the exploitation of underground resources in national parks. Oil development has been a major threat to biodiversity conservation in the Ecuadorian Amazon for the last 50 years, despite the opposition of indigenous peoples and conservationists. The case in Yasuni is particularly delicate because it is the only protected area in Ecuador that contains a formal ‘core protected area’ (zona intangible), and the conservation community does not want the special status of this area to erode.

<sup>2</sup> The Huaorani Ethnic Reserve is surrounded by the Yasuni National Park (created in 1979); together they make up the Yasuni Biosphere Reserve which was created in 1989.



## 2.2 The Maya Biosphere Reserve and Human Displacement: Social Patterns and Management Paradigms Under Pressure

Roan Balas McNab<sup>+</sup> and Victor Hugo Ramos<sup>\*</sup>

<sup>+</sup>Wildlife Conservation Society Guatemala, <sup>\*</sup>Centro de Monitoreo y Evaluación de CONAP/WCS

### Conservation Setting

At 2.11 million hectares, the Maya Biosphere Reserve (MBR) is one of Mesoamerica's largest protected areas, and has been internationally recognized as part of the Mesoamerican biodiversity "Hotspot,"<sup>1</sup> and as a "Last Wild Place."<sup>2</sup> It is Guatemala's largest reserve, spanning 19% of the nation, and 58% of the surface area of the northernmost department of Petén. The Guatemalan protected areas legislation classifies the "Core" zones of the reserve as analogous to IUCN Category Ib, and the "Multiple-use" zone as analogous to IUCN Category VI.<sup>3</sup> The MBR has a high concentration of endemic species and retains an intact suite of large mammals and birds extirpated in much of the rest of Mesoamerica. Some notable wildlife in the reserve include Baird's tapir, white-lipped peccary, jaguar, puma, ocelot, margay, Mexican black howler monkey, Morelet's crocodile, orange-breasted falcon, and Guatemala's last wild population of scarlet macaws. Due to its size, topographic variation, and geographic context, the reserve has varied annual precipitation and altitudinal gradients within it. The MBR is the largest and most intact portion of the tri-national Maya Forest that spans Guatemala, Belize, and Mexico, and is an important segment of the Mesoamerican Biological Corridor. It is also a prime example of sustainable development strategies.

As shown in Figure 1, the MBR's management zones include "Core zones" (767,000 ha; 36%), a "Multiple-use Zone" (848,440 ha; 40%), and a "Buffer zone" (497,500 ha; 24%). Conservation management is effectively absent in the Buffer zone. As of 2006, 66% of the surface area of the Multiple Use Zone (MUZ) has been granted in concessions for timber and non-timber forest product (NTFP) extraction, and 3% in community polygons for limited agriculture.<sup>4</sup> Forest concessions include 12 community-based concessions<sup>5</sup> spanning 400,918 ha of the MUZ (47.3%), and two industrial concessions (15.6%). The remaining 37.1% of the MUZ has not been formally granted as concession and approximately half of this area is reserved within two biological corridors.

Within the Core zones, 16 communities (eight of them with community polygons covering 32,000 hectares) obtained specific agreements effectively allowing temporary residence and use of natural resources.<sup>6</sup> Thirteen of the agreements were a result of the massive influx of migrants into Laguna del Tigre National Park in 1996-97.<sup>7</sup> The agreements evolved as part of the institutional strategy of Consejo Nacional de Areas Protegidas (CONAP) to resolve social conflicts over land in the hope that new settlers would collaborate with existing conservation objectives. While opinions on the wisdom and effectiveness of this strategy are mixed<sup>8,9</sup>, one thing is clear: while these community agreements have reduced socio-economic tensions, they have also reduced effective conservation.<sup>10</sup>

Even though specific, separate zones in the MBR were established for biodiversity protection, regulated multiple-use, and economic development, numerous factors continue to threaten the ecological integrity and wildlife of the region. Approximately 10% of the reserve's original forest cover has been lost since establishment. Habitat loss has isolated Sierra del Lacandón

National Park in the west from the large block of intact forest in the central and eastern parts of the reserve (Figure 2). While community and industrial forest concessions have been less prone to fire and deforestation than the western parks, recent trends indicate that some community forest concessions will lose extensive areas to colonists and pastoral activities soon. In short, the reserve is rapidly approaching a crossroads, requiring new management and conservation paradigms to ensure its biodiversity for the future.

## **Human Populations and Resource Use**

### ***Prehistory***

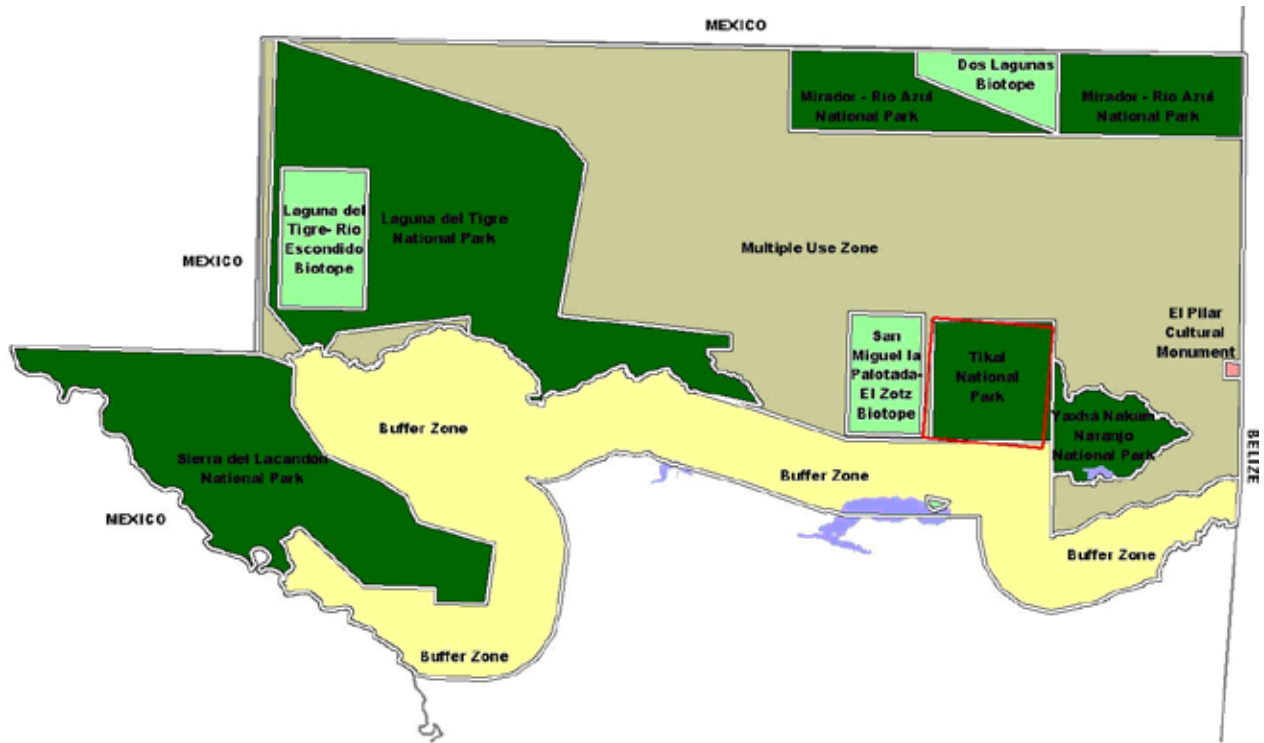
The human population in the lowland Maya forest during the peak of the Classic Period ranged from several million to as many as 14 million people.<sup>11</sup> The area that is today the Maya Biosphere once contained the epicenter of the ancient Maya civilization, including the civilization of El Mirador that flourished from 200 BC to 150 AD (Diamond 2005). Later Maya city-states, such as Tikal, Rio Azul, El Perú, Piedras Negras, and Uaxactún, controlled extensive areas within the current MBR during the Classic Period (300-900 AD). Each of these centers had up to 50,000 inhabitants, and it is likely that sections of the MBR were deforested for agriculture and settlement during this time. War, disease, drought, and deforestation may all have contributed to the eventual disappearance of civilizations from this landscape, a collapse that either occurred at once or in a number of staggered collapses.<sup>12, 13</sup> Environmental stresses linked to high human consumption in the lowland Maya area have remained central to explaining the precipitous decline of the civilization and the massive population reduction<sup>14</sup> from 850-1,000 AD.

### ***Spanish conquest and settlement through Maya Biosphere***

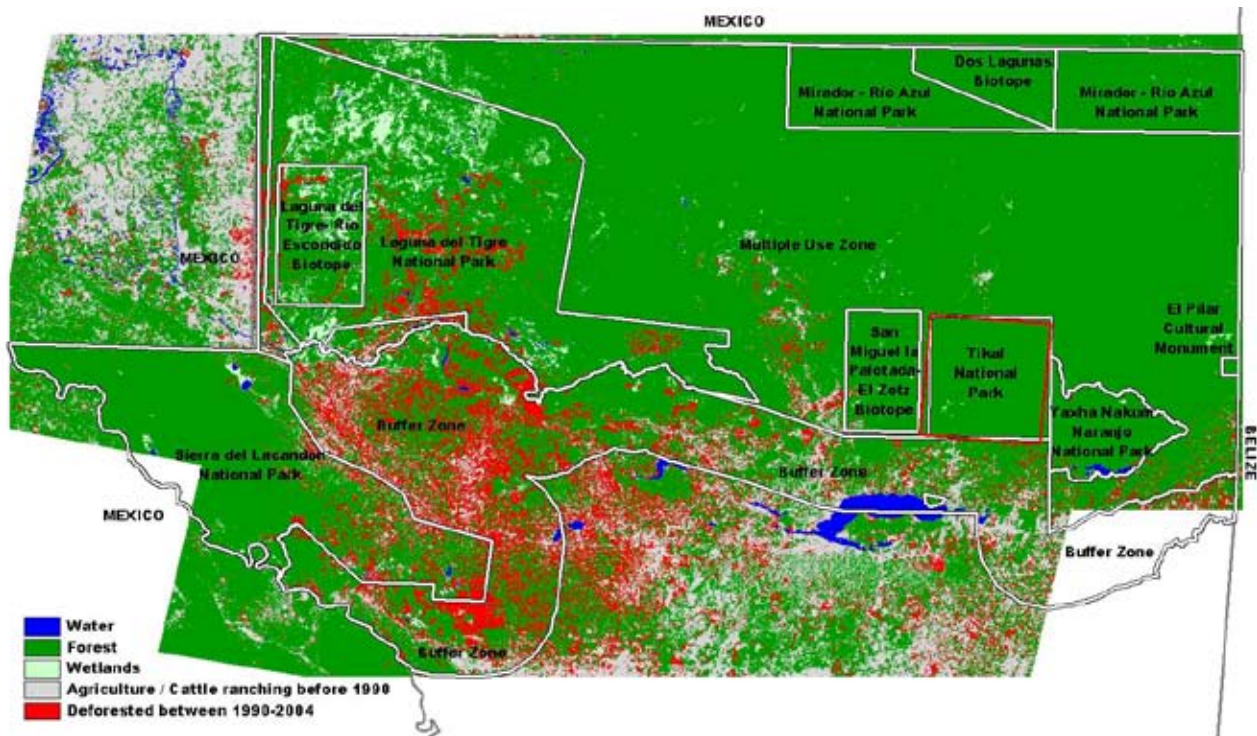
During the nearly 1,100 years following the collapse of ancient Maya, much of the Petén had no human settlement and the lowland Maya forest recovered ecologically. Nevertheless, some important populations remained in the area, foremost the Maya-Itzá of the central Petén, the largest indigenous group at 25,000-40,000 people (Schwartz 1990). Other groups included the Mopan Maya (10,000-20,000 people) in south-central and eastern Petén (outside of the future reserve); and the Cehach (< 10,000 people) in the northwestern Petén (within the future reserve). Western Petén was occupied by 30,000 Chol and Choltí speakers, who were decimated by war with the Spanish, disease, and famine between 1559 and 1721 (Schwartz 1990). The remnants of this group were later joined by refugees of the Yucatec, Itzá, Cehach, and others to become known as the Lacandon – a group that survived by scattering into the forest to avoid contact with the Spanish. The Q'eqchi' may have been moving into southern Petén prior to Spanish conquest but they were not a significant cultural group in the area. The total human population of the Petén immediately prior to Spanish contact exceeded 100,000 people.<sup>15</sup> Indigenous groups established within the area of the future MBR were the Itzá, primarily within the municipality of San José in the areas near Lake Petén-Itzá, the Cehach in the swampy areas of Laguna del Tigre, and the Lacandón in the west.

In 1697 the Spanish conquered the last Maya kingdom – the Itzá ruled by Rey Canek from Tayasal, known today as Flores. The period of Spanish domination spanning the 16<sup>th</sup> and 17<sup>th</sup> centuries was marked by the decimation of native peoples and the establishment of state *haciendas*, or ranches, charged primarily with the production of cattle for the Spanish crown. By 1778, the population of Petén consisted of 1,604 adults, 1,158 of whom were indigenous, 67 were Ladino (people of mixed Indigenous-European ancestry), and only 45

**Figure 1:** Management zones of the Maya Biosphere Reserve



**Figure 2:** Map of deforestation within the MBR, 1990-2004



were Spaniards (Schwartz 1990). The decimation of native populations over this period allowed for the Petén to evolve into a rural department dominated by Spanish-speaking Ladinos (also known as Mestizos).<sup>16</sup>

### **Chicle extraction**

The history of human access to and habitation in the Maya Biosphere Reserve is punctuated by the chicle trade, the tree-tapping industry that provided the main ingredient in chewing gum until the advent of substitutes after World War II. During the 1880s US companies expanded the chicle trade into Petén from Veracruz, Mexico, stimulating the migration of Mexican chicleros to the productive forests in Petén. By the 1920s the chicle trade employed over 1,000 chicleros, and accounted for as many as 5,000 jobs. Approximately half of the chicleros were seasonal migrants arriving from other areas. This pattern of migration continued after the establishment of the Maya Biosphere Reserve in 1990 despite a waning chicle market.

In the early part of the 20<sup>th</sup> century, the forest villages now known as Carmelita and Uaxactún were established. An archaeological exploration by the Carnegie Institute (1904-1937) established the village of Uaxactún, previously *Bambunal*, a chicle camp. These and other forest communities were isolated from economic centers and therefore lived by extraction, management and harvest of forest products, supplemented by small-scale agriculture. These traditional “forest communities,” of which only Carmelita and Uaxactún remain, were thus established well before the existence of significant state control over a vast majority of the Petén.

### **Human population growth**

Despite the boom of the chicle trade in the 1940s, the wave of human migration into Petén swelled in the 1970s. By 1986 an estimated 300,000 people inhabited the department.<sup>17</sup> Though an official census of the population of Petén reported 366,735 people in 2002, a more precise figure may be 550,000 reported for 2000 (Grandia et al. 2001). If we accept the latter figure, the population of Petén in 2006 may be over 600,000 people. Within the Maya Biosphere Reserve, the estimated population in areas outside urban/semi-urban settings was 58,781 in 2001 (Ramos et al. 2001). The greatest challenge to current conservation paradigms comes from the region’s population growth rate of 10%, one of the fastest growing areas in Latin America (Fort and Grandia 1999), due in part to Guatemala’s fertility rate of 4.6 (estimated for 2000-2005), the highest in Latin America (CEPAL 2005).

Ethnicities of MBR residents include Ladinos (80.8%) and Q’eqch’í (15.6%), with a majority of the remainder belonging to other Maya tribes (Ramos et al. 2001). Colonists are composed of people from all over Guatemala, with some migrants from other Central American states.

### **Empresa Nacional para el Fomento y Desarrollo del Petén (FYDEP)**

Prior to the establishment of the reserve, a majority of the Petén was managed by the Guatemalan government agency Empresa Nacional para el Fomento y Desarrollo del Petén (FYDEP). Established in 1959, FYDEP was a military-controlled governmental institution dedicated to developing Petén, with full control of all the territory above parallel 17°10’ (Arrivillaga 1997), including approximately 68% of the area within the current Maya Biosphere Reserve. FYDEP’s mandate over the area meant that no private titles to land were granted in areas above 17°10’, despite previous habitation and natural resource use within the area.<sup>18</sup>

## **Human Displacement**

The Maya Biosphere Reserve was established in 1990 to conserve Guatemala's biological and cultural heritage while also improving the livelihoods of local inhabitants. Below is a consideration of various types of displacement since the creation of the reserve and other protected areas (i.e., Tikal) incorporated during its establishment.

### ***Displacement of economic activities***

The establishment of the Maya Biosphere Reserve: 1) prohibited chicle and other non-timber forest product extraction<sup>19</sup> in Core zones (*zonas núcleo*) beyond Tikal<sup>20</sup> and the Biotopes,<sup>21</sup> and 2) extended the jurisdiction of FYDEP over most of the Petén, thereby undermining tenancy claims from families who had lived on that land for decades. Community forest concessions established within the reserve restricted access to migrant, non-native *chicleros*. Interestingly, the reserve closed most sawmills that had been operating on contracts with FYDEP. In fact, due to the complex history of the reserve, it is often the case that institutions designed to facilitate access to the forest have contributed to the displacement of human activities.

### ***Displacement from Core zones***

Displacement by the Maya Biosphere Reserve includes two broad categories of displacement: 1) people and institutions physically displaced upon the establishment of the reserve,<sup>22</sup> and 2) people denied access or whose access was severely limited. Those that were outright displaced from the Core zones of the reserve numbered approximately 1,000 individuals, which is modest given the size of the area. A notable case is that of the *Comunidades Población en Resistencia* (CPR), a faction<sup>23</sup> opposing the Guatemalan government during the 36-year internal struggle. Toward the end of that conflict, the CPR sought refuge in Sierra del Lacandón, and, after the 1996 Peace Accords, the 300 members of the CPR relocated onto *fincas* acquired by the government. Support was provided to the new communities, including basic housing and assistance with developing livelihoods. As far as access to resources is concerned, the establishment of the Core zones immediately displaced non-timber product harvesters<sup>24</sup> (chicle, xate, allspice), and timber operators and their employees. This totalled approximately 1,000 jobs, including workers linked to these industries outside the reserve. Other types of displacement from Core zones include limitations of extractive, agricultural, and pastoral activities of colonists.<sup>25</sup> The Core zone also restricts access to subsurface resources (i.e. petroleum<sup>26</sup>) and the building of roads.<sup>27</sup>(These activities are not specifically prohibited in the Multiple-use Zone.)

The displacement of colonist migrant groups who arrived after the reserve was created is difficult to assess but their displacement is ongoing. Numerous "invasions" by migrants into fully protected areas (and concessions in the Multiple-use Zone) have seriously challenged the conservation objective of the MBR. To date, approximately 10,000 migrants exist in the reserve; some have formal agreements, others have informal agreements or stay by the use/threat of force, while some have been evicted from the park.

### ***Displacement from the Multiple-use Zone***

Multiple-use zones were designed for the sustainable use of natural resources, but their establishment actually displaced several other forms of resource use. After 1990, private land holdings within the MUZ could not be legally titled,

with the exception of the *ejido* (farming cooperatives). Since that time, the government's ability to adequately address land tenancy issues within the MUZ has been frustrated by numerous illegitimate claims to ownership and falsified titles.

From 1993-2005, 14 forest concessions in the MUZ were approved, facilitating access for the groups owning the concessions, but at the same time prohibiting others access to these areas. The Peace Accords of 1996 ushered in a new focus on "human rights" which limited the government's application of the Law of Protected Areas in cases of illegal human colonization. The Peace Accords also initiated the community-based forest concessions by stipulating that "100,000 hectares within the Multiple-use zone be provided to legally organized *campesinos* to meet the objectives of sustainable forest management, protected area administration, ecotourism, protection of watersheds, and other activities compatible with the sustainable use of the natural resources of the area." These community concessions prescribe guidelines that prioritize conservation and thereby limit free access to natural resources. Interestingly, the government itself experienced displacement from some of the community concessions: When the government planned to explore for oil and gas in the MUZ, managers of local concessions resisted and the plan was dropped.<sup>28</sup>

### **Responses to displacement**

Responses to displacement have varied significantly. On the one hand, the CPR resettlement out of Sierra del Lacandón National Park was generally accepted. On the other hand, many illegal colonists have resisted displacement by threatening to use force,<sup>29</sup> by repeatedly re-colonizing areas, and by using ecological sabotage (setting fire to the reserve in order to render conservation pointless). An important note is that the Guatemalan government has historically been less effective at evicting *terratenientes*, or wealthy landowners. A majority of the area within the MBR for human use is dedicated to extensive cattle production in *fincas*. *Fincas*, rather than small-scale *campesinos*, dominate the region due to a common practice where *campesinos* are employed by an absentee land "owner"<sup>30</sup> to clear and farm that land. After a few years, the "owner" places cattle on the *finca*.<sup>31</sup> In this process, conservation objectives are lost to cattle production and the comparatively wealthy people benefit, while those most in need of farm land obtain merely transitory access to the land. Part of the irony is that in most cases small land holders manage the land in a more sustainable way, using fallow cycling and leaving intact forest areas. Conversion to cattle ranches, however, generally eliminates most of the area's biodiversity. Small land holders often decry that their impacts on the land are minimal, suggesting that evictions should begin with the wealthier ranchers. As a result, the government's hesitancy to apply the law against the more powerful<sup>32</sup> land "owners" promotes a general disregard for rules regarding the protected area.

Given this exceedingly complicated social scenario within the Maya Biosphere Reserve, diverse stakeholders have suggested the following types of changes:

- a) Eliminate the Maya Biosphere Reserve
- b) Re-designate "failing" Core zones as forest concessions
- c) Increase access to some renewable resources within Core zones
- d) Develop the archaeo-nature tourism model (developing another "Tikal")
- e) Develop "conservation incentives" for local employment in management
- f) Strengthen forest concessions (to ensure their persistence)

- g) Grant concessions to Multiple-use zone areas still retained by the government
- h) Resettle communities impacting areas of high biological importance

## Conclusions

In the future, conservation efforts in the Maya Biosphere and across Guatemala are likely to be shaped by the dramatic population expansion in the country. Although currently Ladinos constitute the vast majority of new colonists arriving to the Biosphere, at some point, modern Maya may want increased access to the land, posing new challenges for management paradigms developed during the last century. In addition, increased governance will be essential to integrate development and improve living and working conditions for the significant percentage of the population living in poverty. Because many types of national and international investment stand to be threatened by a continued lack of governance, the broader conservation community should integrate conservation concerns within the dialogue about the sustainability of all management and development initiatives.

In view of the complex social history of the space now known as the Maya Biosphere Reserve, the future management of the area will require monitoring key social variables as well as biodiversity indicators. Although Guatemala has nearly twice the population of the next most-populous Central American nation, it still contains the greatest amount of intact habitat in the region – largely as a result of the visionary establishment of the Maya Biosphere Reserve. In this sense, Guatemala is uniquely positioned to benefit from the development of new, socially viable strategies that advance conservation over the long-term, and provide a model for other nations bound to encounter similar challenges in the future.

<sup>1</sup> Conservation International

<sup>2</sup> *State of the Wild* 2006, eds. Wildlife Conservation Society

<sup>3</sup> Personal communication, Carlos Albacete, Trópico Verde-Parkswatch

<sup>4</sup> (i.e., Cruce dos Aguadas)

<sup>5</sup> In general, community-based forest concessions are permitted access to non-timber forest products including subsistence use of game species, whereas the two industrial concessions in the MBR (La Gloria; Paxbán) only have rights to timber. In this regard the industrial concessions have not displaced collectors and local industries harvesting there prior to concession establishment.

<sup>6</sup> “*Acuerdos de Intención*” include three models of agreements: Cooperation (permanence), Cooperation-Relocation, and Possible Relocation (FIPA/USAID, 2002). Agreements allow occupancy of a Core zone area, in some cases with individual plots identified, but the government reserves the right to withhold title (the granting of title being illegal within MBR Core zones), often including the option to relocate colonists in the future. Agreements typically also included language as to the government’s responsibility to provide social services such as education and medicine. Provision of such services in the remote parts of the MBR has been inconsistent at best, permitting a number of the communities with “*Acuerdos*” to conclude that “the government had defaulted on its promises, so we too will not be bound by previous agreements.” In fact, most communities that received agreements have grown significantly.

<sup>7</sup> Primarily in Laguna del Tigre National Park and Sierra del Lacandón National Park.

<sup>8</sup> Based on remote sensing of deforestation, illegal colonization of the MBR did in fact drop between 1998 and 2002 after a seven-year surge in colonization ending in the big push into Laguna del Tigre in 1996-97. By 2003, however, colonization had spiked again at an even higher level than in the mid-1990s (CONAP 2006). This trend continues.

<sup>9</sup> Critics of the strategy suggested that agreements with colonists within Core zones would only provide the opposite effect of that desired, namely that they would provide an incentive for colonization to continue (domino effect) based on precedent. Supporters of the strategy generally believed that resolving the conflicts of 1996-97 by signing agreements would help gain support for CONAP and lessen the likelihood of wide scale ecological sabotage via fire, thereby helping to conserve areas remaining intact. Supporters also believed that the Guatemalan government was not prepared to use force to evict illegal colonists. (Note: the Peace Accords ending Guatemala’s 36-year civil war were signed in December 1996.)

- <sup>10</sup> A complete review of the topic is provided in: FIPA/USAID (2002). *Evaluación del impacto y sostenibilidad de los acuerdos de cooperación y de reubicación para la conservación de los recursos naturales en la RBM*. FIPA/IRG/USAID.
- <sup>11</sup> Diamond (2005) mentions these figures for the Central Petén area, an area approximately 25% of the area of the “lowland” Maya Forest. Coe (1984) mentions a figure of 8-10 million people living during the population peak in the lowland areas. Culbert and Rice (1990) and Sharer (1994) mention 3 to 13 million.
- <sup>12</sup> Regarding this topic, Mann (2005) states “we now know that the fall was not quite as rapid, dramatic, and widespread as earlier scholars believed. Nevertheless, it was an extraordinary event: the disintegration of an entire social order, followed by a massive emptying-out of a once-populous and once-prosperous land. Rare is its equal in world history.” In contrast, Diamond (2005) stresses that a number of different “collapses” occurred as civilizations overreached their carrying capacities, leading up to the final Diaspora from the southern lowlands in the 9th century AD.
- <sup>13</sup> Jared Diamond (2005) discusses in detail why scholars are now moving away from theories that focus on one monumental “collapse,” instead trying to understand how numerous collapses occurred across time and space, and indeed how some of the areas increased in population while others disappeared.
- <sup>14</sup> The populations of the southern Maya heartlands were reduced by 75% in the 100 years that followed 869 AD (Mann 2005).
- <sup>15</sup> Diamond (2005) mentions the more modest figure of 30,000 people living in the Central Petén when the Spanish arrived, a figure that corresponds reasonably well with Schwartz’s estimate of the Itzá in Central Petén.
- <sup>16</sup> For example, native Itza speakers now number no more than 100, and are generally limited to the municipality of San José, on the northern shore of Lake Petén-Itza. In the 1990s the Itzá were, however, able to obtain a 3,550 ha municipal reserve.
- <sup>17</sup> However, figures cited by Schwartz (1990) for the two latest dates are roughly twice the size of those provided by Arrivillaga (1997), who estimated Petén’s population to be 64,503 in 1973, and 162,874 in 1982.
- <sup>18</sup> Personal communication from Carlos Albacete, Trópico Verde. Nevertheless, inhabitants of villages such as Carmelita, Uaxactún, and more recently other villages with legal recognition within the reserve are able to obtain security for their homestead plots (only), consisting of non-transferable “*derechos de alquilamiento*,” or renter’s rights. Also, a number of “landowners” have come forth in recent years claiming to have received “rights” to areas during the time of FYDEP’s administration.
- <sup>19</sup> To a great extent, the same effect of MBR establishment befell the “*xate*” palm industry that was first established in Petén in the 1960s and continues today as one of the most important sources of income for rural MBR communities.
- <sup>20</sup> Tikal National Park was created by IDAEH (Guatemalan Institute for Anthropology and History) in 1955. In the 1970s, a majority of Tikal’s inhabitants (>200) were peacefully resettled to the village of Ixlu prior to the park’s inscription as a UNESCO World Heritage Site.
- <sup>21</sup> “Biotopes” are fully protected areas that were established by the University of San Carlos in 1986, and incorporated into the MBR as “Core Zones” with its creation in 1990. USAC’s Center for Conservation Studies (CECON) remains co-responsible for the management of these areas.
- <sup>22</sup> In most cases the effects of this displacement manifested as late as 1994-1995.
- <sup>23</sup> CPR members in many cases were women and children, seniors, and others unable to fight in the struggle. They took refuge in Sierra del Lacandón due to its challenging topography, abundance of caves and fresh water, expansive intact forests, and its proximity to Mexico.
- <sup>24</sup> Nevertheless, “illegal” NTFP harvests continue in all Core zones, primarily *xate*, and secondarily chicle and allspice.
- <sup>25</sup> While this analysis is based on a legal interpretation of the Law of Protected Areas, the reality in many cases has been quite the opposite. For example, 10% of the surface area of Laguna del Tigre National Park is now occupied by pastoral and agricultural activities. Although illegal, many colonists have been able to obtain standing in Core zones due to their willingness to use force, their capacity for resistance, and in some cases due to the signing of “*Acuerdos de Intención*” that permit their presence in Core zones.
- <sup>26</sup> Nevertheless, in 1992, the Guatemalan government extended new “exploration concessions” within Laguna del Tigre National Park – from 1997 on, the Guatemalan government received significant criticism from activists for extending concessions within the Laguna del Tigre Core Zone after MBR establishment. Note: Guatemala’s most productive oil field, Pozo Xan, also located within Laguna del Tigre, was awarded as a concession prior to the MBR’s establishment.
- <sup>27</sup> In practice, however, a number of new informal roads have been constructed in the MBR’s Core zones, primarily Laguna del Tigre National Park.



- <sup>28</sup> A broad social movement against the Arzu government's proposal to develop petroleum concessions across the MBR Multiple Use Zone effectively blocked this activity in 1997-98-99. Interestingly, once community concessions began to be approved, many local people living within the reserve raised their voice against petroleum concessions, fearing the destruction of the natural resources they had fought so hard to control. In this sense then, the establishment of the MBR had the counter effect of "displacing" the government's intention of developing petroleum, despite the activity being within the boundaries of the law (within the Multiple Use Zone only).
- <sup>29</sup> In some cases such threats have indeed been carried out. In addition, governmental, national, and NGO conservation projects have been forced to abandon areas at different points in the history of the reserve: WCS-CONAP-IDAEH personnel were taken hostage and later abandoned the area of eastern Laguna del Tigre in 2005; CECON-USAC was forced to abandon installations in Río Escondido Biotope, part of Laguna del Tigre National Park in 2004; CONAP-Defensores de la Naturaleza has evacuated personnel from El Porvenir several times since 2000; ProPetén/Conservation International's biological station was burned in 1996.
- <sup>30</sup> "Owner" is not used in the literal sense, as true titles to these areas do not exist. Nevertheless, clearly a well organized market for land within the Maya Biosphere Reserve exists, especially within Laguna del Tigre National Park and to a lesser degree within three forest concessions.
- <sup>31</sup> In this sense, in many cases landless or wage-based *campesinos* are used as "fronts" for the objectives of *terratendientes* looking to expand their access to land.
- <sup>32</sup> However, it is important to note that in June 2006, the Guatemalan Government and CONAP exposed a massive network of falsified "land titles" within the MBR Core zones of Laguna del Tigre and Sierra del Lacandon. All of these were claimed by "*terratendientes*" identified by the national press as powerful *Narcotraficantes*.

## **2.3 Impacts of Displacement in the Pacaya-Samiria National Reserve, Peru**

Richard Bodmer<sup>+</sup> and Pablo Puertas<sup>\*</sup>

<sup>+</sup>Wildlife Conservation Society Peru and Durrell Institute of Conservation and Ecology (DICE), University of Kent, <sup>\*</sup>Wildlife Conservation Society

The Pacaya-Samiria National Reserve is the largest protected area in Peru spanning over 2,000 km<sup>2</sup> of tropical rainforest. The Reserve is a truly exceptional wilderness area. It is a unique flooded forest that has some of the greatest diversity of animals and plants found anywhere on Earth (INRENA 2000). It is at the point where the Amazon River begins its long journey to the Atlantic Ocean, passing through parts of Peru, Colombia, and Brazil. The two major rivers that border the reserve are the Ucayali and Marañón rivers that originate in the Andes and join to form the Amazon proper. The huge floodplains of these rivers have produced the low-lying flooded forests of the reserve. The rivers are rich in sediments, which are deposited on the forest floor and the water becomes infused with dark tannins from the leaf litter when it flows out of the forest.

The aquatic and terrestrial wildlife of the Pacaya-Samiria National Reserve basin has recovered significantly over the past decade (Bodmer et al. 2004). The river has a particularly large population of river dolphins and is the last remaining refuge for the Amazon manatee. Giant river otters are also returning and every year more are sighted in the rivers, lakes, and channels. There are 12 species of primates in the reserve. Macaws and wading birds are abundant, as are game birds. Peccaries, deer, tapir, and capybara are also on the increase. The caimans and turtles have rebounded and are now common.

The Pacaya-Samiria National Reserve has approximately 95,000 people living in villages and towns along its boundary (INRENA 2000). Some of the villages lie just inside the reserve but there are no human settlements within the core area. Most of the inhabitants are Cocama-Cocamilla Indians (Puertas et al. 2000) who still live as they did centuries ago: They fish and hunt, collect forest fruits, and have small slash and burn gardens. They travel in small dugout canoes and live in thatched roofed houses made from trees and palm fronds from the nearby forest. The Cocama-Cocamilla people are renowned for their mobility: Families move continually between villages (Newing and Bodmer 2004). They have always adapted to other societies and integrated well with the influx of European customs brought by missionaries and the rubber boom.

The Pacaya-Samiria National Reserve is an excellent case study for understanding the displacement of human settlements in protected areas and the importance of local communities to wildlife conservation.

### **History of Human Populations and Displacement in the Area**

In 1880 the geographer Antonio Raimondi produced a detailed map of the area that now encompasses the Pacaya-Samiria National Reserve. In the late 19<sup>th</sup> century there were several Indian groups living along the Samiria and Pacaya Rivers, including Cocamilla, Conibos, Chamicuros, Aguanos, and Puinaguas (Raimondi 1880). Indian villages were distributed throughout the two river basins, inside what is now the core area of the Reserve. In addition, recent archaeological finds within the interior of the reserve confirm the presence of human settlements prior to the establishment of the protected area (Morales Chocano 2002).

When the protected area was initially established in the 1940s during the Pardo government, settlements within the interior of the Reserve were relocated to the reserve boundary. This displacement of people probably disadvantaged them because the interior of the Reserve has higher levees that rarely flood, whereas lands at the Reserve boundary are low-lying and flood. When the Reserve was established, the Regional Director of Fisheries planned to use the area as a fisheries reserve for the state, with an emphasis on the large freshwater fish, especially the *Arapaima gigas*, locally known as paiche in Peru and piracatu in Brazil. Informal conversations with local elders reveal that the Regional Director of Fisheries sent barges with military personnel into the Reserve to forcefully relocate villages to the boundary. Fisheries stock was to be sold in Iquitos for profits to the state – appropriate for a “national reserve”: an area managed by the state for the benefit of the state.

### **History of Resource Restrictions**

The Reserve initially included only the Pacaya river basin. In 1942, it was expanded to include the Samiria river basin (*Plan Maestro de la Reserva Nacional Pacaya-Samiria* 2000). In 1972 the area was decreed as a National Reserve covering 1,478,790 ha and in 1982 the Pacaya-Samiria National Reserve was expanded to its current size of 2,000,080 ha. The Peruvian Ministry of Agriculture under the *Dirección Forestal y de Fauna* (now INRENA) became the major governmental institution responsible for management (*Plan Maestro de la Reserva Nacional Pacaya-Samiria* 2000).

During the first Management Plan period between 1986 and 1992 the Reserve was funded in large part by World Wildlife Fund (WWF). A system of park guards was implemented and a set of strict controls on local people was developed. During this period the actual enforcement of rules was limited due to a lack of financial resources and capacity. Local people were allowed to use fish and wildlife resources in restricted areas. Poaching or the illegal extraction of natural resources was frequent and involved the local communities living around the boundary of the Reserve. A game of cat and mouse developed between the poachers and the park guards.

In 1992, The Nature Conservancy together with US Agency for International Development and ProNaturaleza began a well funded project as part of the Parks in Peril program. This project reinforced the park guard system and worked with local communities on rural development. Parallel to the Parks in Peril program was the WWF-funded program that focused on local community participation in the Reserve and the acknowledgement of indigenous communities of Cocama-Cocamilla origin. The top management of the Reserve experienced frequent turnover until a strict protectionist was hired, and he implemented a system of rigid control of access to the Reserve. By then, the park guard system was relatively well established with help from the Parks in Peril program.

The authors were involved with both the Parks in Peril program and the WWF projects. We conducted census work of mammals throughout the Samiria river basin and set up participatory programs with local people to evaluate the use of wildlife resources by local communities (Aquino et al. 2001; Puertas et al. 2000). During the census work many poachers hunted within the Reserve and it was clear that animals were being hunted in “no-use” zones (Bodmer et al. 1999). Poaching was rampant and local people developed a sophisticated system to avert park guards. This was relatively easy in the flooded forest ecosystem, because there are innumerable access points through the abundant

water channels. Local people in small canoes could easily travel through the landscape and during park patrols poachers would sink their canoes and products underwater and hide within the forests.

The park guards confiscated any products, guns, fishing nets, supplies, and even the canoes. Park guards, however, do not have the power to make arrests, and need to call the Peruvian National Police to actually arrest poachers. During this period, the tension escalated between the Reserve management and the local people. In November of 1997, a group of local fishermen had their nets confiscated. This had a major economic impact on them, since they had borrowed money to purchase the nets. In retaliation, the fishermen attacked a park guard station, armed with machetes. The attack resulted in the killing of the two young biologists at the station and one park guard. The news made national headlines and the situation clearly required attention by INRENA.

Shortly after the attack on the guard station, the head of the Reserve was replaced by a new leader, who began to involve local people in the management of the Reserve. This included setting up management groups with responsibility for a lake or area of the Reserve. These groups are allowed to use a limited amount of natural resources, including hunting, under approved management plans. At the same time, the groups are responsible for helping to control poaching in that area. While not all of the management groups have been successful, it was an important change for the Reserve.

The Pacaya-Samiria National Reserve has seen several types of displacement. Initially, the displacement included the physical removal of entire villages to the boundaries of the Reserve. Later, the displacement included the prohibition of using natural resources from the Reserve by local communities and the local indigenous organization (AIDECOS) still claims that the entire Reserve belongs to the Cocama-Cocamilla ethnic group and that the Reserve should be annulled and converted to an indigenous territory.

### **Impact of Displacement**

The information below on the displacement during the 1990s, when access to the Reserve was strictly controlled, is based on both the attitudes of the communities and the impact that regulations had on wildlife. During this period of strict control, the local people stated that they had no long-term vision for the Reserve and feared that the reserve administration would implement ever-stricter measures in the future. This encouraged them to hunt as much as possible in the near-term since their future was uncertain. As a result, most community members supported or abetted poaching activities.

When the park administration changed and the Reserve began to incorporate the local communities in management, attitudes of the local people changed (Puertas et al. 2000). Many local people began to see the long-term benefits of the Reserve for them and their communities. Many local people now recognize the socio-economic benefits of the Reserve and are helping to conserve the area. Hunting has decreased substantially because ownership of management has reduced incentive for poaching and because local people protect their areas from external poachers. For example, in the community of San Martín de Tipishca, Samiria River, a 1997 assessment recorded 115 animals hunted whereas in 2004 it was only 42.

Animal censuses were conducted during the shift in management policy of the Samiria river basin. Censuses were compared between 1995 and 2005. (The 1995 data correspond to the period of strict control by the Reserve administration, whereas the 2005 data correspond to the period of local involvement in

Reserve management.) In both periods hunting was not allowed in the Reserve, but in the 1990s there was severe poaching.

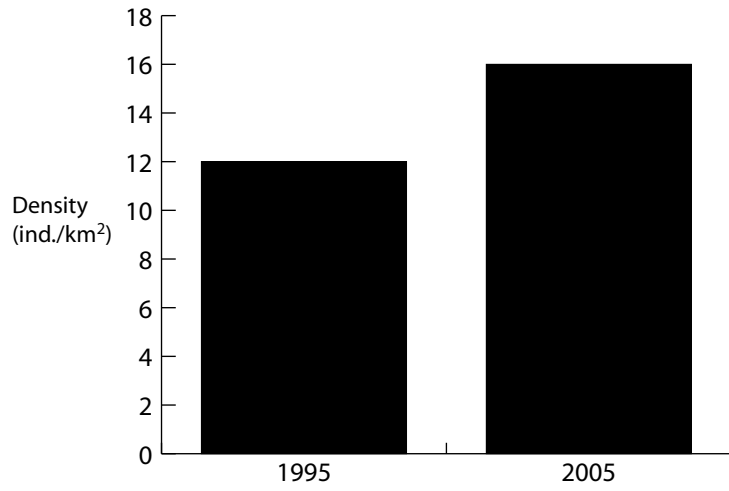
Results of animal censuses in the Samiria river basin clearly show a general increase in animal densities between the period of strict control and the period of local community involvement. White-lipped peccary, howler monkey, woolly monkey, lowland tapir, and agouti densities have shown increases between 1995 and 2005, whereas collared peccary densities have remained stable (numbers for white-lipped peccary [Figure 1] and howler monkey [Figure 2] below). The abundances of giant river otters, Amazon manatees, and black caimans have also shown increases between similar periods.

The wildlife census shows that animal populations in the Samiria river basin recovered in the period that incorporated local people in Reserve management. While this is only a correlation, we feel that the cause and effect can be justified by the changes in attitudes of local people between these two periods. In the period where management incorporated local people in management groups, local people were (and are) permitted to hunt a set number of animals if their management areas fall within the “use” zone of the Reserve. These quotas are set in the management plans by the management groups. There is no hunting permitted in the ‘core’ area of the Reserve, as this area acts as a source area for wildlife populations and is fully protected.

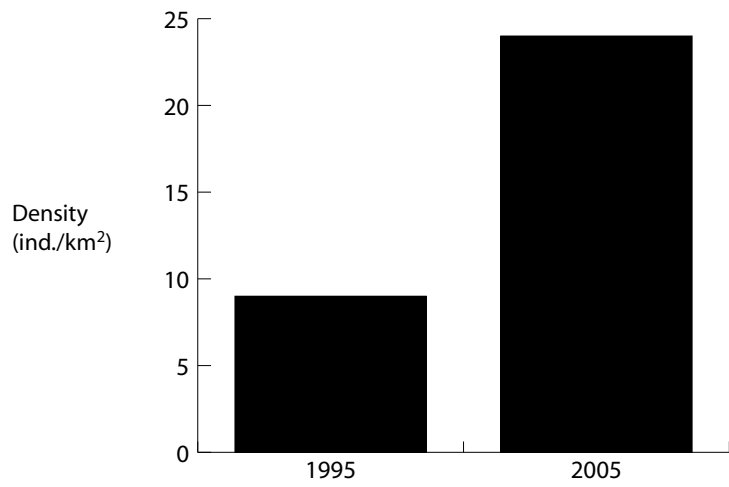
It is likely that the success of management changes is related to the Cocama-Cocamilla culture, which is known for its adaptability to changes. They adapted well during the rubber boom period between 1890 and 1912, and during other socio-economic periods of the 20th century (Newing and Bodmer 2004). This made it easier for them to socially and culturally withstand the initial relocation to the border of the Reserve and the period of strict control of access to natural resources. They have adapted rapidly to the new management system and now generally do not have negative views of the Reserve administration, despite historical conflict. This has permitted them to change their views of the reserve and move from being poachers to managers.

The Pacaya-Samiria Reserve still has conservation problems: Over the past five years, illegal extraction of mahogany timber has been prevalent. Most of the illegal loggers are not from communities around the Reserve but are contracted from other areas. Local communities have been involved with confiscating illegal timber, but their ability to stop the extraction is limited. As yet, the illegal timber operations have not had a noticeable impact on wildlife populations. We believe this is because the timbermen rely more on fish than on terrestrial wildlife for food, and many use axes to fell trees. Illegal timbermen avoid the use of shotguns and chainsaws in order to reduce the level of noise and in turn the chances of being detected by park guards or patrols by local management groups. The impact of the illegal timber operations affected broader conservation of the region of Loreto. Indeed, the regional government has used the argument that illegal timber extraction in the Pacaya-Samiria National Reserve proves that protected areas do not function, and is therefore reluctant to support new protected areas.

**Figure 1:** White-lipped peccary



**Figure 2:** Howler monkey



## 2.4 Multiethnic Dynamics, Protected Areas, and Human Displacement within the Kaa-Iya Greater Landscape, Bolivia: Indigenous Peoples, Building Alliances, and Governing and Managing Protected Areas

Oscar Castillo  
Wildlife Conservation Society Bolivia

The Kaa-Iya Greater Landscape is located in the Department of Santa Cruz, Bolivia. This extensive area of approximately 80,000 km<sup>2</sup> within the Gran Chaco ecoregion is an important complex of habitat systems that include:

- Gran Chaco Wilderness Area (60,000 km<sup>2</sup>), which includes the Arid Chaco (Boreal Chaco) and Humid Chaco sectors (transition to Pantanal). The Kaa-Iya National Park and Natural Integrated Management Area (KINP) provide protection to 34,000 km<sup>2</sup> of the core wilderness area, including the Bañados de Izozog-Río Parapetí and Salinas de San José/Palmar de las Islas Ramsar wetland sites, the TCO Isoso Indigenous Territory (19,000 km<sup>2</sup>), and the Yembiguazu Immobilized Indigenous Area (10,000 km<sup>2</sup>).
- Amazon plains and basin transitional zones (10,000 km<sup>2</sup>). North of the Gran Chaco, this region includes the plains between the Río Parapetí Bañados-Laguna Concepción hydrological corridor and the Rio Grande Basin. The intensive agricultural frontier of Santa Cruz is in this area.
- Chiquitano Forests and Eastern Andean Piedmont transitional zones (10,000 km<sup>2</sup>). The Piedmont region has no protected areas. This area is sparsely populated with indigenous and *mestizo* communities settled along the railway line, gas pipelines, and the recently paved highway connecting Santa Cruz and Argentina. Land use in the Piedmont has traditionally consisted of livestock grazing. This narrow strip of land will experience the greatest change due to highway and natural gas development.

The core of the Kaa-Iya Landscape includes 1) the Kaa-Iya National Protected Area (3.4 million ha) created on November 1995 by presidential decree, and 2) the indigenous territory Tierra Comunitaria de Origen (TCO) Isoso (1.9 million ha), or Aboriginal Common/Community Land declared in October 1996.

The National Protected Areas System of Bolivia (SNAP) was created by the Environmental Law #1333 in 1992. The law's rationale declares that protected areas are created "under state protection, with the purpose to protect and conserve the wild fauna and flora, genetic resources, natural ecosystems, hydrographic basins as well as scientific, aesthetic, historic, social and economic values;...to conserve and preserve the natural and cultural national patrimony." Between 1994 and 2002 additional laws and regulations configured conservation and property regimes that delineate access to natural resources and land. The Kaa-Iya Landscape represents an array of units that are under different conservation and property rights and use systems. Consequently, the Landscape requires multiple management structures and a broad array of actors in order to effect long-term conservation.

## Bolivia: Protected Areas and Indigenous Peoples Territories

Most protected areas in Bolivia are a combination of conservation (all IUCN categories) and management regimes that range from strict protection to the open “Natural Integrated Management Areas.” However, even the most restricted areas recognize the rights of itinerant indigenous groups, such as the Totobiegosode clan of the Ayoreode people who have chosen to remain in voluntary isolation from the national society and spend time in the Kaa-Iya National Park.

**Table 1:** Protected Areas and Conservation Units

Conservation Unit	IUCN Categories	Governance Structure
Kaa-Iya National Park (34,000 km <sup>2</sup> )	<p>This national protected area includes:</p> <p>1) Strict protected areas corresponding to IUCN Categories Ia, Ib, II</p> <p>2) National Park for ecosystem protection and recreation and cultural significance corresponding to IUCN Categories II and III</p> <p>3) Integrated Management Areas corresponding to IUCN Categories IV and VI</p>	<p>1) Capitania de Alto y Bajo Isoso (CABI)<sup>1</sup> is the administrative, financial and institutional manager of the protected area through a Co-Administration Agreement with the Ministry of Sustainable Development. CABI's role includes constructing alliances for financial sustainability of the area.</p> <p>2) Management Committee (MC). CABI leads the Kaa-Iya's MC which includes representatives of municipalities, the departmental government, indigenous organizations, and the National Park Service (SERNAP).<sup>2</sup></p>
Laguna Concepción Departmental Protected Area	A set of zones under IUCN Categories Ia, Ib, and Ic	An environment management unit of the Santa Cruz government responsible for general administration and financial management.
Ramsar Sites: Bañados de Isoso/Río Parapeti Ramsar site	Protection and use according to the RAMSAR Wetlands Convention	This site extends over parts of the Isoceño TCO Indigenous lands, the Kaa-Iya National Park, private properties, and use concessions such as the Bolivia Brazil Gas Pipeline.



**Table 2:** Indigenous Territories<sup>3</sup> (TCO)

<b>Indigenous Territories</b>	<b>Relation to Protected Areas</b>	<b>Governance Structure</b>
Isoceño TCO 1.9 million ha	Adjacent to the Kaa-lya National Park along its western border	The Great “Capitania” (Chieftain) Assembly
Ayoreode TCO: Santa Teresita and Guidaichai, Poza Verde communities	The Ayoreode indigenous territory is on average 20 km from the eastern border of the Kaa-lya National Park. The Ayoreodes use portions of the protected area for hunting and gathering.	Council of family clan leaders
Yembiguazu Immobilized <sup>4</sup> Reserve	Adjacent to the eastern border of the Kaa-lya National Park. This is a multiethnic area (Ayoreode, Guarani, Chiquitano) and also includes private land owners (ranchers) and a portion of the Bolivia-Brazil gas pipeline.	None
Ayoreode Clan Totobiegosode	This is part of an Ayoreode clan that remains in voluntary isolation from the national society. One part of this clan decided to join a colony sponsored by evangelical churches. Based on testimonies, the remaining clan has about 40 to 60 members and uses part of the southeastern zone of the Kaa-lya National Park.	Clan leaders council

**Table 3:** Private Properties, Concessions

Private Units	Relation to Protected Areas	Governance Structure
Private Properties	Private properties ranging from big ranches (5,000 to 30,000 ha) to medium ranches (2,500 to 5,000 ha) for an estimated total 50 properties covering 300,000 ha inside, overlapping, and adjacent to the Kaa-Iya National Park. They make use of the PA resources and services (hunting, grazing, water).	Ranchers' Association, organized at the municipal and departmental levels.
Bolivia – Brazil Gas pipeline	The Right-of-Way of this gas pipeline is a transect 30 meters wide and crosses 161 km of the Park	<ol style="list-style-type: none"> <li>1) Trans Bolivian Gas (Gas TransBoliviano, S.A., or GTB) manages the pipeline.</li> <li>2) The Kaa-Iya Foundation<sup>5</sup> provides a “governance structure” to address the long-term environmental and social impacts of the gas pipeline.</li> </ol>

### Principal Land Uses in the Landscape

The Kaa-Iya National Park was created with the purpose of protecting and conserving the wild fauna and flora, including endemic and endangered species such as the Chacoan peccary, Chacoan guanaco, jaguar, white-lipped peccary, blue-fronted Amazon parrot, and genetic resources generally. It was also created to protect natural ecosystems, hydrographic basins, and the environmental services that they provide, such as watersheds for the Parapeti River, Bañados de Isono floodplain, and Palmar wetland. On a social side, the park was created to protect social and economic values, to support livelihoods of indigenous and local people, and to protect the natural-cultural heritage, such as the Yandeyari sacred spiritual site for the Isoseño Guaraní.

In the Kaa-Iya National Park, biodiversity and ecosystem conservation accounts for approximately 93% of the area. Principle land uses in the protected areas are ranching (3%), while other subsistence uses (hunting, fishing, gathering) cover 3% of the land and concessions for the pipeline constitutes about 1% of the land. In the TCO Isono indigenous territory, land uses include ranching (approximately 55%), agriculture (3%), and subsistence uses (16%). The TCO Isono sets aside 29% for conservation.

### Human Populations and Relationship to Resources

The multiethnic dynamics of indigenous peoples prior to 1900 included a diversity of territorial ethnic groups that ranged from small nomadic groups to complex federations of clans (such as the Guaranís and Isoseños). In the middle range were groups such as the extinct or assimilated Chanés and the Chiquitanos.

### **Guaraníes: Ava, Isoseños and Chanés**

The Guaraní (Chiriguano) had dominion over Cordillera, Chaco, and the eastern plains, and became the most powerful indigenous people in this period. They subjugated Arawak groups (Chanés) and alternately negotiated and warred with the Colonial and Republican systems. In 1890 the messianic leader Apaguayqui Tumpa led a rebellion against the Republic which was defeated, and the Chiriguanos were reduced to religious missions, ranches, and military camps.

### **Chiquitanos**

The Chiquitanos group was an invention of the Jesuit–Franciscan (1600–1870) Mission community model of territorial productive organization and popular religion, which transformed more than 40 diverse groups into the Chiquitanos. Despite sporadic resistance to the advance of the Spanish conquest and colony, the Chiquitanos were considered allies and fought alongside Spanish forces.

### **Ayoreodes**

The Ayoreode clans chose to stay in the forests, avoiding permanent contact for 400 years.

### **Colonial Society: Caucasians and “Mestizos”**

Cities like Santa Cruz de la Sierra became political, economic, social, and administrative centers for the region, promoting a web of small cities and villages in the Chaco and Chiquitania sub-regions. Between 1900–1960, highway and railroad development dramatically changed emigration and occupation of indigenous territories.

The Guaraníes were defeated militarily and faced a new pressure: the expansion of the “hacienda system,” which fragmented and weakened their traditional systems of organization and authority. The Chiquitanos increasingly migrated to areas near railroads, abandoning their traditional lands and losing these areas to later immigrants. The Ayoreodes were reduced and incorporated into missions as “child-persons,” while some clans among them stayed in the forest in isolation. Added to this was a new phenomenon: the immigration of Andean peasants from highlands to join “*Sindicatos and Cooperativas de Colonos Campesinos*” (peasant cooperatives and syndicates) to access land.

After 1960, the combination of infrastructure and urban development, ranching expansion, and the beginning of migration from the Aymara-Quecha Andean regions caused massive displacement of the indigenous groups. The relatively successful Ioseño group managed to retain 50,000 ha of their original domain of 3 million ha. The Ayoreode were reduced to three community lands (5,000 ha). The Chiquitanos were reduced to the conditions of small individual proprietors with an average of 25 ha per family.

### **After the Creation of the Protected Area**

A fundamental departure from the history of displacement came in the process of creating the protected areas in Bolivia (16 million ha), and the recognition of lowland indigenous peoples’ territories (11 million ha). In particular was the Kaa-Iya National Park, as it is under the administration of indigenous people.

### **Indigenous Peoples**

The largest group, the Ioseño-Guaraní, have about 10,000 members. They administer Kaa-Iya NP, are employed as park guards, and pilot tourism efforts.

(They hunt, gather, and farm in neighboring Isoso TCO.) Their claim to the resources is based on historical occupation, indigenous people's identity and cultural values, and livelihood dependence on natural resources.

The next largest group, the Chiquitano, at 5,000 people, also claims rights to the land based on historical occupation and livelihood dependence on natural resources. They are employed as park guards and in tourism, and they hunt, gather, and farm in neighboring community-owned lands.

The smallest indigenous group, the Ayoreo, has approximately 100 members. They hunt and gather in areas between Paraguay and Bolivia. Settled families from this group hunt and farm in Santa Teresita TCO and on the outskirts of Kaa-Iya NP. Almost all their livelihood comes from natural resources.

Non-indigenous residents include the approximately 7,500 mestizo proprietors and Mennonites. They use the protected area for ranching, agriculture, hunting and gathering, and benefit from its environmental services, such as water. Their claims on the resources are based on economic development and laws protecting private property. Other non-indigenous groups who do not currently use much of the resources from the protected area, but are poised to use the resources, are peasant organizations. Their claims to the land are based on their historical displacement from elsewhere and human rights. Finally, residents in nearby municipalities are poised to access environmental benefits from the NP in the near future (water, timber, etc.).

## **Conservation Action**

### ***Resource Restrictions***

For the Ayoreodes, Isoleño-Guarani, and Chiquitano, the resource restriction posed by the National Park is minimal and is felt mainly in the form of restricted commercial hunting, which affects a handful of would-be commercial hunters. The majority of traditional uses are protected. The restrictions were established by CABI and indigenous community leaders and are compatible with their traditional use of wild resources. Private landholders are restricted from commercial and sport hunting, and some ranching, reducing potential income. Peasant groups are restricted from hunting, converting or living on land in the National Park, which limits their access to livelihood resources and is a significant disappointment to them. These restrictions are established and enforced by CABI, INRA, and the Departmental government. The gas pipeline owners and builders are restricted only in that they are asked to account for their environmental impacts, affecting the GTB and sub-contracted firms, who do not seem burdened by the requirements.

### ***WCS Landscapes***

WCS activities are concentrated in two main regional areas: the Madidi and Kaa-Iya landscapes. In both, WCS has maintained strategic long-term commitments.

Both landscapes represent a critical stronghold for biological diversity representative of entire ecoregions: Amazonia, Andes (eastern), Chaco-Chiquitanía and their respective transition zones. They also represent a scale of work that allows our teams to take responsibility for bringing together the multiple elements (e.g., scientific knowledge, individual and institutional capacity, long-term financial strategy) required for successful conservation interventions. WCS has achieved a strong record of building alliances and partnerships with local and national groups to create synergies and multiply the conservation impact of conservation programs. Our experience demonstrates the critical role that

site-based programs play in turning concepts into results. This positions WCS to work in partnership with local people to respond to the threats from highway and hydrocarbon development, and to conserve the region's unique biological diversity and build a local constituency based on enhanced, sustainable livelihoods.

WCS:

- Supports our partners to conduct applied research to improve land management;
- Develops a broadly shared landscape conservation vision through the integration of improved planning and management at different scales and across different jurisdictions;
- Ensures the economic and environmental sustainability of conservation and development initiatives;
- Constructs a combination of partnerships, governance structures, technical and administrative capacities, and finance mechanisms that guarantee efficiency, transparency, and accountability over the long term for all participants in the regional programs;
- Monitors changing conditions, including the impacts of WCS activities, and makes appropriate adjustments in implementation.

### ***WCS-Specific Activities in the Kaa-Iya Landscape***

WCS' principal strategic partner in the Kaa-Iya Landscape is CABI. WCS provides support to CABI in institutional strengthening, applied research, and environmental education to promote the sustainable use of natural resources (wildlife, fish, forestry resources, water resources, rangelands), land-use planning, and generating conservation alliances that will favor long-term conservation across the Kaa-Iya Landscape. An important new partnership between CABI and the gas pipeline company GTB has created the Kaa-Iya Foundation to support conservation actions in and around the Kaa-Iya National Park. WCS also supports training and capacity building, particularly through CABI and the Natural History Museum.

WCS research focuses on landscape and endangered species, including jaguars. WCS is evaluating the conservation value of private reserves and certified forestry concessions in the region through research on jaguars and white-lipped peccaries, and is developing bi-national conservation initiatives (with Paraguayan counterparts) that focus on biological and cultural corridors and on the endangered Chacoan guanaco.

Besides WCS, other organizations working in the landscape include The Nature Conservancy, World Wildlife Fund, the Noel Kempff Mercado Natural History Museum, the Chiquitano Forest Conservation Foundation, and the Desdel Chaco Foundation. They are working to expand and maintain the full range of protected areas (international, national, departmental, municipal, communal, and private) as a benefit to the population in general, as well as to strengthen the rights of indigenous peoples in order to prevent their displacement.

### **Future Developments**

WCS focuses on necessary bi- or multinational initiatives toward effective cross-border coordination on the range of issues that shape biodiversity conservation and sustainable land use. WCS has been forming alliances to address challenges at this broader dimension: 1) Madidi-Manu complex initiative integrating

environmental and social actions between Bolivia, Peru, and the areas of Brazil articulated by the biocenic transport corridor; and 2) The Chaco and Dry Chiquitano Forest, the Gran Chaco Ecoregional Assessment, led by TNC, and currently the Regional Public Goods Initiative for the conservation of the Gran Chaco, supported by the Inter American Development Bank (awarded to the consortium of TNC, WCS, Desdel Chaco Foundation-Paraguay, and Fundacion Vida Silvestre Argentina).

Bolivia is undergoing a dramatic juncture in defining the structure of its government as it transitions to a nationalist government. The changes in the constituent assembly and other processes pose political and social tension regarding ownership, management, and use rights of land. In this climate of change, governments and groups are vying to protect their “rights” over these lands and natural resources.

Non-indigenous residents such as the peasant organizations of the Aymara and Quechua peasants and “*Sin Tierra* Movement” have announced their plan to occupy “free lands” within protected areas and TCOs in the region. These settlements’ legitimacy, sustainability, and effect on indigenous populations are of concern. Other organizations which may displace local use of the National Park and TCO in the near future are land speculators and the military.

<sup>1</sup> Capitanía de Alto y Bajo Isoso, Captaincy of Upper and Lower Isoso. Indigenous organization representing the Guaraní people of Isoso, or Isoceños.

<sup>2</sup> SERNAP is Servicio Nacional de Áreas Protegidas, or National Protected Area Service.

<sup>3</sup> TCO – Tierra Comunitaria de Origen, or Aboriginal Common/Community Land. Official term used in Bolivia to refer to indigenous territorial claims.

<sup>4</sup> Immobilized refers to the fact that the government has recognized that there is a legitimate indigenous land claim for this area. Until the documentation has been reviewed, and the rights of the indigenous claimants and private landowners have been established, the area has been immobilized; that is, no land may be bought or sold in the area until the boundary definition and titling process required by law have been completed.

<sup>5</sup> The Kaa-Iya Foundation has GTB and CABI (an indigenous organization) representatives as the two founding members and directors, with the mission to ensure the long-term conservation and sustainable use of the Kaa-Iya Greater Landscape.

# PART 3

## ASIA

### 3.1 The WCS Cambodia Program in the Seima Biodiversity Conservation Area (SBCA)

Tom Evans  
Wildlife Conservation Society Cambodia

The WCS Cambodia Program works at six main sites. This account focuses on one, the Seima Biodiversity Conservation Area (SBCA), which covers 305,000 ha in Mondulkiri and Kratie Provinces, bordering Vietnam. The SBCA lies in the southern foothills of the Annamite mountain range. The southeastern part is hilly terrain at 100-700 m, grading into plains and low hills to the north and west. There is a complex mosaic of evergreen, semi-evergreen, mixed deciduous, and deciduous dipterocarp forest types. Most of the forest is in intact condition although there has been selective logging in some areas. Other habitat features include extensive bamboo stands, upland grasslands, numerous seasonal pools, and concentrations of mineral licks important for wildlife (Walston et al. 2001).

SBCA is classified as production forest since it lies within a logging concession. Following the withdrawal of the concessionaire, the site was established as a Biodiversity Conservation Area (the only one of its kind in the country) by Ministerial Declaration. SBCA is probably closest to IUCN Category VI (managed resource protected area). There is a proposal to declare the site a Conservation Landscape which would involve cancelling the concession, reclassifying approximately 2/3 of the area to Protection Forest and introducing management that emphasizes conservation and local livelihoods. If the proposed Conservation Landscape were established, large sections of the area would remain IUCN Category VI (managed resource protected area) while sizeable core areas would be established analogous to IUCN Category II sites (national park). To date 46 vertebrates of conservation concern (IUCN threatened, near-threatened, and data deficient) have been recorded in the SBCA. The large mammals are exceptional for Indochina, including substantial populations of rare ungulates (Asian elephant *Elephas maximus*, gaur *Bos gaurus*, banteng *Bos javanicus*, Eld's deer *Cervus eldi*), large carnivores (including tiger *Panthera tigris*, leopard *P. pardus*, clouded leopard *Pardofelis nebulosa*, dhole *Cuon alpinus*, and two bear species), and primates (eight species, including probably the most important populations in the world of two threatened species, black-shanked douc langur *Pygathrix [nemaeus] nigripes* and yellow-cheeked crested gibbon *Nomascus gabriellae*). The tiger population is currently low but is believed to have a high potential for recovery under long-term management. Three critically endangered bird species occur in small numbers (giant ibis *Thaumatibis gigantea*, white-shouldered ibis *Pseudibis davisoni*, and white-rumped vulture *Gyps bengalensis*). SBCA is one of the most important protected populations globally of both green peafowl *Pavo muticus* and orange-necked partridge *Arborophila davidi*. The most significant and threatened botanical communities at the site are the evergreen and semi-evergreen Annamite lowland

forests, which have high species diversity and are expected to contain high levels of endemism.

The SBCA was established in 2002. WCS works at the site in a long term partnership with the management authority, the Forestry Administration (FA). Approximately 2/3 of the proposed Conservation Landscape will be protection forest with conservation as a primary goal. The remaining 1/3 would remain as production forest for use in sustainable timber harvesting, tree plantations, etc. Both of these broadly defined zones contain enclaves of settlement and cultivation and large areas that support livelihoods based on the collection of non-timber forest products (NTFP). The NTFP areas have been recognized and will likely be incorporated into the new zoning appropriately.

### **Human Populations and Resource Use**

Prior to 1900, there is sparse data, but it is thought that the upland ethnic minorities occupied northeast Cambodia for at least 2,000 years (White 1996) and that these groups lived at low densities and practiced a traditional lifestyle of shifting cultivation and harvesting forest products.

During the French colonial era in the early 1900s and in the early post-independence period (1954 onwards) Mondulhiri remained sparsely populated and experienced little development, with few large plantations and only one trunk road (Meyer 1979). Livelihoods remained based on shifting cultivation and forest products. There was some armed resistance to French control in the region and the local ethnic group, the Phnong, developed a warrior-like reputation (White 1996) with ambushes, after which the French lost control over parts of what is now the SBCA during the period 1914-1933 (M. Guerin, pers. comm., 2002). The French and later the independent Sangkum Reastr Niyum regime operated a gradual policy of assimilation (“Khmerisation”) with the Phnong and other groups (Meyer 1979; White 1996; Melville 2000). This included sending over 250 Khmer families to settle in Mondulhiri (White 1996).

Human population in the region seems to have always been small with several shifts in the main centers of population. French military censuses during 1937-1942 found about 1 person/km<sup>2</sup> in the Poste Gatille area, the core of the current SBCA (M. Guerin pers. comm. 2002). Around the time of independence and following, government policy prescribed moving forest-interior villages to nearby main roads to improve government control and ease the provision of services. Through the late 1960s, the area became increasingly affected by the conflict in Vietnam, experiencing bombing and land incursions. Khmer Rouge revolutionaries took over the province in the early 1970s and shortly after came to power nationwide. The future SBCA area was almost totally depopulated as most inhabitants were translocated to another district to attempt collectivized farming. In 1979 the Khmer Rouge were ousted and people were allowed to return home. Many former Phnong village sites were reoccupied, often by the original residents or their children, but in some cases returnees chose new sites. Due to security problems the return was slow and many home sites were only reoccupied in the mid-1990s (Evans et al. 2003).

In 1995 Samling International, a Malaysian logging company, was issued a large timber concession extending from the future SBCA to the Mekong River. Between 1997-1999, Samling built a new road and logged most of the evergreen forest areas along it. They targeted *Dipterocarpus alatus*, a species whose liquid resin provides income to most local communities: In many villages 20-30% of tapped trees were lost (Evans et al. 2003). Due to widespread village protests and donor pressure, all logging concessions nationwide (including Samling’s



Mondulkiri operation) were suspended in 2000-2001. At the time of writing the suspension continues but the concession has yet to be officially cancelled.

### **After the Creation of the Protected Area**

The (re-)establishment of Phnong villages has slowed but migration into the area continues. Between 2001-2006 there was heavy in-migration of ethnic Khmer and Cham people from other provinces to the O Am area. Most settled along the road that forms the SBCA boundary or just inside Snuol Wildlife Sanctuary. Over 1,000 families arrived, causing over 25 km<sup>2</sup> of deforestation in building and clearing (Evans and Delattre 2005). Inside the SBCA, migration and consequent settlements have slowed due to improved law enforcement but it continues in the Snuol Wildlife Sanctuary.

There are two distinct groups: indigenous ethnic groups and recent Khmer and Cham migrants. The principal indigenous people are the Phong with small numbers of Stieng. Due to recent upheavals, many individuals in this group have only come to live in the area in the past decade, but as a group they are generally accepted as having a long-standing claim to live in the area. Most Khmer and Cham villages, as well as a few Phnong villages near roads or markets, concentrate on family-scale cash crop production (cashew, cassava, and soy), supplemented by wage labor, rainfed lowland rice production, and some NTFP collection. Most other Phnong communities rely on subsistence rice cultivation plus intensive resin-tapping and a little income from other NTFPs, livestock, or daily wage labor. These villages are adopting cash crops, which may reduce the importance of forest products over time.

As yet the indigenous groups remain poorly organized and have not been effective in defining or negotiating their claim to land and resources. The 2001 Land Law recognizes the right of an indigenous community to gain collective title to its house plots, gardens, agricultural fields, fallows, and probably small burial forests or spirit forests. Subsistence usufruct rights exist for the extensive forests and upland grasslands between villages under Article 40 of the 2002 Forestry Law, but, interestingly, the lands and trees are owned by the state. This situation is more progressive than in some neighbouring countries (e.g., Thailand) but more restrictive than in various Latin American countries where extensive forests are recognised as part of indigenous territories. No village in Cambodia has yet been issued collective titles to forest land as the legal instruments are still being piloted.

Recent Khmer and Cham immigrants have weaker legal standing on paper but have strong *de facto* claims to the land they now occupy. The recent immigrants harvest forest products, and their subsistence usufruct right is protected under the Forestry Law, as for indigenous groups. Many of them are on land within the Permanent Forest Estate which has already been illegally logged. These large new settlements are implicitly recognized by the local authorities via registration of their residents. The political and logistical challenges to reclaiming land that was illegally cleared are too great and the settlers will remain, but will probably be unable to obtain official land titles.

### **Benefits**

The protected area currently provides major benefits by protecting existing land- and forest-based livelihoods. This is true for both indigenous and recent immigrant groups, but more so for indigenous groups as they have a greater dependence on forest resources. Forest-based activities (resin, NTFPs, fishing, and hunting) are a major source of livelihoods in many villages. Resin alone accounts for over 40% of livelihood turnover in some villages (McAndrew

2003) and is the only significant source of cash in many (Evans et al. 2003). These benefits are maintained by the protected area since it is able to exclude large-scale immigration of other forest users, large-scale logging operations, large-scale forest conversion for plantations and mining. In addition, this prevention of forest destruction likely leads to an improved resource base for fisheries and some NTFPs. Cambodia is in a period of intense competition for natural resources and many comparable communities elsewhere are experiencing severe declines in availability of such resources (see e.g., NGO Forum 2006). Pressure to develop forested areas is real, and many proposals for development projects have been refused because of the SBCA's protected status.

Land alienation – the illegal sale of communally-held farmland – causes serious welfare problems in similar communities in other provinces and poses a threat to indigenous communities in the SBCA as well (CBNRM-LI 2005). The protected area greatly reduces this threat because of legal enforcement and improved land tenure. As one benefit, communities that have clear land tenure are also much more likely to capture other non-land-based income, such as tourism.

Finally, there is potential for increased future benefits for selected villages near a protected area in the form of sustainable logging, tourism, direct payments for conservation, conservation-linked employment, or agricultural assistance. The scale of these benefits is not yet well known but has the potential to be long-term.

### **Conservation Action and Types of Displacement**

Natural resource use at the site is governed by the Forestry Law and Land Law. Officials of the FA conduct regular patrols in association with Military Police and Border Police. Significant problems are addressed off-site through liaison with elected Commune Councillors and senior officials of the armed forces. Since the establishment of the SBCA, there has been little reduction of pre-existing uses by local communities except for some forms of hunting and logging. Restrictions on expanded forest use in the future will likely pose a significant challenge given the increasing local population.

### **Settlements**

No existing settlements have been displaced by the protected area. Several attempts by incomers to establish new settlements have been blocked since 2002.

### **Farmland**

Since the SBCA was established, no established farmland has been reclaimed by the state, except for some small areas of recent illegal clearing. In immigrant-dominated areas, Forestry Law aims for zero new clearance of forest. This causes some complaints since the law is inconsistently enforced across the country and migrants from elsewhere arrive believing that they have the right to clear land wherever they settle. In indigenous villages shifting cultivation is permitted. However, fresh shifting cultivation in intact forest is not allowed, a rule that is difficult to enforce consistently and so leads to complaints of unfairness. Village land-use planning agreements are being developed with zones for expansion of swidden, which helps alleviate the concern that future development has been excessively restricted by the protected area.

### **Forest Products**

Restrictions are most significant on hunting and some specific NTFPs, the collection of which is either forbidden or requires a permit. The Forestry Law

assumes that any NTFP can be collected, consumed or sold in small quantities<sup>1</sup> unless specifically forbidden. Rules apply equally inside and outside protected areas, but are very rarely enforced anywhere. Where enforced they remove sources of income (e.g., logging, wildlife trade), but because these activities are illegal, the impact is hard to quantify. In general these illegal activities have not been core activities for significant numbers of people in the SBCA but may have provided important supplementary income to some.

In SBCA trade in wildlife was common before protection began, with many people hunting occasionally and perhaps 0-2 people per village (Evans et al. 2003) relying on large-bodied species as their major income source. In 2002/2003, before hunting controls were fully in place, McAndrew et al. (2003) found that reported income from hunting accounted for about 6% of total income in one commune.<sup>2</sup> Current regulations in the protected area allow hunting for family consumption, which means that lost income is probably less than 6%. However, given the fact that wildlife populations were collapsing prior to the establishment of the protected area (Walston et al. 2001) income from hunting was likely to have been short-lived. Furthermore, much of the income from the wildlife trade reportedly went to powerful outsiders (soldiers, etc.).

Widespread logging prior to the protection of the area was dominated by outsiders, with local indigenous groups working as guides and laborers. However, in one ethnically Khmer sector where protection efforts are very low, recent surveys suggest that more than 10% of the families own chainsaws and so probably still derive substantial income from illegal logging (Tropical Forest Trust unpublished data). Logging for family house construction is still allowed under permit.

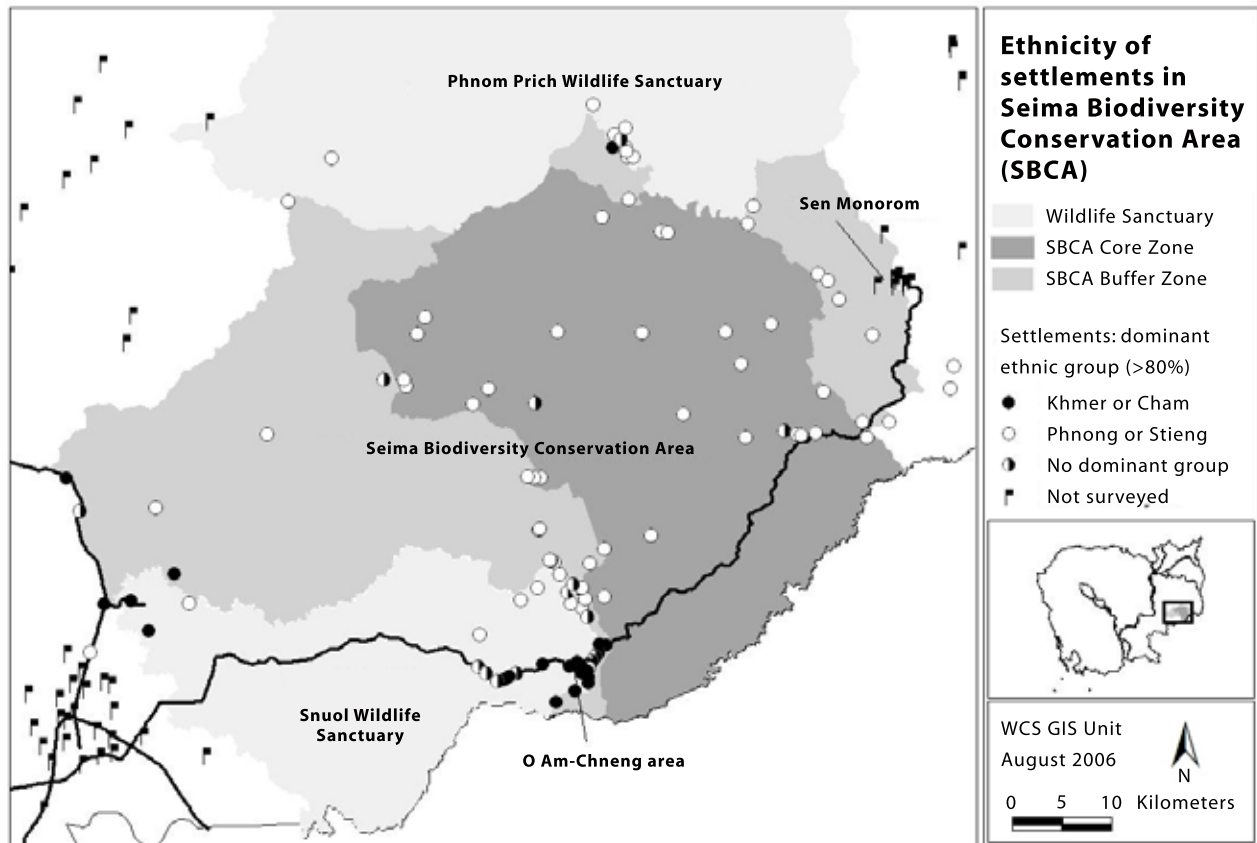
For species/products that are not banned and do not need permits, there is still a discretionary right for forestry officials to reduce or stop any harvest activities that are considered unsustainable or damaging. This has been applied several times, notably for bamboo (harvests perceived to have damaging side-effects), sleng fruits (*Strychnos nuxvomica*, which are felled to collect the fruit), and charcoal production. Each of these restrictions has probably reduced the supplementary incomes of rural families, probably numbered in the tens or possibly low hundreds.

There is currently no major criticism of SBCA protection policies from local communities or from external stakeholders. There are continuing minor concerns, including a claim that bamboo harvest restrictions in one sector are too severe and that rights to clear swidden fields are arbitrarily restricted. These are not significant critiques for the larger landscape but are important to the families/villages involved and need to be resolved equitably. There is also the question of how well existing communities will be able to satisfy their development aspirations in the long term with a finite land supply.

The biggest current pressure to change SBCA rules comes from outside, since many companies wish to see the area opened up for exploitation. There is also some pressure to open the forest for settlers from more crowded parts of Cambodia. Both these changes are broadly opposed by local indigenous communities. This raises the question of how existing residents' rights (and the society-wide values that the protected area provides) are weighed against external and more lucrative demands.

WWF works in two neighbouring protected areas with both the FA and MoE. Their approach with both partners is similar to that followed by WCS/FA, and is not leading to significant displacement.

**Figure 1:** Seima Biodiversity Conservation Area showing dominant ethnicities



<sup>1</sup> At “traditional family scale,” often defined in practice as transport on a motorbike or smaller vehicle.

<sup>2</sup> After inputting cash values for all subsistence activities.

### 3.2 Free to Move: Conservation and Voluntary Resettlements in the Western Ghats of Karnataka, India

K. Ullas Karanth<sup>+</sup> and Krithi K. Karanth<sup>\*</sup>

<sup>+</sup>Wildlife Conservation Society India, <sup>\*</sup>Duke University, Doctoral Program

Beginning with the movement of primitive *Homo sapiens* out of Africa 50,000-100,000 years ago, people have moved across the earth, driven either by the hope of a better life elsewhere or by the risk of staying at a place. As economic developments unfold in the future, human “displacements” of these two kinds will increase at all scales: local, regional, and global. Therefore, conservation strategies must function with an understanding of human movement. This paper examines this conservation dilemma in southern Asia where “intact natural landscapes” comprise less than 5% of total land area, leading some conservationists (Sanderson et al. 2002) to abandon this region. This densely populated, poverty-ridden region has 25% of the earth’s six billion humans packed into less than 10% of its land, and is experiencing rapid technological and economic growth. Given the region’s overall demographic and economic growth rates, humans will move or be displaced at scales witnessed in other developing countries. It is likely that displacement to protect biodiversity will be a minuscule proportion of all human displacements in the region.

Key drivers of massive biodiversity decline in South Asia include habitat fragmentation (Barve et al. 2005; Das et al. 2006; Kumar and Shahabuddin 2006; Yadav and Gupta 2006), hunting (Madhusudan and Karanth 2000, 2002), and human-wildlife conflicts (Saberwal et al. 1994; Mishra 1997; Karanth 2002; Madhusudan and Mishra 2003; Madhusudan 2004). Current conservation initiatives are not adequately addressing these threats. On the other hand, changing land-use practice (e.g. crops that do not attract wildlife, electric barriers), economic development (e.g., availability of affordable poultry protein, new job opportunities), and cultural changes (e.g., watching television instead of recreational hunting) provide some hope for reducing pressures on nature reserves. Nevertheless, impacts of human settlements inside conservation areas pose difficult problems and will likely not be ameliorated by these new trends. Conservationists in South Asia do not often have recourse to “human-wildlife coexistence” and “sustainable forest use” that help reduce pressure in some conservation contexts in Africa, Latin America, or Southeast Asia (McNeely 1994). Rather, conservationists are being compelled to consider the relocation of human settlements to arrest fragmentation.

It is therefore necessary to examine voluntary resettlement as a conservation option for saving endangered species in the Western Ghats region of Karnataka State in India. This includes long-term qualitative case studies from three nature reserves that represent a range of ecological and social variations. The analysis provides scope for addressing gaps in past resettlement efforts. In fact, incentive-driven resettlement projects offer a valid alternative to coercive displacement. Given the present social-ecological context of the region, incentive driven resettlement is the only remaining option to conserve several endangered species, mitigate human-wildlife conflicts, and at the same time improve human livelihoods.

## **Ecological Context**

The Western Ghats of southern India (Figure 1; 8° N to 20° N; 160,000-km<sup>2</sup>) are a global biodiversity hotspot with high levels of biological productivity, species diversity, and endemism (Myers et al. 2000). The Ghat forests occur as a fragmented strip within a larger landscape matrix consisting of crops and tree plantations. The natural vegetation includes evergreen, moist-deciduous and dry deciduous forests, and montane grasslands (Pascal 1988). Fauna in this region represent 30% of all Indian mammal and bird species (Das et al. 2006). There are several larger vertebrate species of global conservation significance due to their rarity, endemism, habitat-specificity, susceptibility to commercial exploitation, or proneness to come into conflict with human societies (Table 1). Although traditional sacred groves in the region have been promoted as a solution to achieving balance between people and nature (Gadgil and Guha 1992; Bhagwat et al. 2005), they occupy less than 1% of the overall landscape, and typically are small, occur in tiny fragments, and their contribution to sustaining biological diversity is relatively small.

Nature reserves in the Ghats cover only 12% of total area and average reserve size is 243 km<sup>2</sup> (Das et al. 2006). Increasing densities of people and livestock, local to global market pressures, and expansion of human activities have placed these reserves in an extremely vulnerable position. Some reserves are additionally under threat from large-scale development activities (mines, dams, roads). The 14 legally protected areas cover a total of only 6,400 km<sup>2</sup>. People living in these areas have also suffered significant livelihood losses. Given this context, preventing (rather than mitigating) human-wildlife conflict, and reducing negative human impacts on wildlife merits serious consideration (Treves and Karanth 2003; Karanth and Gopal 2005; Karanth 2006).

The study sites for this analysis include Nagarahole, Bhadra, and Kudremukh – all three reserves have ongoing resettlement projects to protect wildlife. Importantly, these resettlement projects were initiated at least partially by demand from local people. Details on the location, size, ecology, and conservation history of these sites is in Table 2. These case studies clearly demonstrate the challenges as well as opportunities for understanding human displacement and conservation.

## **Historical and Social Context**

This region has a history of human occupation by aboriginal groups going back 50,000 years (Wells 2002), followed by successive waves of colonization by different cultures (Thapar 2003). The seasonal (3-4 months/year) heavy rainfall (1500-6000 mm/year), benign temperature (15°C-35°C), and fertile soils promoted settled rice agriculture as the predominant land use. From historical records, we know that the movement of people, involving periodic depopulation or re-colonization of large tracts of forest, was common (Ribbentrop 1900; Thapar 1990).

British administrators established full political control over the region in the early 1860s and created “reserved forests” to ensure sustained timber supplies, halting the massive conversion of forests to agricultural land (Brandis 1897; Stebbing 1921). These forests became the network of nature reserves a century later. As human populations increased, slow encroachments by homesteads into the reserved forests were legally sanctioned (Stebbing 1921).

The Ghats were sparsely populated and agriculture was restricted to lowland areas until the late 19<sup>th</sup> century when commercial coffee plantations replaced some of the upland forests. In the post-colonial period (1947-1970), the national policy to “grow more food” encouraged colonization of forests by external settlers responding to land grant incentives. The forestry department intensified exploitation of timber and the emergence of the paper and plywood industry in the 1950s created a demand for bamboo and softwoods. Forestry policies increased logging in interior areas and encouraged migrant laborers to move in and cultivate in these areas. Subsequently, the human settlements in interior forests increased dramatically. Hunting of wildlife also increased in scale, intensity, and impact due to availability of firearms and improved road and motorized access (BNHS 1934; Karanth 2002). Weak wildlife protection laws failed to arrest the sharp decline of tigers, dholes, and elephants.

In the 1960s wildlife conservationists (Gee 1964; Schaller 1967) highlighted the perilous status of wild nature in India and in 1974, the Indian government enacted the Wildlife Protection Act that prohibited hunting and “commercial” exploitation of nature reserves. In 1980, the government’s Forest Conservation Act prevented the diversion of reserved forest land for agriculture or developmental projects. These laws slowed the legalization of forest settlements (Karanth 1998; Karanth 2002).

## **Conservation Issues**

### ***Habitat fragmentation at landscape scales***

Nagarahole, Bhadra, and Kudremukh were all established and managed under the above-mentioned legal framework. Despite nominally strong legal protection, homesteaders gradually encroached onto land in these three reserves a few meters at a time (Karanth 1982, 1992, 1998, 1999, 2002; Karanth 2003, 2006). All three reserves are under pressures from commercial development, particularly iron-ore mining at Kudremukh and Bhadra (Krishnaswamy et al. 2006), highways and road development in Nagarahole and Kudremukh (road construction is now a heavily funded activity of national priority), and windmills in Bhadra. Additional proposals to construct irrigation reservoirs, river diversions, and power plants threaten the integrity of these reserves.

### ***Impacts of fire and biomass extraction on habitat quality***

Several recent studies have examined the negative impacts of human activities on wild animal and plant communities inside reserves. These activities include biomass extraction, livestock grazing, deliberate arson, and removal of wood (Barve et al. 2005; Madhusudan 2005; Karanth et al. 2006). In Bhadra, Karanth et al. (2006) estimated that these combined human activities had directly affected 8 to 10% of this sanctuary by altering 23.7 km<sup>2</sup> of the forest near the villages.

Livestock grazing is widespread in these reserves and increased livestock densities have reduced forage availability, degraded forest vegetation, changed plant composition, and led to declines in wild herbivores due to competition in Bhadra and Bandipur (Mishra et al. 2001; Madhusudan and Mishra 2003; Madhusudan 2005).

Forest products and fuel wood are collected in all reserves (Madhusudan and Karanth 2002; Karanth et al. 2006). In Bhadra, all households collected fuel wood from the forest and quantities ranged from 2,190 to 22,140 kgs/ per week (Karanth 2003). This local scale collection of plant parts has directly affected food availability for wildlife as well as regeneration and recruitment of plant species (Hiremath 2004; Shahabuddin and Prasad 2004).

### **Impacts of illegal hunting at local scales**

Large mammals that provide meat and valuable commercial products (ivory, skins, horns, antlers) are vulnerable to illegal hunting as are some smaller mammals, reptiles, and birds. An assessment of hunting in Kudremukh and Nagarahole found that densities of several large mammal species were substantially depressed in parts of the reserve with high human presence (Madhusudan and Karanth 2000; Madhusudan and Karanth 2002). Local hunting threatens long-term viability of species and sometimes causes local extirpations.

### **Human-wildlife conflict**

People living in these reserves face intense human-wildlife conflicts that result in loss of livestock and crop destruction (Karanth 2002; Karanth 2003; Madhusudan 2003, 2004, 2005; Madhusudan and Mishra 2003). In Bhadra, 73% of households living in the park prior to resettlement regularly lost 15% of their annual harvest to crop-raiding elephants and ungulates (Karanth 2003). The Bhadra households also lost 11 to 25% of their livestock to carnivores (Karanth 2003; Madhusudan and Mishra 2003). Retaliatory killing of elephants and big cats is a serious conservation problem.

### **Case Studies of Resettlement**

During the 1950s-1960s the Karnataka Government's unwritten policy was to generally ignore homesteaders who illegally encroached on forest lands and the Forest Department (the state Ministry of Forests) had legal power to "regularize" such encroachments. This political and administrative process usually took a decade but was liberally employed for electoral gains. Cultivators from farming castes and migrant laborers with political backing became landowners from such regularizations.

Tribal groups such as *Jenu Kuruba* (whose ancestors may have been hunter-gatherers) tended to move around rather than settle down to cultivate land. They did not have strong cultural notions of owning land. Tribal people were poorer, had little education, ranked low in social power, and were unable to become landowners unlike the farming castes and migrant labor. Nevertheless, tribal inhabitants were granted large areas of government-owned "revenue" land outside the reserved forests in parcels of four acres per homestead. These people were ill-equipped to establish themselves agriculturally, and much of the land given to them was taken over by higher caste groups through money or coercion and thereafter the tribal people became "forest encroachers."<sup>1</sup>

The enactment of strong wildlife protection laws in the 1970s ended the "regularization" of forest encroachments. Officials in charge of nature reserves became accountable for recovering "encroached areas." This led to many cases of forced evictions or coercive displacements. Encroachers challenged evictions through support of local politicians and through interventions of local courts. However, the Forest Conservation Act of 1980 made it legally impossible for forest encroachers to get titles. Below are accounts of key issues relating to resettlement and displacements at the three sites.

### **Nagarahole**

During the 1950s-1960s external peasants as well as tribal people cultivated rice in low-lying areas in 10% of Nagarahole. In the 1970s, most non-tribal cultivators were evicted from the reserve and given land outside it (Lakshmana 2001). With increasing restrictions on hunting, protecting agriculture became impossible inside Nagarahole. Consequently, tribal people gave up agriculture



and moved into larger settlements within the forests. Their chief sources of livelihood came from intensified logging and plantation work within forests, growing employment in coffee plantations outside, and illegal hunting and collection of forest products. In the 1980s logging was reduced and employment opportunities inside forests shrank.

The first impetus for voluntary resettlement came in 1991 when a group of tribal people met the chief minister of Karnataka State and demanded services like agricultural land, roads, hospitals, and schools inside the park. In a series of meetings that followed, a consensus was reached and they agree to relocate and resettle in areas outside the reserve and be compensated (Table 3). However, a substantial section of the tribal people initially resisted the resettlement incentive and insisted on being provided all amenities inside Nagarahole. Due to the presence of advocacy groups supporting both factions, the resettlement work progressed slowly and only about 50 families moved out in 1997.

Almost concurrently, the GEF-World Bank funded an Integrated Conservation and Development Project in Nagarahole. It progressed slowly, bringing little development, because the Bank-GEF group was reluctant to fund a reserve that was implementing voluntary resettlement. In 2003, this project was terminated due to corruption and inefficiencies.

Gradually, the perception of resettlement among local people changed. By 2006, more than 250 families had moved out into the resettlement colony at Nagapura. There appears to be an increasing preference among the 1,300 families still living inside the reserve for an acceptable compensatory package. Intensive grassroots level work by NGOs (Living Inspiration for Tribals [LIFT] and Wildlife First) committed to both tribal development and wildlife conservation appears to have successfully supported this attitude change. However, a recent unilateral decision by the Federal government's Project Tiger to reduce the land allotments from five to three acres per family may hinder resettlement progress.

### **Bhadra**

In the early 1900s, the Bhadra sanctuary had "a village with 88 people and 186 cattle occupying an area of 4.19 km<sup>2</sup>" (Anonymous, unpublished report 1917). Development halted when the Bhadra reservoir was built in the 1950s and 1960s. This reservoir isolated the settlements in the sanctuary, limiting infrastructure development. Although Bhadra was legally a nature reserve, human population continued to grow.

Official attempts to impose conservation regulations on the villagers against illegal hunting, grazing, and timber removal caused great resentment. Villagers systematically and deliberately used arson as a weapon in their conflict with forest authorities. In the 1970s, some villagers in the most inaccessible locations began pleading with political leaders and officials for resettlement. In 1987, a preliminary survey of households eligible for resettlement was conducted. In 1992, the state Forest Department drafted the plan for land acquisition and resettlement and in 1996 requested funds from the Central government. In 1998, the project began with the involvement of forest and revenue departments, village representatives, and NGOs (Bhadra Wildlife Conservation Trust, Wildlife First). Initially some villagers opposed the resettlement and initiated a court case that was later dismissed. The compensation package and perceived benefits of relocation (better facilities, health care, schools) convinced others to resettle. Some of the land set aside for resettlement was encroached by others so additional land was acquired in a second village. During 1999-2002, all 419

families from 11 villages moved to the two resettlement villages at M.C. Halli and Kelaguru. People have cultivated crops and have ample access to electricity, water, schools, markets, health care, and education (all of which were absent when they lived in the sanctuary). Households in M.C. Halli have cultivated crops and established themselves. Households in Kelaguru (who received land suitable for growing coffee) are taking longer to settle (Karanth 2006). The Bhadra project is clearly one of India's better planned and executed resettlement efforts.

### **Kudremukh**

In 1987, based on the discovery of a large population of the endemic lion-tailed macaque (Karanth 1985) the process of establishing Kudremukh nature reserve was initiated. Due to initial procedural lapses and insensitivity on the part of forest officials, the notification process increased anxiety among the 40 legal settlements in the area. Subsequently, there were sharp divisions among them on the issue of resettlement; a substantial number were willing to relocate in exchange for an adequate resettlement package, while others, influenced by social advocacy groups, demanded total de-gazetting of the nature reserve. The emergence of a small-armed Maoist guerrilla group in the region after 2000 has created additional complications. The government has announced a resettlement package (without any committed funding) and has promised to relax conservation laws to permit more "development" in the settlements.

Given this uncertain political context, conservation groups (Wildlife First, Kudremukh Wildlife Foundation) have tested privately-funded voluntary resettlement efforts, since a government sponsored full-scale resettlement effort would involve entire villages and take years to materialize. Therefore, the NGOs have focused on identifying smaller settlements located deep in the reserve whose relocation would successfully consolidate large blocks of wildlife habitat. Negotiations began with eight families, all of whom were illegal encroachers in the nature reserve. After identifying suitable alternate agricultural land at locations of their choice, these families were financially compensated and moved out in 2003. Such low-key efforts have subsequently progressed with more families who volunteered to resettle in 2006.

### **Lessons Learned**

The first author has visited these three sites since the 1970s and conducted ecological research there since the 1980s. He is a scientific advisor to Wildlife First, a conservation NGO that has promoted the voluntary resettlement efforts in all three reserves. The second author examined the impacts of villages on biodiversity in Bhadra and is tracking the resettlement effort and its impact on relocated people (2002-2006). Based on our collective experience, we present the following insights which we believe capture key "lessons learned" from these real world experiments in displacement for achieving conservation. Our analysis is empirical and qualitative but may still have some value given the scarcity of rigorous studies in this arena.

1. Given the rapid rate of economic growth in the Western Ghats region, conservation-related resettlements are a very small fraction of overall human movement and displacement driven by development. We estimate that all potential conservation related relocations would comprise less than 1% of all relocations going on now in the region.

2. The process for identifying areas for relocation must be a careful scientific exercise that leverages maximum conservation effect to reduce fragmentation. Conservation managers often use existing administrative boundaries or other convenient markers for selecting resettlement targets, resulting in relocations that may not derive maximum conservation impacts.

3. Many people living in remote forest areas of the Western Ghats are attracted by the modern amenities, better opportunities and incomes, and easier lives that people enjoy in more developed areas. Modern communication tools, such as radio, television, and the near 100% literacy rate in the region intensify this attraction. The proliferation of cheap poultry meat and other protein sources has rendered subsistence hunting irrelevant to human welfare and illegal hunting is becoming too risky to be attractive.

4. These combined factors provide conservationists with new opportunities to arrest habitat fragmentation in reserves through pro-active, fairly compensated and voluntary resettlements. However, the potential for such solutions are not clearly perceived by many. Still rooted in the experience of coercive displacements, social advocacy groups and reserve managers fail to perceive significant emerging opportunities to promote human welfare based on genuine aspirations of local people to change their circumstances. Such ideologically based opposition to relocation may contradict what a substantial proportion of these people want and may in fact be a curtailment of their freedom to move.

5. The resettlement process should be incentive-driven, generous, fair, and, importantly, it must be understood as being fair by all potential stakeholders. In the case studies, frequent funds shortage and administrative inefficiencies caused delays in implementation, particularly in Nagarahole. Creating appropriate institutional structures is the key to promoting successful and acceptable resettlement: The implementation of resettlement projects is best achieved by specialized agencies set up for that purpose with full involvement of conservation and social NGOs and family and village representatives.

6. Opposing the argument that satisfactory resettlement is prohibitively expensive (TTF 2005), we argue that if future costs of delivering social services to remote areas are considered (Karanth 1998), the cost of resettlement is reasonable (Karanth 2006, unpublished). Such investment would require specific re-allocation of funds from developmental budgets (rural developments, roads, power transmission) to a resettlement agency. However, government bureaucracies holding such funds are unlikely to yield them. Therefore, it may be necessary to establish a specialized new funding agency exclusively for this purpose. Possibly multilateral aid organizations currently sinking substantial funds into unviable conservation projects could instead fund voluntary resettlement projects (with grant conditions that ensure truly voluntary, fair, incentive-driven resettlement).

7. A key feature of the resettlement efforts at Nagarahole and Bhadra was that democratically elected representatives from the area were engaged in the process. After initial lack of enthusiasm, a majority of them began to support the resettlement projects since these projects were generally perceived as having improved the lives of the beneficiaries. At the same time, NGOs that had opposed the resettlement efforts (in Nagarahole) gradually lost their hold among the people. These advocacy groups initially gained some international publicity. Interestingly, after the World Bank-GEF disengaged from the Integrated Conservation and Development Project in Nagarahole, the attention of these remote players subsided.

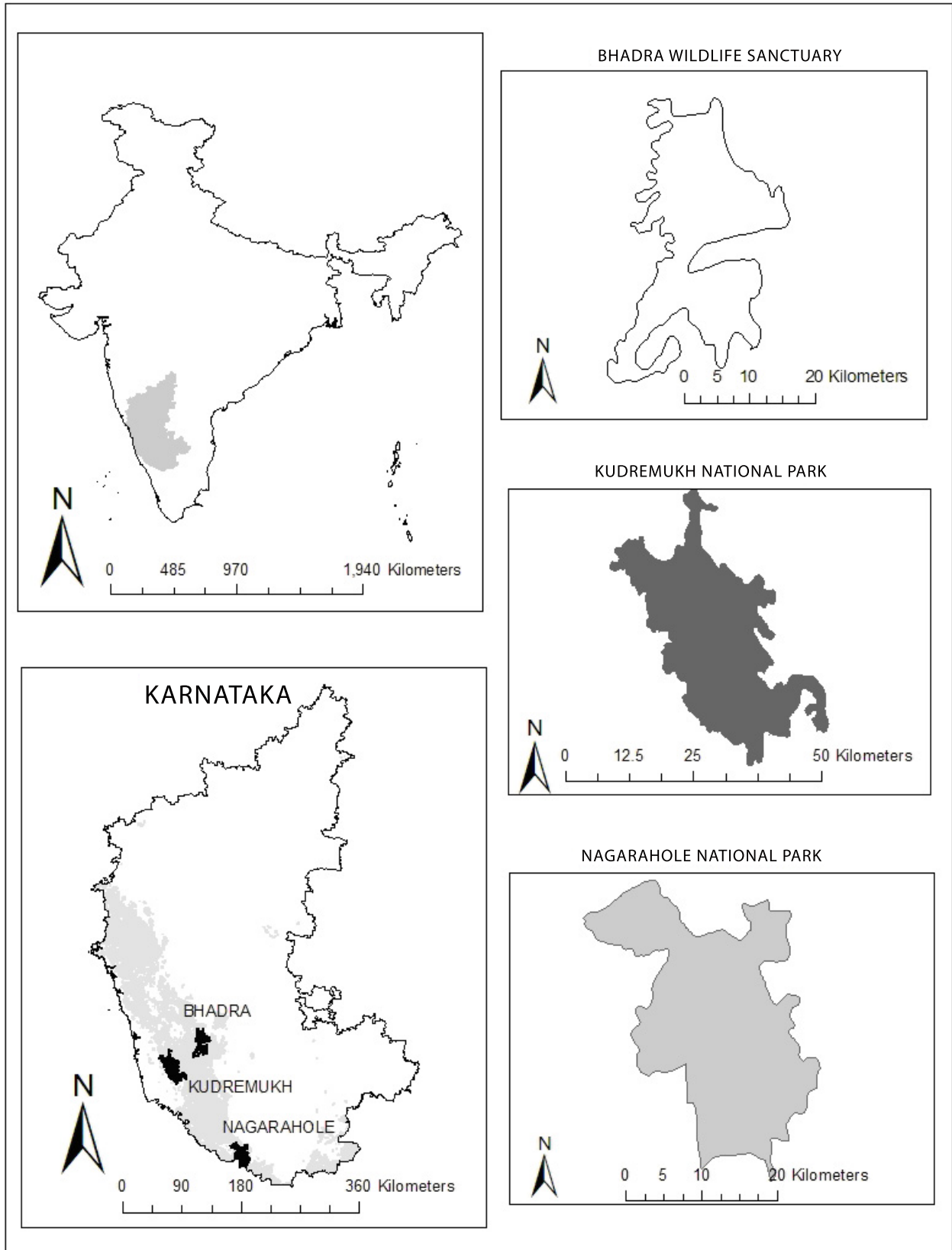
8. Slow and inefficient project implementation and the resulting frustration can still derail the resettlement project in Nagarahole. No surveys have been undertaken to assess attitudes of the beneficiaries. However, given that very few if any of the beneficiaries have chosen to return to their original locations inside the park, it could be considered at least a tentative success. Tracking the resettlement effort in Bhadra (2002-2006) most people have been able to establish themselves and they perceive the project positively (Karanth 2006). Yet, the general human tendency to complain makes it difficult to objectively measure whether the resettled people are “happier and more satisfied,” a criterion used by social advocacy groups to test resettlement success.

9. If the government were to dismantle all conservation laws and reserved forests (25% of the area) and nature reserves (12% of the area) in the Western Ghats region, it would likely be supported by the majority of the people living in the region. However, such a policy would destroy biodiversity and likely not lead to wise and equitable development.

10. If voluntary resettlement schemes are not implemented as a strategic conservation initiative in the Western Ghats soon, then a significant component of the vulnerable species will be lost forever. As a “wildlife conservation organization,” WCS has no other option but to seriously explore appropriate opportunities for supporting voluntary resettlement. Such work would be in full compliance with India’s national conservation policy (TTF 2005).

WCS (and perhaps other conservation NGOs) can advance rational arguments for promoting incentive-driven resettlements as a part of sustainable development programs. However, demonstrating to potential beneficiaries that they are free to move out of nature reserves to achieve a better life is the task of Indian institutions, the governmental and non-governmental sectors. The key to getting started appears to be committed conservation leaders catalyzing such institutions through informed advocacy.

**Figure 1:** Maps of area



**Table 1:** Threatened and Endemic Species in Western Ghats

Common Name	Scientific Name	IUCN and Endemic Status
<b>Birds</b>		
White-naped Tit	<i>Parus nuchalis</i>	VU and Endemic
Crimson-backed Sun Bird	<i>Nectarinia minima</i>	Endemic
Nilgiri Flycatcher	<i>Eumyias albicaudata</i>	Endemic
Lesser Florican	<i>Sypheotides indica</i>	EN
Indian Vulture	<i>Gyps indicus</i>	CR
Green-billed Coucal	<i>Centropus chlororhynchus</i>	VU and Endemic
Red-faced Malkoha	<i>Phaenicophaeus pyrrhocephalus</i>	VU and Endemic
Malabar Trogon	<i>Harpactes fasciatus</i>	Endemic
Jerdon's Nightjar	<i>Caprimulgus atripennis</i>	Endemic
<b>Mammals</b>		
Lion-tailed Macaque	<i>Macaca silenus</i>	EN and Endemic
Nilgiri Langur	<i>Trachypithecus johnii</i>	VU and Endemic
Nilgiri Tahr	<i>Hemitragus hylocrius</i>	EN and Endemic
Dhole	<i>Cuon alpinus</i>	EN
Tiger	<i>Panthera tigris</i>	EN
Rusty-spotted Cat	<i>Prionailurus rubiginosus</i>	VU
Small-clawed Otter	<i>Amblonyx cinereus</i>	VU
Smooth-coated Otter	<i>Lutrogale perspicillata</i>	VU
Nilgiri Marten	<i>Martes gwatkinsii</i>	VU and Endemic
Malabar Civet	<i>Viverra civettina</i>	CR and Endemic
Brown palm Civet	<i>Paradoxurus jerdoni</i>	VU and Endemic
Stripe-necked Mongoose	<i>Herpestes vitticollis</i>	VU and Endemic
Wroughton's Free-tailed Bat	<i>Otomops wroughtoni</i>	CR
Malabar Giant Squirrel	<i>Ratufa indica</i>	VU and Endemic
Travancore Flying Squirrel	<i>Petinomys fuscocapillus</i>	VU and Endemic
<b>Reptiles</b>		
Malabar Pit Viper	<i>Trimeresurus malabaricus</i>	Endemic
King Cobra	<i>Ophiophagus hannah</i>	
Beddome's Keelback	<i>Amphiesma beddomei</i>	Endemic
Travancore Tortoise	<i>Indotestudo forstenii</i>	Endemic
Cane Turtle	<i>Geoemyda silvatica</i>	Endemic
<b>Amphibians</b>		
Malabar Tree Toad	<i>Pedostibes tuberculosus</i>	EN and Endemic
Black Microhylid	<i>Melanobatrachus indicus</i>	EN and Endemic
Indian Green Frog	<i>Euphlyctis hexadactylus</i>	Endemic

**Table 2:** Details on Selected Protected Areas in the Western Ghats

<b>Protected Area</b>	<b>Bhadra Wildlife Sanctuary</b>	<b>Kudremukh National Park</b>	<b>Nagarahole National Park</b>
Location	13°25' to 13°50' N and 75°15' to 75°50' E	13°9' to 13°19' N and 75°5' and 75°15' E	11°5' to 12°15' N and 76°0' to 76°15' E
Area	492 km <sup>2</sup>	563 km <sup>2</sup>	644 km <sup>2</sup>
History and Year of Establishment	1. Reserved Forest between 1912-1950 2. Game Sanctuary in 1951 (parts) 3. Bhadra Wildlife Sanctuary in 1974	Reserved Forest between 1891-1986 Kudremukh National Park in 1987	1. Reserved Forest between 1890 – 1954 2. Game Sanctuary in 1955 (parts) 3. Nagarahole N P in 1974
Current Classification	Wildlife Sanctuary	National Park	National Park
Major Vegetation Types	Dry and moist deciduous forests(bamboo), evergreen, montane grasslands, teak plantations	Evergreen forests, montane grasslands	Moist and dry deciduous forests, teak plantations

**Table 3:** Details on Resettlement Projects

Protected Area	Bhadra Wildlife Sanctuary	Kudremukh National Park	Nagarahole National Park
Villages/ Settlements	13 Villages	40 villages (divided into 90 hamlets)	55 villages
Villages Relocated	11 complete	None	1 complete, 8 partial
Total Number of People/	4000	6241	6500
Cultural Composition	Agriculturalists	Agriculturalists and Tribals	Tribals
Total Number of Households	457 (419 selected for relocation)	1299 (201 voluntarily requested)	1550
Relocation Proposed	Proposed in 1974, 1992. Re-proposed in 1999 Resettlement package announced in 2001.	Proposed in 1999. Resettlement package announced in 2005.	Proposed in 1991-1992 and 1996-1997.
Implementation	1998 - 2002	Not Implemented	1999 - Ongoing
Number of HH Relocated	419	8 (through private initiatives)	250
Number of HH/People yet to Relocate	Complete; Discussion to relocate the two remaining villages	1291 (201 families have applied for rehabilitation package )	1300
NGOs involved	Wildlife First, Bhadra Wildlife Conservation Trust, Nature Conservation Guild	Kudremukh Wildlife Foundation, Wildlife First	Living Inspiration for Tribals, Wildlife First

<sup>1</sup> Among our study sites, tribal groups are numerically dominant only in Nagarahole and tribal groups form a very small fraction of the population in the entire Ghats region to the north of Nagarahole.



# PART 4

## NORTH AMERICA

### 4.1 Aboriginal Peoples and Protected Areas in Canada: Implications for Achieving Conservation

Justina Ray and Donald Reid  
Wildlife Conservation Society Canada

Most Canadians live within 500 km of the United States border, in the St. Lawrence/Great Lakes corridor, the southern prairies, and southern British Columbia. Although the footprint – industrial development (forestry, oil and gas, and mining) and associated road corridors – extends further, there are significant tracts of intact forest and arctic eco-regions in the northern half of the country. In many such areas, aboriginal people comprise the absolute majority and are increasingly at the forefront of decision-making regarding the nature of land uses (including protected areas) in their traditional areas. Development pressures in much of the northern boreal forest and tundra regions are enormous and much attention is focused on how and where development will take place. The fact remains, however, that the Canadian North has some of the largest tracts of intact ecosystems on the planet, translating into tremendous conservation opportunities and possibilities for proactive conservation-based planning.

This contribution covers Canada as a whole to highlight the legacy of varying forms of historical displacement from protected area establishment and follows the evolution of legislation as it addresses aboriginal interests. It explores the ramifications of historical and legislative conditions on the future of protected areas and provides a more detailed case study on the province of Ontario.

#### **Cultural Setting: History of Aboriginal Peoples and Treaties and Land Claims in Canada**

Aboriginal peoples in Canada number about one million and are comprised of First Nations, Inuit, and Métis (mixed aboriginal and Caucasian) peoples. Unlike the United States, native peoples in Canada were never formally conquered, a distinction that has played out in vastly different ways. Over the centuries since Europeans first came to North America, aboriginal peoples did, however, lose control of land by: 1) legal concessions through treaties (in which their title to land was “extinguished” in return for rights to use that same land); 2) ties of dependency through fur trade; 3) loss of people through disease and general demographic inundation with new immigrants; and 4) Canadian federal government policies of assimilation (Booth and Skelton 2004).

The first treaties between Europeans and First Nations were “Peace and Friendship Agreements,” which essentially called for assistance from aboriginal people in wars against other adversarial colonial powers. These were followed by treaties where large regions of traditional aboriginal occupancy were exchanged for a combination of “reserve” lands (small parcels which aboriginal people owned outright), the right to hunt and fish on surrounding lands, small

cash payments, and annual payments. The issue of aboriginal rights and title re-emerged only in the early 1970s, following a landmark court decision referring to King Charles' Royal Proclamation of 1763. This court decision stated that unless a title had been explicitly extinguished by treaty, aboriginal title still exists on the lands. The implication was that aboriginal title had never actually been extinguished in major areas of Canada, particularly in the North. This started the process of land claim settlements, which are essentially modern-day treaties or social contracts between First Nations governments and the government of Canada. The new formal government-to-government relationship that developed emphasized co-management of lands and resources, local economic development and self government for the purposes of creating sustainable aboriginal societies.

In 1982, the Canadian constitution went a step further by stating that the existing aboriginal and treaty rights (rights to land use) of the aboriginal peoples were recognized and affirmed. As a result, aboriginal peoples are the only members of Canadian society that have constitutional rights to harvest fish and wildlife.

### **History of Protected Area Establishment and Aboriginal Peoples in Canada**

In the late 1800s, federal and provincial governments did not acknowledge aboriginal rights when establishing protected areas or parks (Morrison 1997; Hrenchuk 1993; Gladu et al. 2003). In some cases, First Nations were displaced from park boundaries and/or prohibited from hunting and fishing in their traditional use areas. In the 1970s, after First Nations title was reaffirmed and hunting and fishing rights restored, First Nations perceived the stated purpose of most protected areas as hostile to or unaligned with their concepts of traditional use (Gladu et al. 2003). A notable exception is Wood Buffalo National Park on the border between Alberta and Northwest Territories: It has accommodated the traditional use activities of native communities residing inside and outside the Park since its creation in the 1920s (Nepal 2000).

The history of land use designations in the Northern Territories is relatively recent, and has paralleled the evolution of aboriginal rights in Canada. A progressive National Parks Act passed in 2000 entrenched consideration of aboriginal rights in the process of new park establishment. As such, aboriginal peoples have significant park planning and management roles in new northern parks (Sherry 1999; Usher 2003). On provincial land, the approach to accommodating the needs of aboriginal peoples is more *ad hoc* in nature, settled on a case by case basis rather than through comprehensive legislation or policy (Coyle 2005). Nevertheless, it is fair to say that aboriginal rights and interests are recognized as a *de facto* necessity for the successful establishment and planning of protected areas, and governments actively seek the co-operation and agreement of the relevant aboriginal groups before proceeding with protected-area designation.

In Canada, it is generally impossible to separate issues of aboriginal rights from title. Aboriginal title is a right to the land itself, while aboriginal rights refer to using the land, i.e., customary traditions, hunting, fishing, and gathering. Today, title cannot be extinguished except through treaties or land claims; the right to use the land can never be taken away from the original inhabitants. The challenges and opportunities regarding conservation and management and aboriginal participation or land vary considerably between the three types of land title:

- *Settled treaties*: Up until 1930, treaties did not explicitly recognize aboriginal rights in governing parks and protected areas. There is also no comprehensive legislation to address aboriginal use rights on provincial land. A lack of comprehensive legislation limits the opportunities for meaningful protected area co-management with First Nations. This, combined with the legacy of displacement, deepens aboriginal mistrust towards the motivations behind protected areas, rendering them unattractive land use options. With no framework for government-to-government negotiations, effective and sustained capacity building for land-use planning and management is limited.
- *Settled land claims agreements*: By contrast, the modern land claims settlements have provided ample opportunity for aboriginal involvement in the creation and management of protected areas. New protected areas can be established as part of the settlement, and indeed this occurred recently in the Yukon and Nunavut. (Parks in the north have been established more for wildlife and ecological purposes than tourism or recreation as was the tradition in parks further south.) Integrating protected area designation as part of the land claims settlements offers more opportunities and tools for both stakeholder groups at the outset. While the legacy of displacement still prevents protected areas from being fully embraced, the enhanced opportunity for co-management has increased their acceptability among aboriginal communities. The negative side is that the process of co-management adds layers of administrative burden that are foreign to resource managers and First Nations governments alike. Co-management can also risk conservation effectiveness if the decision-makers on the First Nations side strongly desire revenue from mining, oil/gas exploration, and forestry.
- *Unsettled areas*: Areas where aboriginal communities have not yet settled land claims are ambiguous. Nevertheless, numerous protected areas have been established in these regions with varying levels of endorsement from aboriginal peoples. For example, in British Columbia and the Northwest Territories many First Nations have actively participated in comprehensive land-use planning processes, sometimes including government-to-government negotiation, similar in process to land claims settlements (above). However, the long-term results for secure land designations and future protected area co-management remain unclear, and perhaps contingent on a final settlement of aboriginal title.

### **Case Study: Northern Ontario**

Ontario is a province of over 1 million km<sup>2</sup> in size. The northern half of the province, characterized by lowland boreal and taiga forest habitats, is largely undeveloped, with forestry and accompanying road construction not currently permitted north of the “Cutline” at approximately 51° north latitude.

#### ***Human populations and resource use***

The northern part of the province is home to 28 First Nations communities, with populations ranging from several hundred to a few thousand, totalling approximately 10,000 inhabitants in 450,000 km<sup>2</sup>. They are mostly fly-in communities, with ground transportation only possible by winter ice roads, open 3-12 weeks each year. Mining interests are increasing exploration in the north and permits for a diamond mine were granted recently. The Ontario provincial government initiated a land-use planning process for forestry and protected areas covering ten million hectares north of the cutline, which intersects with

the traditional use areas of nine First Nations communities, and these communities are in various stages with regard to planning and pursuit of commercial forestry licenses. Other planned and potential land uses in the region include development of hydro corridors transporting electricity from neighboring Manitoba, coal-bed methane, all-weather roads to connect northern communities, and nuclear waste disposal.

All northern communities are Ojibwe and Cree First Nations who, until about 40 years ago, engaged in traditional land use patterns of small family groups staying in one place nine months of the year and congregating at lakes during the summer. In the 1960s, the Ontario government evacuated aboriginal peoples from their traditional use areas and re-settled them in permanent communities for centralized education and employment opportunities. This, followed by the advent of snowmobiles and satellite television, entrenched the process of settlement, with more than 80% of residents now dependent on government welfare since employment did not materialize. Population growth in aboriginal communities is high, offset somewhat by migration to urban centers. The younger generation is losing ties to the land and natural resources.

### **Conservation action**

Protected area designation in the southern half of Ontario has proceeded without regard to First Nations rights. In the north, several large “wilderness” and “waterway” parks were established in the 1970s and 80s, including Polar Bear Provincial Park (2.3 million ha), established to protect polar bears. In many protected areas, First Nations were forcibly removed by gunpoint from the park; elsewhere they were banned (as was everyone) from hunting and fishing within protected area boundaries.

In the north, the remoteness of the parks has generally precluded active management by provincial government authorities and First Nations rights have been better recognized. The only imposed restriction has been in the case of Polar Bear Provincial Park, where members of Peawanuk First Nation were not permitted to build their winter road through the park, and instead had to route the road a considerable distance around the park. Recently, however, they have requested to re-route the road through the park which will likely be approved.

Ontario was the first Canadian province to formally acknowledge the relationship between province and First Nations in August 1991 in a “Statement of Political Relationship.” This was a political agreement recognizing the equal status of aboriginal governments necessary to undertake government-to-government discussions. There is still no Ontario government policy or law to protect First Nations activities on their traditional lands or to protect treaty rights across the province (Coyle 2005). Despite the harvesting rights mentioned in historical treaties, the Ontario government has passed several game and fish laws that do not acknowledge these treaty rights. First Nations have challenged these in court. Additionally, the number of unresolved land claims has risen dramatically in recent years and as of late 2005, several hundred “specific” land claims against Canada and/or Ontario have been filed, with only a fraction settled. One recent case became confrontational when the Chippewa people from Kettle and Stony Point First Nation occupied Ipperwash Provincial Park in 1995 arguing that the park, once part of their traditional lands, contained sites that were sacred to their people. The resulting confrontation with the police ended up with one native protestor killed and two wounded.

In the late 1990s, the province of Ontario undertook a land-use planning process known as Lands for Life. South of the Cutline, this process sought public consultation on the fate of unallocated public lands. The process resulted in

a fairly positive conservation outcome and increased protected area allocation. However, the prevailing view of First Nations was that they were effectively shut out of the process by the government's refusal to work with First Nations on a government-to-government basis, and the fact that individual First Nation "representation" failed to provide an aboriginal voice in the negotiations. There is also the perception that environmental non-governmental organizations did little to support First Nation involvement.

A new Ontario Parks Act was passed recently with no mention of aboriginal involvement in parks creation and management. Although the act is progressive in conservation terms, an absence of the aboriginal component hampers the legislation's effectiveness in setting aside "no-go" zones to protect far northern areas from industrial development.

### **Policy Implications for WCS**

The history of displacement, the lack of legislative and policy tools regarding potential First Nation roles in the creation, planning and management of protected areas, and the negative experience of the Lands for Life process, have collectively tarnished the protected areas for Ontario First Nations. The risks for conservation include the potential erosion of integrity of existing parks by renegotiation of relationships, and an unwillingness to create new parks in the absence of effective co-management.

What are the ramifications of this? It will not be enough to deal with the issue of displacement of aboriginal peoples from protected areas without grappling with the global issue of aboriginal rights in general. Indeed, at least one major conservation organization in Canada (Canadian Parks and Wilderness Society) has a stated policy on hunting in parks (affirming treaty rights), and it is not uncommon for one to be asked for an organizational policy on hunting by aboriginal peoples in protected areas. WCS is not widely known in Canada and has not had to publicize a policy on this issue, but increased WCS presence in the future and continued work with First Nations will make a policy perspective necessary.

# PART 5

## AFRICA

### 5.1 Protected Areas and Displacement: Okapi Faunal Reserve in the Ituri Forest, DR Congo

Richard Tshombe  
Wildlife Conservation Society Democratic Republic of Congo

The Ituri Rainforest is centered on the upper watershed of the Ituri River and is bordered by savanna in the north and northeast and the Western Rift highlands to the east and southeast. The Ituri Forest is of particular interest for conservation because it probably contains the greatest diversity of mammalian fauna of all forests in the Democratic Republic of the Congo (Curran 1992; Wilkie et al. 1998). The Okapi Faunal Reserve (OFR), which covers 1,372,625 ha and represents about 18% of the Ituri Forest, was created in 1992 in recognition of its biological significance and in response to increasing threats to its integrity. The Okapi Faunal Reserve is situated within a much larger area referred to as the Ituri-Epulu-Aru Landscape (approximately 3,600,000 hectares). The most diverse habitat in the OFR is mixed moist semi-evergreen rain forest. The Reserve also comprises of moist evergreen rain forest dominated by *Gilbertiodendron dewevrei* (Caesalpiniaceae), secondary forest, swamp forest, and grass-topped inselbergs. Vertebrate species of conservation concern in the OFR include the okapi (*Okapia johnstoni*), an endemic forest giraffe with a distribution centered in Ituri. The OFR contains at least 17 species of primates (the highest diversity known from a single site in Africa), two species of forest pigs, ten species of forest antelope and the forest buffalo, and it provides refuge for one of the largest populations of elephants in DRC. A large mammal inventory conducted in 1994-1996 suggests that the OFR contains approximately 4,000 okapi, 7,500 chimpanzees, and 5,000 elephants (Hart and Bengana 1997). In addition, over 300 species of birds and 500 species of butterflies have been identified in the central sector of the OFR. The Ituri Forest is also rich in plant diversity, including many valuable timber tree species such as African mahogany (*Khaya* and *Entandrophragma*) and Iroko (*Milicia excelsa*).

The Okapi Faunal Reserve is an IUCN Category VI: managed resource protected area. According to that definition, it is an area “containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.” The national designation for the OFR is a *Réserve naturelle intégrale* (Ministry Decree No. 045/CM/ECN/92 of 2 May 1992) meaning that provisions of the 1982 hunting law No. 82-002 apply to it (Article 14, Chapter II, section 1, Law) A *Réserve naturelle intégrale* is defined as “an area under public control in which any kind of hunting, fishing, any kind of timber, agriculture or mining exploitation, any excavation, prospecting, sampling, earthworks or construction, all works that can modify the ground or the vegetation; any action that can destroy or perturb fauna as well as flora; any introduction of zoological or botanical species...all strictly forbidden; and in which it will be forbidden to enter, to circulate or to

cut without a special written authorization from competent authorities and in which scientific research will be conducted only with permits.”

However, it was obvious at the time of the creation of the Okapi Faunal Reserve that some accommodation of the needs of the human population would be necessary if the Reserve was to ultimately succeed in conserving wildlife. As a result, the Ministry Decree No. 045/CM/ECN/92 of 2 May 1992 lifted certain restrictions that usually apply to *Réserves naturelles intégral*. It allowed hunting of partially protected animals such as small duikers (*Cephalophus silvicultor*, *Cephalophus monticola*, etc.), human settlement, and gardens in the Reserve. It is the responsibility of the Institut Congolais pour la Conservation de la Nature (ICCN) to regulate access and resource use within the Reserve.

Principal land uses within the area and approximate percentage of the area to be used is as follows:

- Agricultural zones surround villages and are defined in consultation with the local population. Logging, construction, and hunting are permitted. Agricultural zones will account for 10-15% of the Reserve once final zoning is completed.
- Hunting zones extend beyond agricultural zones. Logging and agriculture are not allowed but hunting, fishing using traditional technology, and the collection of plant products are permitted. Hunting zones will cover 50-60% of the Reserve once final zoning is completed.
- Conservation zones prohibit all forms of hunting and fishing. Conservation zones will cover 20-30% of the Reserve once final zoning is completed.

### **Human Populations and Resource Use**

The Ituri Forest has, until recently, been one of the longest inhabited, and one of the most sparsely occupied forest blocks in northeastern DRC. At the time of the first European arrival in the late 19<sup>th</sup> century (and the first written historical records), the Upper Ituri Forest contained only scattered small settlements. Indeed, the first expedition through the region in the late 1880s, which supplied itself from the settlements in the area, found so few settlements that they nearly starved to death. The ravages of the slave trade and the Arab-western confrontation in the region in that time period may have reduced what was already a very low human population in the forest. In any case, the forests of the upper Ituri Basin were clearly more sparsely occupied than forest areas to the immediate west and the savanna biome to the east and north.

The first known inhabitants of the Ituri Landscape are thought to be the Pygmy peoples, represented today by the Mbuti and Efe, whose population in the landscape is estimated at about 30,000, and who remain in large measure strongly attached to their traditional nomadic hunting and gathering life styles. Recent archaeological evidence suggests they arrived at least 40,000 years ago. Furthermore, debate continues about whether these hunter-gatherers occupied the forest interior independently of, or in conjunction with, the arrival of forest-adapted shifting cultivation in the region, thought to have occurred two to three millennia ago.

The Ngwana people arrived in the landscape with the advent of Arab trade in the 19<sup>th</sup> century. Beginning with the colonial period, the numbers and diversity of newcomers expanded, but was dominated by the Nande from the eastern uplands, and the Budu from the densely settled hinterlands to the north and west.

## **1900-1960**

The most significant of the traditional forest cultivator groups of the Ituri Landscape today include the Bila, Ndaka, Lese, Mbo, and Mamvu. Their main occupation is subsistence farming based on shifting cultivation methods on the marginally fertile forest soils, fishing, and hunting.

Human settlement of the Ituri-Epulu-Aru Landscape grew during the colonial period as roads opened and mining and plantation agriculture developed in the region. Within this period, major movements of immigrants came to occupy portions of the landscape. The colonial administration moved people from the forest to roads for taxation and labor. As villages grew along main roads, the Mbuti moved away from areas near these villages. This resettlement had a major impact on the way people perceived themselves and/or were perceived by others. From that time, cultivators became “villagers” whereas the Mbuti remained “forest people” (Peterson 2000). This distinction between villagers and forest people has led NGOs, ICCN, and researchers to draft policies that separate the Mbuti from their associated cultivators. Thus, in the Okapi Faunal Reserve, cultivators have been prevented from staying in forest Mbuti camps based on the assumption that cultivators are not forest people. This has become a permanent source of conflict between local people and the Reserve.

## ***Post-1960 and before the creation of the protected area***

The unequal distribution of land in North-Kivu has been identified as the major factor which pushed people to move from their highly populated native home lands (more than 100 pers/km<sup>2</sup>) to the sparsely populated Ituri Forest (< 2 pers/km<sup>2</sup>) (Peterson 1991). The Institut National des Statistics (INS) data show that between 1970 and 1994, human density in North-Kivu steadily increased, whereas in the Ituri Forest the human density was stable for the same period. A major factor attracting landless people to the Ituri Forest was the presence of family members who had been moved there by the colonial administration to work in gold mines. In addition, weak and unclear land tenure policies among Ituri forest tribes rendered the occupation of land easy. Today, most of the settlements in the landscape are ethnically mixed.

## ***After the creation of the protected area***

A 2003 census reported 17,000 people occupying the Reserve area (about 1.2 inhabitants per km<sup>2</sup>). An additional 37,000 people live within 15 km of the Reserve borders. Immigration into the landscape continued, even during DRC's internal conflict from 1996 to 2003 and despite militias occupying the landscape during that period. While some immigrants arrived in the landscape fleeing even greater insecurity elsewhere, the major driving force of immigration was perceived economic opportunity. These opportunities included access to land for agriculture, employment in artisanal logging and mining, and income from small-scale commerce.

One would assume that political instability makes large-scale capital investment in resource extraction risky. However, threats to the forest and its resources have never been greater. Illegal artisanal mining of gold and coltan (colombo-tantalite) is growing. Internally displaced people seek refuge in the forest from conflict in the east. Although these people mainly relocate to the east and south of the Reserve, some take to mining opportunities within the Reserve, particularly if they are landless. Their settlements border the Reserve and have increased deforestation. Increased permanent settlement in the Reserve and on its perimeter is a terrible result of the current conflict as it could



cause an increase in the exploitation of lands for agriculture and wildlife for the bushmeat trade.

### **Conservation Action**

The Okapi Faunal Reserve's special status as a *Réserve naturelle intégrale* with exceptions for human activities gives the Reserve authorities a mandate to regulate access to the natural resources. This puts a tremendous amount of power in the hands of the Head Warden and his team of ecoguards, who unfortunately are generally poorly trained, ill-informed of people's rights of access to resources, and vastly underpaid. In reality, the present lack of capacity of this agency (ICCN) to enforce Reserve rules means that people who harvest Ituri's flora and fauna (as opposed to illegal gold and coltan mining) have experienced only marginal restrictions. Nonetheless, the capricious interpretation and enforcement of laws and isolated incidents between Reserve authorities and local communities has fostered conflict and a perception that the Reserve is detrimental to local people.

In terms of land ownership, there remains considerable ambiguity as to who has what rights and what authority under both customary and state laws. If land use and conservation zones are to be established – and honored – land zoning agreements must be negotiated with individual families or villages. These locally negotiated zoning agreements should then be ratified by relevant levels of government that have jurisdiction over land ownership and land use. WCS is now in the third year of a zoning program using this approach, and has achieved “agreements” with local chiefs, ratified by the ICCN and the territorial administration, that establish agricultural zones and protected zones around specific villages within the OFR. Zoning for the communities along about two thirds of the east-west road has been negotiated. The eastern north-south road remains to be zoned. The WCS project is currently engaged in participatory mapping exercises aimed at defining traditional hunting territories for the Bambuti, with the ultimate goal of delineating hunting zones and strict conservation zones over the rest of the Reserve. The success of this project depends on it being integrated at all levels of government and an increased capacity within ICCN for working with local communities.

It is clear that human population has increased in the Ituri region. Many of the current villagers have moved into the region in the last few decades. Settlement to the northwest and southeast of the Okapi Faunal Reserve is independent of the war but linked instead to growing populations in eastern Congo and the search for natural resources in Ituri. Current political instability means that there is little direction or control of human migrations and opportunities are seized without regard to existing laws, as most laws can be easily circumvented. Means to control this unrestrained immigration and resulting deforestation are absolutely necessary and are a priority for the Reserve management team.

Any efforts to control immigration, or to limit resource exploitation through a program of zoning, are inevitably met with criticism from some opponents who believe the people should have the right to move wherever they wish, and that conservation projects simply do not have the right to restrict access to natural resources. WCS and its partners in the OFR believe that in order to protect the rights of long-term residents to continue to benefit from natural resources in Ituri, some controls on waves of human groups are required. We are committed to ensuring that these controls are developed in a socially responsible fashion, in collaboration with local communities, so that future generations may continue to use the flora and fauna of the Ituri Forest to their benefit.

**Table 1:** Most important groups of peoples present and the nature of their claims

<b>Group</b>	<b>Main activities</b>	<b>Nature of their claims</b>
Bambuti/Efe	Hunting with nets (Mbuti) and bows/arrows (Efe); NTFP collection; labor in gardens; exchange with Bantu groups	Traditional use rights on forest resources
Babila, Bombo, Bandaka	Small-scale agriculture; small-scale mining; exchange with Bambuti	Traditional use rights on land (agriculture) and on mining; maintain economic as well political ties with the Bambuti
Mamvu	Agriculture	Traditional use rights on land (agriculture)
Budu	Small-scale mining and hunting using snares	Traditional use rights on forest resources, especially hunting
Walese-Dese and Walese-Karo	Small-scale agriculture and NTFP collection; small-scale hunting using snares; exchange with Bambuti	Traditional use rights on land and on forest resources; maintain economic as well political ties with the Bambuti
Nande	Both extensive and intensive agriculture; trade; mining	Immigration and mining

**Table 2:** Nature and extent of benefits that the protected area provides

<b>Group</b>	<b>Benefits received</b>
Bambuti/Efe	Traditional use rights on forest resources protected, job opportunities, formal education, health care
Babila, Bombo, Bandaka	Traditional use rights on land (agriculture), job opportunities, improved agricultural techniques, environmental education, school furniture, improved health care
Mamvu	Traditional use rights on land (agriculture)
Budu	School furniture, environmental education
Walese-Dese and Walese-Karo	Traditional use rights on land and on forest resources, improved agricultural techniques, environmental education, school furniture
Nande	Job opportunities

## 5.2 Parks and People in Gabon

David S. Wilkie<sup>‡</sup>, Lee White<sup>\*</sup>, and Bryan Curran<sup>#</sup>

<sup>‡</sup>Wildlife Conservation Society Living Landscapes Program, <sup>\*</sup>Wildlife Conservation Society Gabon Program, <sup>#</sup>Wildlife Conservation Society Democratic Republic of Congo Program

In September 2002 at the World Summit on Sustainable Development in Johannesburg, President El Hadj Omar Bongo Ondimba of Gabon announced that the Republic of Gabon was creating a new national park system protecting 10.8% of the nation's forests and coastal zones (Figure 1) covering almost three million hectares. Gabon is a country of great importance for the conservation of biodiversity. Its forests are among the richest in Africa in terms of botanical diversity and endemism, and both marine and terrestrial ecosystems support intact and abundant assemblages of large mammals. Kingdon (1997) reports over 130 mammals species in Gabon. Its forests constitute 40% of the total range of western lowland gorilla (*Gorilla gorilla gorilla*) and chimpanzee (*Pan troglodytes troglodytes*) (Tutin and Fernandez 1984), support over 60,000 elephants (Barnes et al. 1995), and possibly the highest mammalian biomass of any tropical forest (White 1994). Gabon has more species and genera of plants than other West African forests (Wilks 1990) that cover over twice the area. Gabon's biological richness results in part because the Monts de Cristal, Monts Doudou, and the Massif de Chaillu served as "forest refuges" during the dry phases of the Pleistocene era, and because Gabon has historically had a low human population (Vansina 1990).

Though the 13 national parks are of great global and continental importance as strongholds of biodiversity, in Gabon they are also valued as a means to diversify the economy which relies heavily on petroleum. The parks' scenic beauty and spectacular wildlife offer tourism potential and could, with the right infrastructure and management, be an important source of revenue for Gabon.

In the late 1990s over 80% of the forests of Gabon were in concessions to private sector companies for timber. Only a relatively small percentage of these concessions had been logged and none had been clear cut. However, global demand for wood was increasing and the pace of logging in Gabon accelerated. This spurred Lee White and Mike Fay of WCS to begin discussions with the Government of Gabon about establishing a network of protected areas to conserve the nation's biological heritage and create a series of world class eco-tourism destinations.

### Selecting Sites to Maximize Biodiversity Benefits and Minimize Social Impacts

To ensure that the envisioned national park system represented the most intact, biodiverse, and spectacular terrestrial and coastal ecosystems in Gabon, with minimum impact on local communities, WCS, WWF, and the Government of Gabon completed a series of ecological and socio-economic surveys in the most isolated regions of the country between 1998 and 2002. The social science work was deemed particularly vital, as establishing and maintaining a protected area network can often cause lost access and natural resource use rights for nearby communities. Recognizing this, WCS and the Government of Gabon were keen that the proposed protected area network avoid conflicts with traditional territorial claims of rural Gabonese communities, and thus minimize restriction of their access and use rights. Claudine Angoué, a specialist in issues of resource

access and benefit sharing at the Université Omar Bongo in Libreville, and Sally Lahm, an anthropologist at the Institut de Recherche en Ecologie Tropicale at Makokou, organized teams of Gabonese social scientists to survey the distribution of human settlements and natural resource use in all areas visited by the ecological teams. These ecological and social science surveys were instrumental in determining the location and shape of the 13 protected areas so that they would maximize the biodiversity conservation and minimize conflicts over natural resource use with local communities.

Several circumstances made it possible to establish 13 national parks covering slightly over 10% of the nation and avoid resource use conflicts with local communities. Historically Gabon has always had a relatively small human population (Vansina 1990), and fertility rates are relatively low because of widespread fallopian tube occlusion associated with *Chlamydia trachomatis* infections (Collet et al. 1988). The Gabonese population was further reduced by the slave trade from the 15<sup>th</sup> to the 19<sup>th</sup> century, and by a series of famines that occurred during the 1920s (Pourtier 1989). In pre-colonial times people were distributed across the landscape in small founder family groups and communities, with typically 20-50 people per group (Pourtier 1980). Peaking during the late colonial period (1945-60), the government had a policy of coerced “*regroupement*” of villages into larger settlements along major roads and rivers. The policy was intended to allow easier government control over the population and facilitate provision of social services. The movements were justified in terms of promoting “development” by making the country’s labor force more accessible to logging and mining enterprises (Pourtier 1989). After independence, the state continued this policy for several years (Barnes 1992), so that between 1960 and 1970, the number of villages in Gabon fell from about 4,200 to 2,800 (Pourtier 1989). More recently the booming oil-based economy has caused rapid urbanization such that today, Libreville, the capital city, and Port Gentil, the oil industry center, have over 600,000 residents combined. Eighty-three percent of Gabon’s estimated 1.4 million people now live in towns and cities (UNDP 2006); rural populations are declining at 2.3% per year and are now almost entirely concentrated along the major roads and navigable rivers. As a result, large areas of Gabon are absent of human settlements.

### **A Public Taking of Private Sector Rights**

With the exception of Mayumba, Akanda, and Bateke Plateau, all lands used to create the national park network were state owned. However, all parks contained timber concession areas held by one or more private companies. Therefore, creation of the national parks system required an eminent domain taking of the concessionary rights of private timber companies, and significant debate continues as to whether and how much compensation timber companies should be awarded.

### **Assessing the Welfare Impacts of Establishing and Maintaining Parks**

Even though the protected area network was designed to avoid restricting local peoples’ resource access and use rights, WCS initiated, with the support of Gabon’s new National Park Authority, a long-term study to empirically assess the welfare impacts caused by the national parks.

Demonstrating the impact of protected areas on the welfare of local peoples is difficult for several reasons:

*First*, the tangible value of natural resources to households varies enormously. For example, in a recent meta-analysis of 54 case studies of the value of forest resources to the rural poor (Vedeld et al. 2004), average annual household income from forest resources ranged from \$0 to \$3,458.

*Second*, studies assessing the impact of terrestrial protected areas on local people are either *ex ante* predictions of social impacts or *post facto* measures of present welfare and refer to no baseline data on local households prior to the establishment of the park. The primary problem with *post facto* assessments is that merely showing that local people around parks and reserves are often poor and marginalized says little about the role that park creation actually played in their marginalization. Rather, the status of these people may simply reflect the fact that protected areas are often established in remote regions where resources may be less abundant or productive, where households rarely have access to markets, and are the last to be provided with government- or NGO-sponsored social services.

*Third*, studies have not been conducted to track changes in human welfare indicators over time within the same households near a protected area.

And *finally*, the welfare of households that traditionally have claims on park resources has never been compared concurrently with the welfare of “control” households that do not have such claims. As a consequence, we are unable to assess whether changes in the welfare of households near the park over time result from the establishment of the park or from other exogenous factors, such as changes in currency or commodity values that affect the welfare of all households in the nation.

### **Research Sites**

Of the 13 protected areas created by President Bongo we selected four (Birougou, Ivindo, Monts de Cristal, and Waka) because they: a) were not subject to prior conservation or development investments (as was the case with *inter alia* Loango, Moukalaba-Doudou, Minkebé, and Pongara) and b) differed in proximity to markets, human population density, ethnic composition of local communities, and habitat types. All sites are under the jurisdiction of Gabonese National Parks Authority (Conseil National des Parcs Nationaux – CNPN), are managed with the technical assistance of the Wildlife Conservation Society, and receive support from donors, most notably the USAID Central African Regional Program for the Environment.

### **Data Collection Approach**

To ensure that the human welfare metrics assessed in this study (e.g., consumption, health, education, social relations, income and wealth, etc.) were valid and accepted by a broad constituency, we used World Bank guidelines for assessing impoverishment risks associated with projects (Cernea and McDowell 2000) and consulted a panel of experts drawn from cultural and economic anthropology (Drs. Katherine Homewood and Ricardo Godoy), household economics (Drs. Dean Karlan and Paul Glewwe), and public health (Dr. William Leonard).

Data are being collected at both the village and household level. Household level data include an extensive panel of 2,000 households and an intensive subsample panel of 576 households, equally divided between park-influenced and control families. (Control households were selected to match park-influenced households in terms of ethnicity, market access, and wealth.) Data are being

collected by teams of trained local language assistants led by Gabonese social scientists.

At the village level we are using participatory mapping and survey methods to gather data on the extent and spatial distribution of natural resource use, market access, access to social services, and commodity prices. We will use remote sensing analysis to estimate abundance and spatial distribution of natural and anthropogenic land-cover types within 5, 10, and 20 km of each settlement.

For the household level panel we are using ethnographic methods to create a narrative history of the family in the community and to assess self-perceptions of health, economic welfare, dietary sufficiency, family cohesion/conflict, and community cohesion/conflict. We use survey methods to assess: a) demographic attributes of the household – age and gender composition, ethnicity, and education level; b) short term health; c) household wealth, proxied by the value of a standard basket of assets and the quality of house construction; and d) household income, measured as all sources of labor, trade, exchange and remittance income generated by all family members in the previous month.

Extensive panel data will be gathered on 250 households that, based on the results of the participatory mapping, historically used park resources, and an additional 250 control households outside the influence of the park in each of the four research sites. Households will be surveyed in approximately 20 park-influenced and 20 control villages at each of the four sites. Data will be gathered on each household in 2005-2006 (baseline) and again in 2009-2010. During repeat surveys attriter households will be found, whenever possible, and interviewed to determine why they left their study villages.

As single surveys tend to provide unreliable or incomplete data on income and consumption we randomly selected 72 park and 72 control households from the extensive panel at each site to conduct more intensive analyses. For the intensive panel we collect data on each household during seven consecutive days, twice per year, with sample periods chosen to ensure that both rainy and dry seasons are covered. On the first day of each week-long visit demographic and short term health data are collected. On days 2-7, household income and consumption are assessed using a 24-hour recall survey.

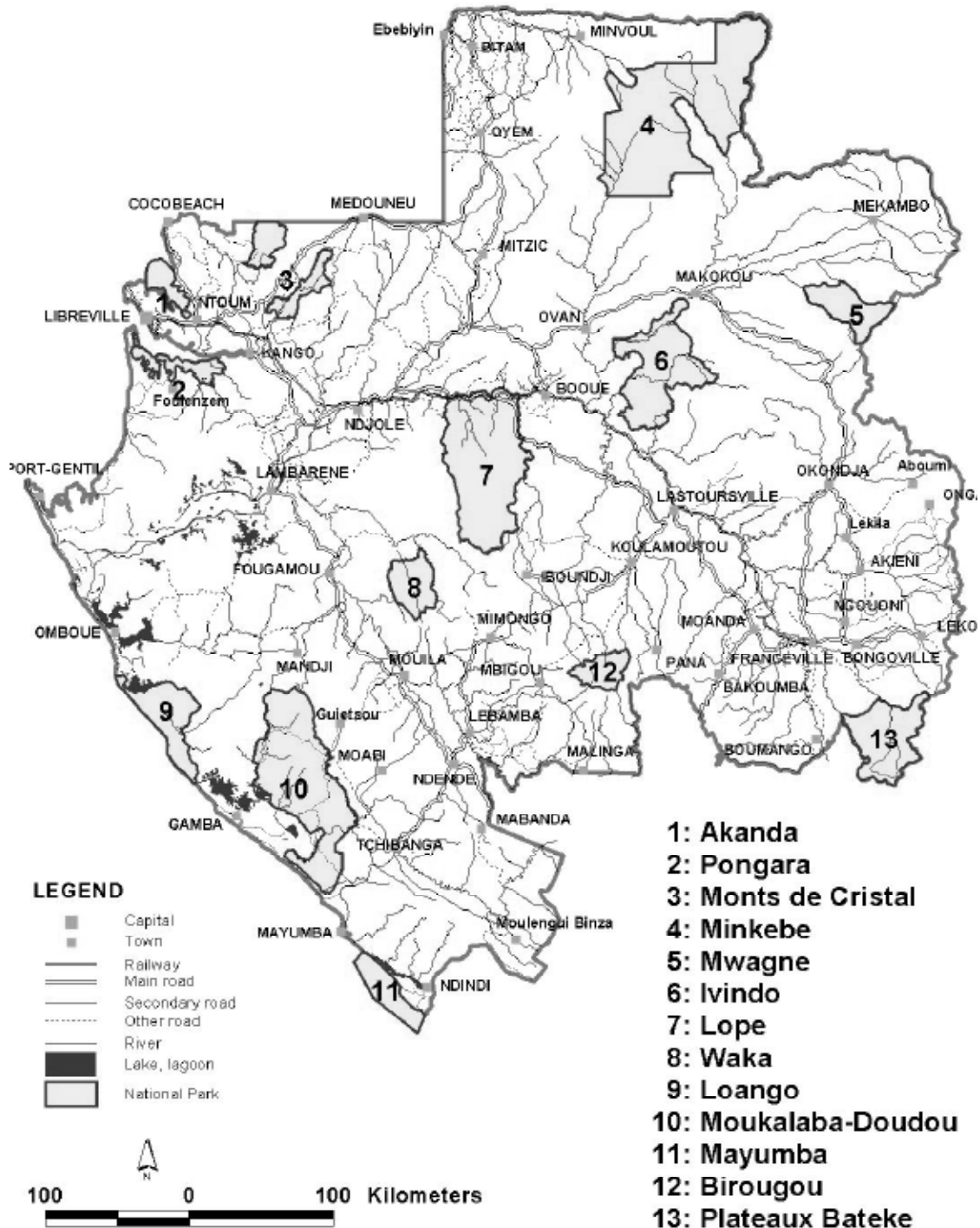
Data from the village level and extensive and intensive household panel surveys will allow us to: a) evaluate the relative contribution of natural resources to park-influenced and control household economies and to assess how this changes over time as park resource use regulations are formalized and enforced; b) evaluate the influence of market access, residence duration, access to health and education services, and ethnicity on household welfare; c) compare the sources and levels of income of park-influenced and control households over time; and d) assess (using the Gini coefficient) income, health, and consumption inequality within and across households in park-influenced and control communities, and track the level of inequality over time.

Results of preliminary comparisons of park-influenced and control households using the baseline data will be available by January 2007. Results of our longitudinal assessment of human welfare changes associated with the establishment of the parks will be available in 2011. All research protocols and blank datasheets are available, now, on request. Twelve months after completion of each survey the data, without personal identifiers, and with accompanying data dictionary, will be posted on a public access data archive such as the Data and Program Library Service at the University of Wisconsin-Madison (<http://dpls.dacc.wisc.edu/archive.html>) or the Internal-University Consortium for Political and Social Research at the University of Michigan (<http://www.icpsr.umich.edu/org/index.html>).

## Implications of This Study for Protected Areas and Local Livelihoods

Results from this study will be the first to assess in a rigorous and controlled manner the impact of protected areas on household welfare. Understanding whether and how protected areas influence the welfare of households that reside close to parks and reserves is a critical first step in developing and implementing policies to address any adverse effects of parks on people, and identifying policy options that increase local benefits associated with parks.

Figure 1: New Protected Areas in Gabon



### 5.3 Central Africa's Protected Areas and the Purported Displacement of People: A First Critical Review of Existing Data

Fiona Maisels\*, Terry Sunderland+, Bryan Curran\*, Karin von Loebenstein^, John Oates#, Leonard Usongo§, Andrew Dunn\*, Stella Asaha❖, Michael Balinga❖, Louis Defo§, and Paul Telfer\*

\*Wildlife Conservation Society, +CIFOR-Center for International Forestry Research, ^GTZ-Gesellschaft für Technische Zusammenarbeit – German Development Aid, §World Wildlife Fund, ❖FOREP, #Wildlife Conservation Society and Hunter College

In the past several years a large body of literature has been published on the involuntary displacement of local communities living in or around protected areas in Central Africa (Brockington 2004; Brockington et al. 2006; Cernea and Schmidt-Soltau 2003, 2006; Schmidt-Soltau 2000, 2001, 2003, 2004, 2005a, 2005b; Schmidt-Soltau and Brockington 2004; Schmidt-Soltau et al. 2001). These papers call into question what they see as the practice of biodiversity conservation projects to designate conservation lands without discussion with or compensation to these displaced people. They point out that people do not have to necessarily be physically displaced for their access to resources to be affected. Writ simply, they see the creation of certain national parks in Central Africa as reducing the standard of living of local communities, as they believe local people's access to their traditional lands has been restricted. These restrictions are then translated into economic losses, or more seriously, local impoverishment, caused directly by the creation of protected areas. We wish to make clear at the start that contrary to the conclusions of many of these papers, we can find no unequivocal evidence of people having been forcibly or involuntarily displaced from the protected areas cited by the authors. We will address the issue of what the authors define as economic displacement below, and we will demonstrate that the majority of the case studies are based on incorrect or inappropriate data, or at the least, data which have been interpreted incorrectly by people who have spent very little time at the majority of the protected areas in question.

The examination of restrictions imposed by protected areas is a laudable ethical objective, and the papers provide a compelling case against conservation-related resettlement. However, it should be noted that most conservation organizations have not neglected these issues. In fact, the codes of ethics of the IUCN and WWF clearly state that biodiversity conservation should be achieved in an ethical manner (IUCN 1996; WWF International 1996). Nonetheless, we would advocate that there are indeed instances where fully protected national parks may be necessary to ensure biodiversity conservation, for the good of local communities and the world at large, and that contrary to others (Schmidt-Soltau 2005b), unrestricted access to natural resources in all cases is neither sensible nor desirable over the long term. Any efforts to limit resource exploitation, even through collaboratively designed programs of zoning, are inevitably met with criticism from some individuals who believe that people should have the right to move wherever they wish, and that conservation managers simply do not have the right to restrict access to natural resources. Many conservation organizations believe that some controls on natural resource exploitation are necessary. Part of this reasoning is to protect local and indigenous communities as they continue to use and rely on those resources. Most conservation organi-



zations are committed to ensuring that these controls are developed in a socially responsible fashion and in collaboration with local communities. A discussion of who should be compensated, for what, can be found in a recent paper by Wilkie et al. (2007) which also examines how local people, communities, and governments have restricted access of others to natural resources in an historical perspective.

This paper examines the validity of data from the 12 case studies in six Central African parks cited by Cernea and Schmidt-Soltau (2003, 2006) and Schmidt-Soltau (2003). The same data are used for multiple papers to support the authors' arguments relating to the human welfare costs of protected area establishment, which is, in turn, being uncritically cited by others also questioning whether such trade-offs are acceptable (e.g., Hutton et al. 2005; Tian and Diaw 2006). All the data were collected by Schmidt-Soltau alone. To avoid multiple citations of the same data in the various publications, we will refer to the data source as "Schmidt-Soltau." The sites concerned range from protected areas established in colonial times to new ones established in the last five years. These papers provide an overview of the surface areas of the different countries, area of original forest cover, rate and extent of tropical forest loss, and the extent of protected areas in each country. The data on the specific sites presented include: 1) park area, 2) whether there is a resettlement policy, 3) the population in or around the parks, 4) whether people were expelled from parks or denied access to previously used land, 5) whether there is a compensation strategy, and 6) whether there was any demonstrable "success."<sup>1</sup>

We echo the call of Wilkie et al. (2006) for the use of sound science to examine these issues, as the perceived conflict of poverty alleviation and biodiversity conservation is creating polarized viewpoints that are, at times, based more in the halls of academia than in real-life village and park situations. The presentation of detailed and accurate data is essential when constructing and testing hypotheses about cause and effect. In this paper the accuracy of the data presented in the Schmidt-Soltau articles is examined and found wanting in various ways; more precise data are offered instead to demonstrate a more accurate picture of what is happening on the ground, and in the communities around these protected areas in Central Africa.

Following is a review of definitions, background information, and park-specific data used by Cernea and Schmidt-Soltau.

### **Country Profiles and Forest Loss**

For an overview of forest loss, rather than drawing on data from different years spanning 1998-2005, the authors would have been better advised to use Minnemeyer (2002), which summarizes data from all the Central African countries for present forest cover. Area data from the Food and Agriculture Organization (2003) are also standardized to a common year: the figures on the FAO website are arguably the most consistent. Even so, there are errors in the forest loss calculations. For example, the line concerning the Republic of Congo first quotes the surface area of the country as being 341,500 km<sup>2</sup>, all of which is assumed by the author to have originally been tropical forest, and which has now, according to Schmidt-Soltau, been reduced by 38% (or by 33.4%, this figure varies within the various Schmidt-Soltau papers). According to Sayer et al. (1992), originally only about 65% of the Congo was tropical forest (the central area of Congo is a plateau of savannah and gallery forests). The figure that Schmidt-Soltau are probably citing is "38% tropical forest loss in 1992" from Davis et al. (1994), who estimated that this was what had been lost of the original 213,400 km<sup>2</sup> of forest by 1992.

The population of Gabon is estimated at 1.4 million, of whom 83% are urban (UNDP 2006). In other words, about 238,000 people live in the rural areas. Only 5% of the population is considered to be malnourished (UNDP 2006), in contrast with most of the rest of sub-Saharan Africa (30%). For food security, Gabon is on a par with, for example, Kuwait, Belize, and Mexico and better than that of several Eastern European countries (UNDP 2006).

### **Traditional Forest People: The Ba'aka**

Throughout Central Africa, so-called “pygmies” or Ba'aka live in an uneasy partnership with Bantu villagers. For example, the Babenzélé live in the south of the Central African Republic and in northern Republic of Congo; the BaNgombe along the Sangha River and in eastern Cameroon; the Baka in the Dja, the Bakola live in Central Congo and eastern Gabon; the Babongo in south-central Gabon, and so on. Here we use the accepted collective term for these people, the Ba'aka.

### **The Sites and Research Methods**

The data that are presented in the papers are cited as being collected as follows: “*Between 1996 and 2004, I conducted surveys in twelve protected areas and National Parks in six countries. Some visits resulted from consultancy contracts directly related to resettlement, dislocation and questions of land-ownership, others were official or private project visits*” (Schmidt-Soltau 2005: 283). More detail is given in Cernea and Schmidt-Soltau (2006: 1816): “*Some of the research visits resulted from consultancy contracts, while others were research visits. In cases 2, 3, 4, 6, 9, 10, all villages have been visited, while in the other cases a representative sample has been drawn.*” An earlier paper, Cernea and Schmidt-Soltau (2003: 8) cites the methods as “*Some field visits resulted from consultancy assignments directly related to resettlement, dislocation and questions of landownership, others were official or personal research visits.*” The Schmidt-Soltau (2003) paper says essentially the same thing, only for eight of the sites: the Dja, Boumba-Bek, and two parks in Gabon (Loango and Moukalaba-Doudou) were added in later publications. It is unfortunate that the authors note that most data on displaced peoples “are rough estimates based on published and unpublished data” (Cernea and Schmidt-Soltau 2003b: 8; Schmidt-Soltau 2005a: 285), as all subsequent estimates of the value of lost access to natural resources, the cost of compensating displaced people and so forth are based on these “rough estimates.” Finally, we find the practice of acknowledging the “contributions” (see footnote in Cernea and Schmidt-Soltau 2006: 1808) of people who were not aware they were participating in these “studies” and who certainly do not agree with the authors’ conclusions, to be misleading. To look at these on a case-by-case basis, we drew on the published documentation, our own experience, and data gleaned from years of working in and around most of these protected areas.

### **Dja Biosphere Reserve, Cameroon**

This protected area was first gazetted in 1950 as a wildlife and hunting reserve, and in 1981 was named as a Biosphere Reserve and in 1987 as a World Heritage Site. There are several villages within the Reserve and about 50 villages within a kilometer of the Reserve limits (ECOFAC Dja GIS database). The area of the Reserve cited by the Schmidt-Soltau series of papers is correct (5,260 km<sup>2</sup>), but the population cited is the number of people living outside the Reserve, and therefore using a much larger area than the park alone. No people were resettled to create the park (R. Fotso, pers. comm.).

### *Korup National Park, Cameroon*

This was originally established as the Korup Native Administration Forest Reserve in 1937. A series of enclaves were created for three of the villages within the protected area to allow the people to remain legally inside the Reserve. Permission was given for rights of way, fishing, hunting, and the collection of food materials and palm products. By 1980 the Korup Forest Reserve had been adopted as an official project of WCI (latterly WCS) and, some time later, WWF. From the early 1980s government officials and conservationists stressed that resettlement was inevitable, but that resettled villages would enjoy better facilities than they currently possessed once they were relocated.

The issue of resettlement was therefore discussed with the inhabitants of the settlements involved well before the Korup Forest was decreed a national park. With reference to a previous article, Schmidt-Soltau (2000; 2003) states that in the case of Korup National Park (KNP), the prospective resettlers barely negotiated or defended their interests at all: The inhabitants of the Park agreed to resettle “voluntarily” without a written agreement or compensation. However, Schmidt-Soltau fails to point out that from 1981 onwards, a series of meetings was held between governmental authorities, project staff and park inhabitants, where the issue of resettlement was discussed and negotiated (Malleon 2000). Assessments were also carried out by government officials to calculate compensation for resettling the villages. A dossier was then submitted to the Presidency but was rejected on the basis that there was no provision for compensation and no suggested alternatives to resettlement (Gartlan 1984; Malleon 2000).

In 1986, Korup National Park was gazetted and the boundaries of the Korup Forest Reserve were extended eastwards to include two more villages. The legal basis for the enclaves inside the Park was removed (MINEF 2002). This meant that the inhabitants of the Park had an ambiguous legal status. The creation of Korup National Park was accompanied by additional and increased funding for the Korup Project. Concerns over the issue of resettlement were hotly debated by project staff, and some of the consultants working there raised concerns over this issue in their reports (Devitt 1988; Ruitenbeek 1988). Nevertheless, the resettlement of Park inhabitants remained central to Korup Project implementation plans.

However, Schmidt-Soltau is wrong to say that Park inhabitants failed to defend their interests. In 1987, the people of Erat and Ekundu Kundu (both settlements located inside the KNP), as well as the people of Ekon 1 (located on the western periphery of the Park), appointed a lawyer to represent them over the issue of resettlement. Representatives of these three villages, along with the lawyer, visited the Secretary of State for Agriculture, the Secretariat General of Tourism, and the Presidency to express their concern over resettlement (Malleon 2000). In addition, two élites (one of whom was a retired government minister) submitted a resettlement proposal to the government and the Korup Project in 1987.

The original Master Plan produced for the Korup Project in 1989 (WWF 1989) reinforced the opinion that all Park villages should be resettled. It was stressed, however, that all resettlement should be voluntary, meaning that people move to a site of their own choice and at their own time. Due to lack of government capacity, responsibility for resettlement was left to the Korup Project. In 1994 funds were provided by the EU. Finally in February 2000 the first village (Ekundu Kundu I, with 189 people representing 23 households) was officially moved to a new site outside the Park (Tiani and Diaw 2006). However, questions were raised concerning the final cost and the benefit of resettlement; the cost was more than 360.000.000 FCFA, or about \$506,000 at 2000 exchange

Table 1: Sites referred to in the recent literature and summarized in Cernea and Schmidt-Soltau (2006: 1814). Areas from WDPA (2005) apart from Gabon where data from CNPN (2002) is used.

Site no.	Name	Date of gazettelement	Country	Total area (km <sup>2</sup> )	Impact on local population claimed by Schmidt-Soltau	Population quoted by Schmidt-Soltau
1	Dja Bio-sphere Reserve	1950	Cameroon	5260	Expulsion of Pygmy-bands; Dispossession	7800
2	Korup NP	1937; 1986	Cameroon	1295	Involuntary resettlement of villages; Dispossession	1465
3	Lobeke NP	1974; 2001	Cameroon	2178	Expulsion of Pygmy-bands; Dispossession	4000
4	Boumba Bek NP	2005	Cameroon	2487	Expulsion of Pygmy-bands; Dispossession	4000
5	Dzanga-Ndoki	1990	Central African Republic	1143	Expulsion of Pygmy-bands; Dispossession	350
6	Nsork NP	2000	Equatorial Guinea	700	Expulsion of settlements; Dispossession	10,000
7	Loango NP	2002	Gabon	1550	Expulsion of settlements; Dispossession	2800
8	Moukalaba-Doudou NP	2002	Gabon	4495	Expulsion of settlements; Dispossession	8000
9	Ipassa-Makokou**	1971	Gabon	100	Expulsion of Pygmy-bands; Dispossession	100
10	Cross-River Okwango Div.	1991	Nigeria	640*	Involuntary resettlement of villages; Dispossession	2876
11	Nouabale-Ndoki NP	1993	Rep. of Congo	4190	Expulsion of Pygmy-bands; Dispossession	3000
12	Odzala NP	1935	Rep. of Congo	12882	Expulsion of Pygmy-bands; Dispossession	9800

\* Erroneously called "Ipassa-Mingouli" by Schmidt-Soltau.

\*\* The area is the same as the previous Okwango Forest Reserve.

rates, which equates to \$22,000 per household. The average annual GDP per capita in Cameroon is about \$2,200 (UNDP 2006). The remaining funds were insufficient for the resettlement of the remaining five villages, and from 2001 all further resettlement was suspended. Therefore the claim of Schmidt-Soltau that 1,465 people were resettled is incorrect, and that the resettlement was involuntary is also incorrect (Schmidt-Soltau 2000; 2003).

Following the suspension of all further resettlement the long-term management options for those villages remaining inside the Park was evaluated (Diaw et al. 2003). Various solutions were presented including boundary modifications to excise some villages, the formal recognition of enclaves for other villages, and with resettlement recommended outright for only one small community. The Korup management plan (2003-2007) states that further resettlement is not realistic in the near future and that alternative arrangements for managing Park villages are required. It recommends that the usufruct rights of Park villages in the meantime can be accommodated through the establishment of *Temporary Use Zones* (MINEF 2002). These zones would temporarily legalize subsistence farming, fishing, and hunting activities within a prescribed area of the Park according to agreed regulations, rights, and responsibilities.

In the section on “joblessness” (Cernea and Schmidt-Soltau 2006:1819), the authors stress the need to assess the pre-displacement income of people to be resettled. In the case of KNP this was actually undertaken. In addition to the assessments that took place in the early 1980s, a detailed household census and income data were collected from all the villages to be resettled as well as the villages within 4km of the Park boundary in 1988. (Devitt 1988; Infield 1988; Ruitenbeek 1991.) No reference to these works is made in the Cernea and Schmidt-Soltau (2006) paper even though the authors could have been aware that the data exists.

### ***Lobeke, Boumba-Bek and Nki: General***

There is regulated access of indigenous peoples into Lobeke, Boumba-Bek, and Nki National Parks in southeastern Cameroon. An agreement was reached with local Bantu communities at large and Baka pygmies in particular on selected use zones inside the park for harvesting of bush mangoes, shrimp fishing, wild yams, and other valuable forest products other than wildlife. Fourteen community hunting territories have been established with technical assistance from Gesellschaft für Technische Zusammenarbeit – German Development Aid (GTZ) and WWF in surrounding forest areas of the three national parks. WWF and GTZ have been promoting integration and participation of Baka pygmy communities in overall natural resource management processes in southeast Cameroon. There have been no evictions in Lobeke, Boumba-Bek, and Nki.

### ***Lobeke National Park, Cameroon***

In various citations (Cernea and Schmidt-Soltau 2003b, 2006; Schmidt-Soltau 2005a), Schmidt-Soltau refers to the displacement of approximately 4,000 people caused by the creation of Lobeke National Park in southeastern Cameroon. However, the population estimates provided by Schmidt-Soltau appear to come from national level census figures for southeastern Cameroon (PROFORNAT 2003), which includes people who live many kilometers away from the Park, and are probably not even aware of its existence, let alone impacted by it.

Teams working for the Wildlife Conservation Society (WCS) spent years working in the forests and the villages in southeastern Cameroon in the prelude to the creation of the Lobeke National Park, specifically to ensure that impacts

of the creation of the protected area (which was originally proposed as a faunal reserve, and in fact was only gazetted as a national park in 2003) would have minimal impact on local communities. There are detailed demographic and socio-economic data available from this work (WCS 1996) which present a clearer and more realistic summary of the situation than that proposed by Schmidt-Soltau. In fact, WCS focused its social science work in the nine villages (and the associated Ba'aka camps) closest to the proposed protected area. In 1995 there were a total of just over 5,000 people living in those target villages. These villages were 20-40 km away from the proposed protected area boundary, and the lengthy socio-economic surveys and interviews and hunting studies indicated that with the exception of some dry-season fishing spots, they had no need to go to the protected area. Therefore, we are not sure how the authors arrived at their figure of 4,000 people displaced by this park (and a similar number for Boumba-Bek, which in fact has even fewer people living nearby, and no permanent villages inside: see next section). It is unfortunate as well that the authors appear not to have read in its entirety one of their own citations for this park, for they would have noticed that these villages were supportive of the creation of a protected area: "Many area residents have indicated that they would be willing to support total protection of a core area (even if their own activities were limited there) if an adequate amount of forest were also set aside for traditional subsistence and economic activities" (Curran and Tshombe 2001: 526). And indeed, this is precisely what has happened with the creation of Lobeke National Park, which is buffered by an area gazetted for local community resource extraction. Today, in Lobeke, the Ba'aka pygmy community is being assisted by technical partners to obtain 5,000 ha of community forest. The indigenous forest people may access certain forest areas to perform traditional rituals.

### ***Boumba-Bek National Park (BBNP), Cameroon***

Boumba-Bek National Park was created in 2005 and covers 2,382 km<sup>2</sup>. In 1995 the Boumba-Bek-Nki Essential Protection Zone (ZEP) was created. Between 1996-2000, the national forestry authority and its partners then carried out biological, ecological, and socioeconomic studies to collect information for the gazettelement of the protected area. Based on these studies, and on the 1995 Government of Cameroon Land Use Plan, the Government of Cameroon, WWF, and GTZ organised a series of meetings between 1999 and 2001 with the local populations of about 30 villages around Boumba-Bek. These meetings were to inform the villages, and to discuss and negotiate the future limits and user rights. At the end of the meetings, the limits that had been proposed in the original national land use plan were revised, and the surface area was reduced according to the wishes of the local populations. It is important to note that no village was within the final park boundaries, and that the mean distance between the villages and the park limits is about 20 kilometres in a straight line. User rights of the local populations were not prohibited. They were defined according to the existing legal texts which apply country-wide (for example Décret No 2005/3284/PM of 6 Cct. 2005).

Today as in the past, the Ba'aka populations of the region continue to carry out their traditional/ customary activities in the Park. In order to ensure these customary rights for the indigenous people (for example by integrating them in the management plan currently in preparation), WWF, Forest Peoples Project (FPP), and some local NGOs are facilitating a participatory mapping process and are undertaking studies on the spatial patterns of resource use of the Ba'aka in the Boumba-Bek region.

Cernea and Schmidt-Soltau (2003, 2006) cite Curran and Tshombe (2001: 521) with respect to population figures for Boumba-Bek National Park (also in southeastern Cameroon), despite the fact that this paper makes not a single mention of Boumba-Bek.

### ***Dzanga-Ndoki National Park, Central African Republic***

This site is a multiple-zone protected area gazetted in 1990 within which a WWF and GTZ project to help the government manage the area for integrated conservation and development has been active since 1988 (Blom 1998; Carroll 1998). The main settlement is the logging town of Bayanga, which has had a fluctuating population of between 1,500 and 5,000, depending on whether the sawmill is in operation; it has opened and closed several times since the Park was gazetted. It is hard to know where the figure of 350 people expelled came from. However, no people or settlements were moved when the protected area complex was created, and two-thirds of the area was left open for people to continue to hunt, fish, and collect forest products using legal methods: These details can all be found in the regulations of the protected area.

### ***Altos de Nsork (or Nsoc) National Park, Equatorial Guinea***

The source of the data published in Schmidt-Soltau (2005a) is cited as “Schmidt-Soltau, unpublished data.” The visit was the first of one of the “unofficial or private visits,” and in fact the year of his visit is cited as 1998 (Cernea and Schmidt-Soltau 2006; Schmidt-Soltau 2003). There are discrepancies in estimates of area and human population. For example, although the area of this site is quoted as 5,150 km<sup>2</sup> (for example in Cernea and Schmidt-Soltau 2006), the area on available maps (Larison 1999; ECOFAC GIS database) is just over 1,000 km<sup>2</sup>, and was cited at only 700 km<sup>2</sup> by Machado et al. (1998), Pérez de Val (2001), and most recently by the WDPA (2005).

The Schmidt-Soltau papers give a population density of 1.98 people per km<sup>2</sup> and suggest that ca. 10,000 people had been affected by displacement or dispossession due to the creation of the national park in 2000. However, a researcher familiar with the area, Jaime Pérez de Val, states that “the human population within the Park is small, but probably exceeds 5,000 in the surrounding villages” (Pérez de Val 2001: 271). According to Machado (1998) the population of the whole Altos de Nsork area is 2,000. The difference between these other published data and that of Schmidt-Soltau’s figure is not explained.

Although identified as a possible protected area in 1988, Nsork was only given legal status as a national park in 2000. Pérez de Val (2001:271) reported that until 2001 “no official protection measures have been implemented” and this has been confirmed by recent communication with national institutions (C. Obama *in litt* 2006). Given the disparity in population estimates coupled with a notable lack of protection measures it is difficult to accept that up to 10,000 people have been affected by “expulsion of settlements” and “dispossession” (Cernea and Schmidt-Soltau 2006b:1814).

### ***Ipassa-Makokou Reserve, Gabon***

The northern part of the Ivindo National Park in Gabon (gazetted, like all the other national parks of Gabon in 2002) overlaps with the Ipassa-Makokou Reserve (Okouyi et al. 2002) (not the “Ipassa-Mingouli Reserve” as cited by the Schmidt-Soltau series). This area has been heavily hunted for the last 25 years as the nearby town of Makokou and its associated bushmeat markets have grown. It is not clear where the data cited by Schmidt-Soltau on the number of people

nor on the expulsion of “pygmy” (sic) bands comes from. The Reserve was originally 100 km<sup>2</sup> and was later enlarged to 300 km<sup>2</sup>, but no Bakota (Ba’aka) have ever lived in this area (J. Obiang, pers. comm.): Their territory is to the east and north of Makokou. Numerous Bakota, however, have their fishing camps all along the Ivindo River. This area is now inside the Ivindo National Park, gazetted in 2002. At present, these fishing camps are not considered to be illegal (even if their presence does violate the spirit of the national park model), and people have never been moved out of them.

It is worth mentioning here that the national parks of Gabon were designed specifically to avoid including villages inside their area in order to minimize conflict between local people and park authorities. Nevertheless, a recent unpublished study by Kramkimel et al. (2005) made demonstrably erroneous claims about displacement around the network of Gabon parks: This report claims that 14,000 people were displaced by the creation of parks in Gabon, a figure which has been completely discredited by the Gabonese National Park Service. The table on page 201 of this report details displacement numbers for the 13 Parks and then adds another line for “New Parks,” but no new parks have been created since 2002. When challenged on the veracity of these figures, Dr. Schmidt-Soltau responded in an email (dated 6/6/2005): “*Le chiffre de 14.000 est une estimation. Pas plus pas moins.*” (The number 14,000 is an estimate. Not more, not less.) And an erroneous estimate at that, considering that not a single individual has been displaced by the creation of any of the parks, which, as noted earlier, were designed specifically in order to avoid conflicts with communities.

### ***Cross River National Park, Nigeria***

Cross River Park was established by presidential decree, along with many other Parks in Nigeria, in 1991. A WWF-organized and European Development Fund-funded feasibility/planning study (1988-90) suggested the most appropriate boundaries for the Park. However, these recommendations were, in the end, not followed, and the existing forest reserves were declared a national park, as this was a much simpler political process and much cheaper than trying to negotiate for non-reserve land to become a protected area.

South of the Cross River, the Oban Hills Group of forest reserves became the Oban Division of Cross River National Park, and north of the Cross River, the Okwangwo, Boshi, and Boshi Extension Forest Reserves became the Okwangwo Division of the Park. Part of the Oban Hills had been made into a forest reserve back in 1912, one of the first in Nigeria, and additional areas were added later: Okwangwo was gazetted as a forest reserve in 1930, Boshi in 1951 and Boshi Extension (140 km<sup>2</sup>) (for its gorillas) in 1958. Farming had therefore been restricted in these forests for a long time, but gathering of NTFPs and hunting continued at high levels. The area of the Park is not well-established, nor are its boundaries. Many current maps show the Park boundaries as recommended by the 1988-1990 WWF-EDF study, and are therefore highly inaccurate. The old Forest Reserve boundaries have not been resurveyed for a very long time and in some cases were only ever crudely mapped (as in the case of Boshi Extension). Rough estimates are: Oban Division: 3,000 km<sup>2</sup>, and the Okwangwo Division: 640 km<sup>2</sup>, for a total of about 3,700 km<sup>2</sup>.

A larger number sometimes appearing for Okwangwo (920 km<sup>2</sup>), which is quoted in the Schmidt-Soltau papers, was the *proposed* rather than actual area. This proposed area included the three enclaved communities of Okwangwo, Okwa, and Balegete (which cover a total of 80 km<sup>2</sup>), which were never, in the end, gazetted. In addition, the proposal included the Obudu Plateau (100 km<sup>2</sup>)



and the Mbe Mountains (100 km<sup>2</sup>), that were also never gazetted as part of the Park.

When the Okwangwo Forest Reserve was gazetted in 1930, three villages/settlements were “enclaved” within it: Okwangwo, Okwa 1, and Okwa 2. At the time that the Okwangwo FR became part of the Cross River National Park it technically had no people living in it, because only the Forest Reserve legally became a park and the enclaves were not in the Forest Reserve. Therefore the human population in the Park when it was decreed was zero. There was never any suggestion that the people of Okwa and Okwangwo would be resettled “involuntarily.” However, resettlement has certainly been given a lot of thought, because the settlements have grown and their farm area has now spilled beyond the enclave boundaries, such that the Okwangwo Division of the Park is threatened with being divided into two. The people of Okwa and Okwangwo hunt inside the park with few if any constraints, so even the claim of “dispossession” (Cernea and Schmidt-Soltau 2006: 1814) has no real validity. Early on in the planning of the Park, therefore, discussions were held with the people about a voluntary resettlement, and land to be settled was identified outside the Park boundary (south of Butatong). To quote from the WWF plan for developing the Okwangwo Division (Caldecott et al. 1990): “In the case of the three communities of Okwa 1, Okwa 2 and Okwangwo...it is necessary to recommend that they be invited to participate in a resettlement programme, and this should be implemented as early as possible in the Project...Since involuntary resettlement is disallowed, the onus of establishing compliance through a correct balance of incentives and disincentives will be firmly on Project management.” People of course were not prepared to resettle unless they received compensation; terms of compensation were never agreed (and no willing donor found), so no resettlement occurred. However, prompted by the Governor of Cross River State, the Federal Government (Ministry of the Environment) is currently investigating options for the resettlement of the three enclaves.

### ***Nouabalé-Ndoki National Park (NNNP), Republic of Congo***

Schmidt-Soltau visited the Park headquarters, which is 20 kilometers away from the Park itself, on three occasions, including two short (social) visits. During these latter visits he stayed in the Park HQ as a guest of project management, aside from one afternoon trip lasting an hour or so, to the nearby village of Bomassa, and a trip inside the Park to a tourist facility. In his publications, Schmidt-Soltau writes that there was “*expulsion of Pygmy-bands and dispossession/expropriation*” (Cernea and Schmidt-Soltau 2006: 1814) when the Park was created, without any citation (unless the authors are referring to an acknowledgement of the “contribution” [Cernea and Schmidt-Soltau 2006] of the former Nouabale Ndoki Project Director, who in any case never suggested that anyone was forcibly displaced from the Park, because this did not happen). In fact, there are no signs of recent human habitation within the area of the Park. Analyses of oil-palm kernels found in the beds of streams throughout the area shows them to be between 900 and 2,300 years old, with the highest oil palm population dating from about 1,700 years ago (Fay and Blake 1998). There are no living oil palms in the Park today. This suggests that there were settlements there about 900 years ago, but that people left.

The Ba’aka peoples of the area are split into two main groups: the BaNgombe, who came from the Cameroon side of the Sangha and settled along its banks, and the Oubanguian Babenzelé people, who came from much further to the east and have settled in villages and camps up the Motaba and Mokabi watersheds, and across into the Central African Republic. None of these people

used the area that is now the National Park for any reason other than hunting elephants for ivory. This was a highly organized activity, carried out by Bantu or Hausa commercial ivory hunters, who had access to the financial resources required to buy a heavy-duty elephant gun (which costs at least \$300), and commercially made slugs (about \$7 each). These were lent to Ba'aka teams in the forest under the control of a Bantu leader or "manager" who ensured that there was a supply of manioc and other necessities, and who also ensured that ivory from the elephants killed by the band reached the owner of the gun. The Ba'aka were usually paid in kind (elephant meat, cigarettes) and given a small sum of cash (\$5-10) in return for hunting expeditions lasting a few weeks. This sort of activity cannot be considered "use of a forest patch" by a "pygmy-band," as they reaped little reward for their efforts and most of the value of the ivory went to people outside the area and often outside the region. Most of the Ba'aka people living around the NNNP (and the contiguous Dzanga-Ndoki National Park in CAR) live in the existing towns and villages along the major rivers of the region (Sangha, Motaba, etc.) in an uneasy and subservient role to the Bantu living in those villages.

Schmidt-Soltau suggests that 3,000 people in "pygmy-bands" were expelled when the Park was created. It is impossible to understand where this number came from. When Schmidt-Soltau visited northern Congo in 1999 and 2001, there were only 280 people living within a distance of 20 kilometers (about two days walk there and back) of the NNNP boundaries (all in the small village of Bomassa-Bon Coin) (WCS annual census data). There were at most 4,000 people living within 50 kilometers of Park boundaries in Congo, mostly in the two logging towns of Kabo and Ndoki II (Government of Congo 2001), which are major poles of attraction in the region for people hoping for employment in a sawmill or with a logging company.

Under the section "*Facing the Risk of Food Insecurity*," which is found in several of these very similar papers (e.g., Schmidt-Soltau 2003), the authors again use the NNNP as a case study. They state that the villagers living around the NNNP receive subsidized food from the conservation project, because crop raiding by elephants undermines the efforts to establish farms. It is true that elephants started coming to two small villages (total population 200+ people) in late 1998, after enforcement of existing Congolese law started successfully protecting them. The authors then state that "*during the 1999 civil war in Congo, the WCS team had to leave the country. Since the villagers did receive (sic) neither donated food, nor had farms for subsistence, they had to start re-hunting for cash (to buy farm products) and for subsistence...it seems obvious that the new generation, which does not have the skill to survive as hunter-gatherers is facing an increasing risk of food insecurity* (Cernea and Schmidt-Soltau 2003: 17)."

Firstly, because the villages are not, and never have been, in the National Park, the villagers had always hunted for subsistence: Most forest antelopes and monkeys are not protected by Congolese law, and it is perfectly legal to hunt them for family and local consumption. Most young men in the village have an excellent hunting skill set, as they hunt regularly for subsistence. In addition, since the promotion of "enlightened self-interest" policies by the project, where people no longer hunt commercially, the amount of wildlife available for subsistence hunting has greatly increased, allowing protein intake per capita to increase (meat is not being sent away from the village but is being consumed by the community). Thus there is no risk of food insecurity.

Secondly, the war in Congo was in 1997-1998, not 1999, and therefore pre-dated the elephant crop-raiding: There were still farms around the village,

and there was not yet the system of provision of subsidized food. Thirdly, WCS did not leave the country, but maintained a skeleton management staff together with the local Government Head Warden, who assured the continuation of the Park base and of salary payments to villagers employed by the project. Most other NGOs and bilateral agencies (including GTZ) did indeed leave Congo; many returned about six years later or have not yet returned.

### ***Odzala National Park, Republic of Congo***

The citation concerning the Odzala National Park (Republic of Congo) (Cernea and Schmidt-Soltau 2003b) claims that when the Park was created, there was “*expulsion of Pygmy-bands and expropriation.*” In the footnote to this table, it is explained that the expulsion of pygmy-bands “*refers to the expulsion of ‘pygmies’ which do not utilize permanent settlements, from some parts of the forest utilized and inhabited by them on a temporary bases (sic)*” (Cernea and Schmidt-Soltau 2003b: 8). In fact, in Odzala, which is the oldest national park in Congo, villages (not pygmy-bands) were moved from within the protected area at its creation in 1935 during the colonial period, and were settled along the roads of the region. A further regrouping of villages in the whole country – completely unrelated to the protected areas – took place from 1968-1971 under the direction of the local administration, which again concentrated people along the roads (Hecketsweiler et al. 1991). The old locations of these villages can be clearly seen from the air as clusters of oil palm trees on hilltops, and some of these sites are still visited on ceremonial occasions by the villagers who now live in the main village of Mbomo and in nearby Mbandza. During the early part of the last century, the colonial authorities in general moved people out of the interior forests and onto the roads, chiefly for the purposes of taxation and control. Had the authors of the paper consulted some of the anthropological documents available from Odzala (e.g., Gami 1995a, 1995b, 1999; Lia and Gami 1995) this would have been clear. The numbers of people displaced are probably documented in the colonial literature and it would have been preferable to see a reference to one of these historical documents to support these figures. A good source of historical documentation of the Sangha region, for example, is the book produced in 1998 by the Yale group (Eves et al. 1998) which pulls together historical, biological, and social approaches of the various concessions, foreign powers, logging companies, and conservation organizations in the region over the last couple of centuries.

### **Risks of “Joblessness,” “Homelessness,” and “Economic loss”?**

To date there has been no published comparison on the welfare of households that traditionally have claims on park resources with “control” households that do not. This type of study requires a large sample size, and “before” and “after” scenarios. However, a new MacArthur Foundation supported study of the human welfare impacts of national parks in Gabon will soon provide us with just such information (Wilkie et al. 2006 – see previous chapter).

The economic analysis of these Schmidt-Soltau papers (“*Facing the risk of landlessness*”) rests on a livelihood survey in Takamanda, in SW Cameroon, on the Nigerian border. It is stated that this is “*one of the remotest areas*” of central Africa (Schmidt-Soltau 2003: 535) whereas in fact there are former logging roads leading into this area that are maintained by local communities, and two new access roads currently under construction to the south and east of the present reserve, one of which has been motorable since 2000 (Sunderland et al. 2003a). The numerous rivers that characterize this area also provide boat access to most of the area and are a key evacuation route for many forest prod-

ucts, including timber. The author further states that “*no conservationists or state agents had penetrated this area before the survey*” (Schmidt-Soltau 2003: 535), so it must be presumed that the authors were unaware of the body of work carried out previous to their survey, and subsequently published both as grey literature and in a recent book (Comiskey et al. 2003). These documents include work carried out and reported on by WWF between 1997 and 2000 (Groves and Maisels 1999) and by previous researchers (Critchley 1968; Ifeka 1999; Thomas 1988). In fact, during the time of Schmidt-Soltau’s socio-economic fieldwork, a large-scale, long-term (2000-2003) multi-taxa assessment of the Takamanda Forest Reserve was being undertaken with funding from the Smithsonian Institution (Comiskey et al. 2003) and longer-term livelihoods surveys were also being undertaken by a UK Department for International Development (DfID) funded research project from 2000-2005 (Sunderland 2006). During the period between 1999 and 2004, Takamanda was in fact the subject of considerable field-based scientific research. During his 2000 surveys, Schmidt-Soltau was often encountered by researchers in communities, so it is puzzling to know why he considered that there had never been previous work at the site and why he had not consulted the existing literature.

The claim that “*our team which included officials from the Cameroonian Ministry of Environment and Forests (MINEF) was the first government team seen in the region for thirty years*” (Schmidt-Soltau 2003: 535) is also incorrect and underplays the role of the Government of Cameroon in the region. Despite its relative isolation, vaccination campaigns bring government health workers to the area at least twice a year, visits that were noted by Schmidt-Soltau himself in his 2001 report (Table 10, page 28) making his claim of undertaking such pioneering work even less credible. Periodic visits by parliamentarians during elections also bring local government officials to the communities. Local MINEF staff, including the Chief of Section for Wildlife, were engaged by the WWF-funded gorilla surveys which began in 1996 as they were for the Smithsonian project. Finally, the GTZ project around Takamanda in 2000 – an initiative in which Schmidt-Soltau was engaged as a consultant – involved numerous pre-project missions to the area and visits from officials from both GTZ and the Government of Cameroon.

It is questionable that household income data from the Takamanda region can be extrapolated across the Central African region as claimed. Suggesting that it has been “*documented that these data can be used as baseline data for un-conserved forest for the entire Congo Basin*” (Cernea and Schmidt-Soltau 2006: 1820) is somewhat disingenuous given that this documentation relies on citations of his own work. Firstly, there are some inconsistencies in the way this economic data is presented in the various reports. For example, in the recent World Development paper (Cernea and Schmidt-Soltau 2006) Schmidt-Soltau uses the terms “settlement” and “village” synonymously, implying a higher sampling of independent communities than is actually the case. The original socio-economic report (Schmidt-Soltau 2001) provides some clarity, however. On the Cameroon side of the border, 43 villages and 87 settlements were surveyed: the difference being an arbitrary use of “settlement” to mean separate areas of the same village. Yet the data are consistently presented by each of the 43 villages; there is no distinction between villages and settlements. In addition, it is stated that “*the average per capita income of 2,400 households in 68 settlements*” were utilized (Cernea and Schmidt-Soltau 2006: 1820). Firstly, it is unclear what accounts for the discrepancy in number of settlements surveyed, and secondly the original socio-economic report refers to 2,827 households being visited for census purposes while only 840 “*granted an insight of their*

*socio-economic reality*” (Schmidt-Soltau 2001: 2). The figure (2,827) corresponds to the total number of households within and around the Takamanda Forest Reserve and, by his own admission, 12% of these were either absent or refused to cooperate during the Schmidt-Soltau one-off surveys. Unless further surveys were undertaken, Schmidt-Soltau’s own reports contradict the data presented in later papers.

It should be remembered that although Takamanda may be remote by Cameroonian standards, Cameroon is the tenth wealthiest country in Africa (UNDP 2006) and economic analyses based on Cameroonian standards cannot necessarily be applied throughout the region. As an aside, the average GDP per capita in Cameroon is only a third of that of Gabon but over double that in Congo (UNDP 2006); so comparing even neighboring countries in the same region using Takamanda as the model is invalid. In addition, Takamanda runs along a highly porous international border with Nigeria, a voracious consumer of forest products including timber, NTFPs, and bushmeat. The economy in and around Takamanda benefits from these thriving markets and cross-border trade as forest resources in Nigeria continue to decline significantly (Malleon-Amadi 1993; Sunderland 2001; Sunderland et al. 2003b). Consequently, household incomes in Takamanda are significantly higher than they are in other remote areas elsewhere in Central Africa where there may be little or no market access and, as such, are not representative of the wider region. Based on an intensive three year study of 320 households which included a detailed baseline household survey followed by five recall surveys of the same households (to capture the effects and influences of seasonality), research funded by DfID found that the average per capita income for the inhabitants of Takamanda was 79.39 Euros (Malleon et al. 2006); higher, incidentally, than the figure cited by the Schmidt-Soltau surveys. The majority of this cash income is derived from the sale of forest products to Nigeria. These unique economic conditions are not present in the other survey sites in Central Africa and it is questionable whether it is appropriate to use such data for extrapolation. However, in order to calculate estimated income loss per capita from the supposed displaced peoples from each protected area in the analyses (a number which is vastly inflated), these unrepresentative figures from Takamanda are used – and multiplied together – creating unsubstantiated figures.

For Odzala National Park (Congo), the supposed economic loss caused by protected areas is calculated by the lost potential stumpage fees from logging. However, French colonial authorities established this park in part because of the low economic value of the forest area (low stem density) and none of the timber trees reach marketable densities (Maisels 1996). Hence, these extrapolations of data from other sites cannot be freely applied without knowledge of each forest.

The “Risk of Joblessness” discussion in the Schmidt-Soltau (2003: 537) paper suggests that “*it should be possible to negotiate an agreement with the rural population that they do not hunt certain endangered species*” by offering hunters guns instead of using wire traps. This suggestion demonstrates a lack of understanding of hunting practices in this area. Certainly in Korup and Takamanda areas, a significant proportion of hunting is carried out at night with the use of lamps. It is very difficult to distinguish the species being shot in the dark. This same recommendation was made in the hunting regulations of the buffer zones of the Nouabalé-Ndoki National Park, but with the stipulation that there be no hunting at night. In fact, the wildlife law of all Central African countries stipulates no night hunting (and no use of wire snares) anywhere in the country, inside or outside of protected areas.

Another significant criticism of Schmidt-Soltau's writings is his fundamental misunderstanding of the livelihoods of some of the groups of people he studied in Southwest Province, Cameroon (from the Korup and Takamanda areas). In his 2003 article, Schmidt-Soltau refers to his "livelihood survey" of the people in Takamanda and the challenge for the resettlement of "non-sedentarized people." In the Cernea and Schmidt-Soltau (2006) paper, several general references are made to the people as "hunter-gatherer societies" "incipient horticulturalists" and as going through "a shift from foraging to farming" (Cernea and Schmidt-Soltau 2006:1812). Whilst some of the cases he refers to may have once traditionally been "non-sedentarized hunter-gatherers" (e.g., Ba'aka) this is certainly not the case for the people of the Korup and Takamanda areas. The ethnic groups of these areas have been living in semi-permanent and permanent villages since at least the 16<sup>th</sup> century (Malleon 2000). Farming both for subsistence, for barter and cash income plays a significant role in the economy of these settlements. The inhabitants of the Korup Forest area have grown cocoa on their farms since the beginning of the 20<sup>th</sup> century. So to refer to these people as incipient horticulturalists or non-sedentarized people is misleading.

In Schmidt-Soltau's papers, the section "Facing the risk of homelessness" refers to "huts of semi-permanent settlements as well as huts of hunter-gatherers" that "hardly involve cash expenses and can be built without much effort." People of the Korup and Takamanda forest areas who live in what they regard as permanent structures with thatched or corrugated metal roofs with wooden window and door frames and wattle and daub, plank or cement block walls, would be appalled to read that their houses "can be built without much effort."

## Summary

To summarize, in the series of papers based on Schmidt-Soltau's studies, it is difficult to accept their evidence as fact. *If* the facts were correct, then there is a clear moral case to be made. We have looked at a subset of the protected areas cited by Schmidt-Soltau, and of these, many of the facts presented are misrepresented or are incorrect and it is clear that there was no "detailed study" undertaken at certain sites. This does not bode well for the rest of the case studies presented. Until there is a better-researched review of the possible impacts of protected areas on human welfare, based on substantiated (and substantial) field visits and thorough data collection, the basis for the claims made by Schmidt-Soltau and his colleagues should be viewed skeptically by scholars both in the conservation and socio-economic/socio-political fields. Publications like those produced by Schmidt-Soltau influence decision-makers at the large donor agencies and within national governments. When the information on which it is based is poorly gathered and makes false assumptions, it can misinform policies, which can be detrimental for conservation but also redirect focus away from rural issues in Central Africa that really need attention. Despite this, the overall issue of displacement and its role in conservation remains a vital one for analysis and action by conservation organizations as well as others.

<sup>1</sup> Defined as a situation "when all parties reported their satisfaction with the outcomes during our assessment" (Cernea and Schmidt-Soltau 2006b: 1815).

# PART 6

## THE MARINE REALM

### 6.1 Displacement in Marine Protected Areas: Making Sense of Social Change

Michael B. Mascia and C. Anne Claus  
World Wildlife Fund

In recent years, there has been increasing discussion of conservation interventions as both a vehicle for sustainable social development and as a source of social costs (Agrawal and Redford 2006; McCleave et al. 2006; Nagendra et al. 2006; Newing and Wahl 2004; Wilkie et al. 2006). Of particular concern has been the positive and negative social impact of parks and other types of protected areas. (Brechin et al. 2003; Colchester 1997; Stevens 1997). The physical, economic, and sociocultural displacement of local peoples from protected areas has generated especially intense discussion in the academic literature and popular press (Chapin 2004; Dowie 2005; Paddock 2006), as scholars and others have debated the concept of “displacement” (Cernea 2006), its extent and magnitude (Cernea 2000; Schmidt-Soltau 2005), and its moral or ethical appropriateness (Brockington 1999; West and Brechin 1991).

Like any protected area, a marine protected area (MPA) is a socially constructed set of rules that collectively governs human interactions within a spatially-defined area and, in so doing, allocates access to and use of natural resources among stakeholders (Mascia 2004). Because MPAs allocate access to marine resources – and the economic wealth associated with these resources – it is not surprising that MPA development, management, and reform are politically and socially contentious. Here we develop a conceptual framework for understanding different forms of displacement related to the establishment of marine protected areas, drawing upon the political economy literature to characterize the rights lost, retained, or gained. The reallocation of rights to marine resources directly and indirectly manifests itself in different social domains; across time; in space; and among groups.

#### Conceptualizing Displacement

Displacement has been defined in various ways by different authors. For some, displacement includes economic and social exclusion from resources (Cernea 2000), while others view displacement as physical exclusion, a phenomenon conceptually and morally distinct from the loss of economic or resource use rights. The concept of “displacement,” however, focuses on just one side of the coin (the excluded). To understand the full empirical and ethical dimensions of (marine) protected area displacement, it is critical to consider both the “losers” of resource rights and the “winners” of these same rights, which provides insights into issues of power, equity, and justice. Are the powerful gaining rights? Are “winners” more marginal or impoverished than the “losers”?

Focusing on rights reallocation, rather than physical displacement, also allows us to differentiate between the process through which protected area

rights are reallocated and the substantive impacts of this reallocation. The structure of decision-making processes has a major impact on how rights are reallocated – and to whom (Ostrom 1990) – making it essential to examine the process through which protected areas are established. Procedural justice, however, is distinct from substantive justice (Stone 1988). Here we focus on the substantive impacts of MPA rights reallocation, which enables us to characterize the types of social impacts that follow the emergence and evolution of MPAs (which may be the product of either legitimate or illegitimate decision-making processes). Rigorous study of the substantive social impacts of protected area rights reallocation provides the basis for decision makers to develop appropriate policies, such as compensation for those experiencing negative impacts and taxation of those given economic windfalls.<sup>1</sup>

### **MPA Establishment and Rights Reallocation**

All forms of “displacement” involve reallocation of property rights, but the specific types of rights lost, retained, and gained dramatically shape the magnitude, extent, and equity of social impacts. The most basic property rights that an individual may hold are the rights of *access* (Schlager and Ostrom 1992). *Access rights* are the rights to enter and to pass through a defined space. MPA access rights include rights of transit, the reallocation of which may prescribe how, when, and where individuals may travel in or through a MPA. Loss of travel rights may disrupt access to markets and social relationships among communities, as well as diminish sense of place (memory, history, and myth associated with location [Fortwangler and Stern 2004: 158]). Conversely, restrictions on certain forms of access (e.g., motor boats) may preserve cultural traditions and/or enhance other forms of resource use. Communities in Rarotonga, through reinstatement of traditional MPAs (Ra’ui), banned passage of jet and water skis in favor of other, less disruptive activities (Hoffman 2002).

*Withdrawal rights* are the rights to appropriate the flow of goods or resources generated by a natural or manmade resource system (Schlager and Ostrom 1992). Withdrawal rights, therefore, govern both consumptive (e.g., fishing) and nonconsumptive (e.g., scuba diving) forms of marine resource use. In MPAs and other natural resource systems, reallocation of withdrawal rights reshapes the manner in which resources can be exploited and, as a result, may have significant economic and social ramifications – particularly in resource-dependent communities. Researchers have documented both positive and negative impacts of MPA withdrawal rights reallocation on subsistence and commercial resource use patterns (Hoffman 2002; Ngugi 2001), traditional lifestyles (Fortwangler and Stern 2004; Gelcich et al. 2005), and cultural identity (Oracion 2005). Collectively, access and withdrawal rights are termed *use rights*.

*Management rights* are the rights to regulate resource withdrawal and to “transform the resource by making improvements” (Schlager and Ostrom 1992: 251). Thus, management rights confer the authority to determine what MPA resources may be exploited and when, where, and how such exploitation may occur. In countries with state-managed marine resources, the establishment of community-based and co-managed MPAs, for example, represent the partial (co-managed) or complete (community-based) transfer of state-held management rights to local resource users.<sup>2</sup> Devolution of management rights in the Moheli Marine Park (Comoros Islands), for example, led the local community to restrict certain types of fishing gear (Granek and Brown 2005). Significantly, management rights also include the rights to control resource transformation and improvement; in the case of MPAs, this includes installing mooring buoys to prevent boat anchor damage (e.g., Hol Chan Marine Reserve, Mascia 2000)



and adding fish aggregating devices to enhance fish catches (e.g., Miyako, Okinawa, Kakuma 2006).

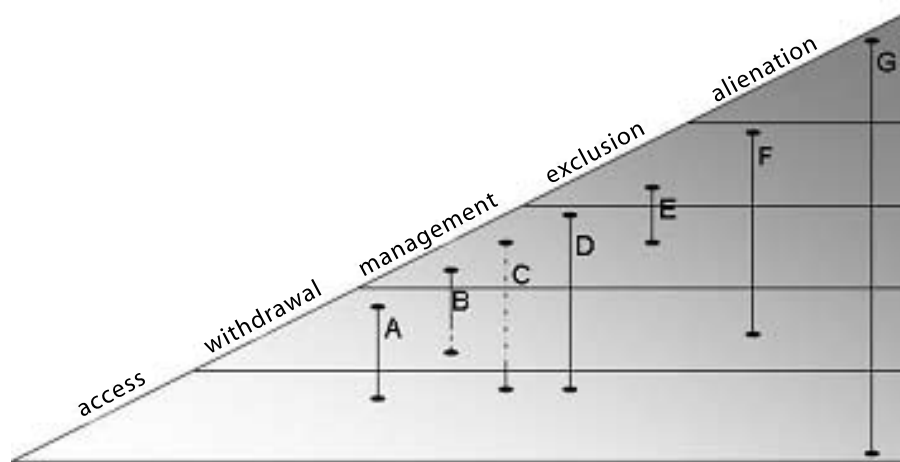
*Exclusion rights*, as the name suggests, confer the authority to exclude individuals from entering a defined space (Schlager and Ostrom 1992). Thus, while MPA management rights confer the ability to shape what MPA resources are exploited when, where, and how, exclusion rights confer the ability to determine *who* may engage in resource exploitation. In community-based and co-managed MPAs, local resource users (“insiders”) gain or retain exclusion rights and may prevent “outsiders” (e.g., non-local fishermen) from accessing the MPA for *any* manner of resource use (e.g., Apo Islands, Philippines, Russ and Alcalá 1999) or require non-locals to obtain a permit for entry, for which a fee is often required (e.g., Hol Chan Marine Reserve, Mascia 2000). These preferential resource use rights not only grant local users a greater share of the MPA resource benefit stream, but may also reduce local resource exploitation and create incentives for more sustainable patterns of resource withdrawal. Loss of exclusion rights, by contrast, transfers significant control over resource use to outsiders.

*Alienation rights* are the rights to transfer resource management and exclusion rights to another actor (Schlager and Ostrom 1992). The state generally holds MPA alienation rights, but there are situations in which alienation rights may be held by other actors or transferred as part of MPA establishment. In MPAs with terrestrial components, for example, local residents may hold rights of alienation to the land upon which they live, enabling them to sell or lease it to others. Similarly, fishermen and other resource users may hold the right to transfer rights of resource management and exclusion associated with marine territories or other marine resources. In the South Pacific and elsewhere, communities or kin-based groups often hold alienation rights over specific coral reefs or other defined marine features, which they may sell, lease, or rent to other users (Akimichi and Ruddle 1984; Ruddle 1996). In Belize, establishment of the Hol Chan Marine Reserve resulted in the reconfiguration of alienation rights; the authority to transfer lagoon fishing rights shifted from local fishermen (fishing territory “owners”) to the co-managed MPA authority, which subsequently restricted the transfer of fishing rights to intra-familial transfers only (Mascia 2000).

MPAs usually reallocate bundles of these five types of rights (Figure 1). In Australia, for example, establishment of the Lord Howe Island Marine Park reallocated access and withdrawal rights: who could enter (residents), the type of gear that entrants could use (drop lines), and what entrants could do with their catch (consumption only on island) (Bishop et al. 2004). MPAs in the Philippines reallocated management, withdrawal, and use rights by involving local stakeholders in some management decisions (*how* the MPA would be used) and subsequently reshaping rules governing consumptive (seasonal restrictions on shellfish gathering) and nonconsumptive (dive operations) activities (Oracion et al 2005). Establishment of the Moheli Marine Park in the Comoros Islands led to significant reallocation of management rights; local ecoguards now monitor and enforce the decisions of local communities regarding withdrawal (such as location and method of extraction) and access rights (no motorized boats, Granek and Brown 2005). The reinstatement of Ra’ui on Rarotonga similarly reallocated some management rights (community meetings determined what uses would be allowed) along with withdrawal rights (all consumptive uses banned for months to years, particular recreation uses allowed, Hoffman 2002). In some cases, reallocation of exclusion and management rights does not impact withdrawal or access rights; establishment of the Marine Extractive Reserve of Arraial do Cabo, Brazil, led to reconfiguration of decision-making

organizations without substantively changing resource use (da Silva 2004). In its most extreme case of MPA rights reallocation, the full set of property rights may be transferred as part of MPA establishment (Figure 1, G).

**Figure 1:** Protected area displacement continuum (based on property rights framework developed by Schlager and Ostrom [1992]). Figure highlights different bundles of property rights reallocated through MPA establishment. Vertical lines represent the reallocated bundle of rights (solid lines = permanent reallocation; dotted lines = temporary reallocation). Establishment of the Lord Howe Island Marine Park (example 'A'), for example, reallocated withdrawal and access rights from one authorized claimant to another. A: Lord Howe Island Marine Park, Australia (Bishop et al. 2004); B: Mabini, Philippines (Oracion 2005); C: Rarotonga (Hoffman 2002); D: Moheli Marine Park, Comoros Islands (Granek and Brown 2005); E: Arrial do Cabo MR, Brazil (da Silva 2004); F: San Salvador Island, Philippines (Christie et al. 1994); G: reallocation of all rights. See text for further discussion.



### Ripple Effects of MPA Rights Reallocation

MPA rights reallocation may impact the governance, wealth, health, education, social capital, and culture of resource users, local communities, and other social groups (Table 1, Khurshid and Mascia in prep.; Mascia 2004). As many have noted, MPA establishment may have negative impacts on those individuals and groups losing ownership and use rights, while those gaining corresponding rights may benefit accordingly (Mascia 2004). Wealth impacts may include change in income, consumption, and natural and material assets. Change in food security may be considered a wealth or a health impact. School enrollment rates and other educational variables may be shaped by MPA establishment. Less tangible (but no less important) MPA impacts on social capital and culture include shifts in trust, partnerships and alliances, identity, and sense of place.

The impacts of reallocating rights to MPA resources vary within and among social groups. MPAs often restrict fishing rights, for example, transferring these rights to others. In some instances, MPAs limit only certain types of fishing, transferring the benefits of resource extraction from one subgroup to another (e.g., net fishers vs. line fishers). In other cases, fishing rights are transferred from one community to another, as local resource users exclude fishers from outside the immediate community. In both of these cases, as well as in cases where all fishing is prohibited, limits on extractive resource use may create new economic opportunities for individuals engaged in dive tourism and other forms of non-extractive resource use. This reallocation of benefits may induce shifts in wealth, health, education, and culture, which can vary in accordance with the specific resource use and community, gender, class, religion, and age.

**Table 1:** Potential direct and indirect social costs and benefits of MPA rights reallocation. Categories adapted from Khushid and Mascia (in prep). Asterisked items (\*) indicate items highlighted by Cernea's framework of physical displacement risks (2000).

<b>Social cost</b>	<b>Social benefit</b>
<i>Governance</i>	
Decreased resource control Property lost* Use rights lost Conflict resolution mechanisms weakened	Increased resource control Property gained Use rights gained Conflict resolution mechanisms strengthened
<i>Wealth</i>	
Employment lost* Income lost* Assets lost* Consumption reduced	Employment gained Income gained Asset gained Consumption increased
<i>Education</i>	
Public services lost* Human capital lost* Education opportunities lost	Public services gained Human capital gained Education opportunities gained
<i>Health</i>	
Health diminished* Food availability reduced* Nutritional status diminished Psychological well-being diminished Health services reduced	Health enhanced Food availability increased Nutritional status enhanced Psychological well-being enhanced Health services increased
<i>Social capital</i>	
Social networks degraded* Social status lost* Partnerships/alliances lost Trust lost	Social network increased Social status gained Partnerships/alliances increased Trust gained
<i>Culture</i>	
Cultural space lost* Local knowledge lost Sense of place diminished Norms and values undermined	Cultural space gained Local knowledge gained Sense of place enhanced Norms and values reinforced

MPA rights reallocation may also have secondary social impacts. Users whose rights are restricted within a MPA may migrate to exploit natural resources in adjacent areas, creating new social challenges (e.g., resource conflict) and opportunities (e.g., novel management practices) for existing resource users and others in these new host communities. Simultaneous with this out-migration, those who gain rights may physically migrate to a MPA to take advantage of new opportunities, inducing change in their communities of origin and creating new challenges and opportunities in the MPA community.

MPAs not only reshape resource governance, but, through this process, induce changes in resource use patterns and in the resource system itself. Limiting consumptive resource use within MPAs generally leads to increases in the populations of fish and other species targeted by fishers (Halpern 2003; Halpern and Warner 2002). As these populations increase within the MPA, fishers with limited rights within the MPA may get better catches of fish. Furthermore, fish adults and offspring may “spill over” into adjacent waters outside the MPA; this spill over of both adults and larvae may increase catches in adjacent waters, compensating for the loss of fishing access within the MPA (Alcala and Russ 1990; Russ et al 2004). The positive externalities generated through this MPA spill over dynamic may create incentives for resource users to restrict their own behavior.<sup>3</sup> These spill over benefits may accrue to resource users across oceanographically-connected seascapes 10s-100s of kilometers wide. Research suggests that the initial biological benefits of MPAs appear within several months after MPA establishment (Halpern and Warner 2002), though it may take several years for the full benefits to accrue (Galal et al. 2002; Roberts et al. 2001; Ward et al. 2001).

## Conclusion

Protected area “displacement” touches upon numerous conceptually distinct and socially charged issues. Effective resolution of these legitimate procedural and substantive concerns requires us to disaggregate these issues, so that we may better understand each of them and the collective relationships among them. An explicitly property rights-based approach to understanding the social impacts of protected areas provides us with a fine-grained analysis to examine not only displacement, but the full range of positive and negative social impacts. Research demonstrates that MPAs have varied positive and negative impacts on local communities, depending upon how the MPA is designed and implemented. To date, however, scientific discussion of spatial, temporal, and cross-MPA variation in the magnitude and extent of these social impacts remains largely unexamined. A critical next step in conservation social science research, therefore, is to document and explain variation in the impacts of MPAs on governance, wealth, health, education, social capital, and culture.

<sup>1</sup> Focusing on the process through which protected area rights are reallocated allows us to better identify illegitimate decision-making processes (which may have either positive or negative substantive impacts) and design appropriate procedural reforms. Discussion of procedural aspects of protected area decision-making processes has focused on stakeholder participation and free prior informed consent (Dearden et al. 2005; Lepp and Holland 2006; McNeely 1999).

<sup>2</sup> Recent trends towards decentralization and devolution of marine resource management rights (often in the form of MPAs) (Johannes 2002) have reversed a centuries-old trend of state appropriation of marine resource management rights from resource users (Johannes 1978; Ruddle 1996).

<sup>3</sup> While MPA biological success and subsequent spillover creates incentives for resource users to restrict use and to comply with rules, the biological success of a terrestrial protected area may create negative externalities (e.g., crop-raiding wildlife) that create incentives to break ‘no hunting’ rules and limit spillover/conservation effectiveness.

# PART 7

## INTERNATIONAL POLICIES

### 7.1 Protected Areas and Human Displacement: International Conventions, Policy, and Guidance

Linda Krueger  
Wildlife Conservation Society Policy Program

Conservationists have demonstrated that people living around protected areas may receive direct and indirect benefits from those areas, including, for example: access to wildlife that leaves the protected area and becomes available to hunt in the buffer zone; watershed protection; local climate buffering; employment in ecotourism. However, there clearly are instances when local communities lose access to land, forest resources, and development opportunities when strict protected areas are established. In these cases, conservationists face both moral and practical dilemmas in balancing competing claims between the public good and individual or community economic and cultural losses. This paper will briefly discuss the issue of equity as it relates to costs imposed on local communities, whether through restriction of access to resources, or actual translocation, and the attempts of multilateral institutions to develop policy guidelines that can assist conservationists in cases where conservation activities may result in some form of displacement.

The past half-century has produced a large and increasingly sophisticated set of international instruments and guidelines governing issues of equity and the rights of local and indigenous people. Land rights have been central to this discussion. The issue of displacement of local people from existing or proposed protected areas shares many characteristics with displacement caused by development, urban renewal, or energy generation and even armed conflict. The development of international human rights law surrounding displacement (or forced evictions or involuntary resettlement) in these contexts, and the adoption of corresponding policies and guidelines by a broad range of institutions that may directly or indirectly be responsible for such displacement, provides WCS with the framework for developing its own policy for fair, transparent, and positive interactions with local and indigenous peoples who may live in or near conservation sites. This policy context also provides a lens through which to evaluate past conservation practices and the criticisms that have sometimes been leveled at them.

#### **Treatment of Displacement in International Human Rights Law**

Principles of land rights for local and indigenous people are derived from broader concepts of universal human rights – rights that should be granted to the individual regardless of the legal jurisdiction in which he may find himself.

The rights identified in the UN Charter were further delineated in the non-binding Universal Declaration on Human Rights in 1948,<sup>1</sup> which in turn served as the foundation to the International Covenant on Civil and Political Rights<sup>2</sup> and the International Covenant on Economic, Social and Cultural Rights, both negotiated in 1966.<sup>3</sup> Together, these documents establish the widely accepted

international norms on individual land rights, cultural rights, rights to movement, information, and other protections for indigenous peoples upon which much interpretation on forced evictions and resettlements is based.

On the basis of these agreements, the Committee on Economic, Social and Cultural Rights, a treaty-authorized adjudication body, concluded that “[f]orced evictions constitute prima facie violations of a wide range of internationally recognized human rights,” including the rights to freedom of movement, to choose one’s residence, to personal security, to work, to information and popular participation, and even family life. Evictions “can only be carried out under exceptional circumstances and in full accordance with relevant provisions of international human rights law.”<sup>4,5</sup>

Signatory states to human rights conventions (i.e., most countries) are legally bound under international law to ensure the internationally recognized human rights, and are responsible for displacement that is illegitimate or in violation of these agreements. States are obligated to apply appropriate penalties against any entity that carries out extra-legal displacement, including international organizations that sponsor or implement projects that contravene international protocols.<sup>6</sup>

### **Principles of Eminent Domain and Protected Areas**

Eminent domain has a long history derived from English feudal property laws, and is the only legal means by which private land rights can be usurped by the state. Nearly every country has legislation describing when and how private property might be taken by the state, and what compensation is required, although they vary in specific procedures, in the strength of their protections for private rights, and in compensation. These laws are frequently subject to capricious interpretation and application, and remain the subject of judicial interpretation, even in countries with well-developed legal systems (cf. *Kelo v. New London* in the United States).

To the extent that protected areas are established by governments, the taking of land or access to resources for the protected areas is governed by the relevant eminent domain laws of that country, and the state bears ultimate responsibility for the fair application of its laws, and for preventing forced evictions, no matter who may be driving that policy.<sup>7</sup> A taking that does not adhere to eminent domain laws of a country is by definition illegal. This, however, should not allow non-state actors such as NGOs or corporations the room to abrogate responsibility for outcomes that may harm local people; non-state partners in the creation of protected areas (or in any sphere) expose themselves to criticism on human rights grounds if their protected area establishment is expedited as a result of lax government enforcement or improper application of eminent domain in a country.

### **Conservation Community Response**

Traditional use rights and the protection of indigenous people have been on the radar screen of the major conservation NGOs for several decades.

#### *IUCN – World Conservation Union*

Conservationists have not been idle spectators in the human rights debate on displacement. Despite the criticisms leveled at conservation organizations for their disregard for local communities, the conservation world has often found itself in alliance with indigenous and local groups in efforts to avoid displacement due to development projects. IUCN has consistently taken the view that conservation goals are rarely incompatible with traditional land uses. IUCN

policy has also been explicit in its support of efforts to integrate traditional peoples into conservation practice.

Nearly every IUCN Congress has endorsed one or more resolutions, supportive policies that safeguard traditional forms of sustainable use and eschew displacement. The 2003 World Parks Congress in Durban highlighted its commitment “to involve local communities, indigenous and mobile peoples in the creation, proclamation and management of protected areas.” Of the major goals of the Action Plan negotiated at Durban was to secure the rights of indigenous peoples, including mobile indigenous peoples, and local communities in relation to natural resources and biodiversity conservation. Significantly, Durban also recognized the validity of applying a variety of protected area governance types (including community conserved areas) to all IUCN categories of protected areas.<sup>8</sup> Resolutions passed in Durban also strengthened IUCN policy against forced expulsions. The IUCN positions in some sense capture the “bigger picture” – that there are natural alliances between those who eschew diversity (cultural, biological, economic) and those who promote efficiency, market forces, and globalization.

#### *Convention on Biological Diversity*

The preamble to the convention notes the close dependence of traditional and local communities on biological resources. Article 8(j) of the Convention calls on parties to respect, preserve, and maintain traditional knowledge relevant for the conservation and sustainable use of biodiversity. With these emphases, the Convention has primarily concerned itself with securing the intellectual property rights of local and indigenous people (through coordination with and advice to the World Intellectual Property Organization)<sup>9</sup> and guaranteeing the inclusion of traditional knowledge in environmental impact assessments. The issue of displacement per se has not been significant within the CBD negotiations, as the treaty itself is weighted toward securing gains to local people from biodiversity.

*Ecosystem Approach.*<sup>10</sup> The ecosystem approach endorsed by the parties to the Convention implicitly recognizes that indigenous peoples and local communities are important stakeholders and are critical to the direct implementation of the Convention’s goals. The CBD’s guidance on sustainable use of biodiversity (the Addis Ababa principles<sup>11</sup>) promotes the needs of local people and implies they should be compensated for their efforts on behalf of sustainable use (including, presumably, uses foregone to enhance the prospects of long-term sustainability).

*Global Environment Facility.* The GEF, the financial mechanism of the CBD, was created largely in recognition of the unequal distribution of costs and benefits of biodiversity conservation. The GEF aims to cover the incremental cost to nations for securing the conservation and environmental benefits which accrue globally.

*Program of Work on Protected Areas.*<sup>12</sup> This program included specific actions toward improved governance, participation, equity, and benefit-sharing. The overarching goal of this program is to establish (by 2008) mechanisms to ensure equity of costs and benefits of protected areas. In practice, this requires signatories to assess the impacts of protected areas on local people and provide fair compensation for losses. Other targets require mechanisms to ensure the full and effective participation of indigenous and local communities in the establishment, management, and monitoring of protected areas.

*Traditional Knowledge and Intellectual Property Rights.* The CBD's focus on the preservation of traditional knowledge has led to extensive negotiation on the conduct of cultural and social impact assessments for any projects that will affect traditional lands, culminating in 2004 Akwé: Kon<sup>13</sup> guidelines, which suggest procedures.<sup>14</sup>

## **Development Agencies**

Economic development agencies and financing institutions have much more experience than conservation organizations in tackling displacement issues. The construction of dams alone has resulted in the displacement of millions of people, and, unlike the rezoning of land for protected areas, the inundation of traditional lands for hydropower causes irreversible displacement and a drastic change in the landscape and its resources. Millions more have been displaced through the building of urban infrastructure, ports, mines, irrigation projects, large industrial facilities, and roads and railways. As a result, development agencies that finance projects that lead to human displacement have been leaders in developing the guidelines for mitigating the negative effects of displacement, which can serve as a useful model for conservation organizations.

*World Bank Operational Guidelines.*<sup>15</sup> Each of the multilateral development banks has instituted guidelines to govern treatment of indigenous and local peoples whose lands or livelihoods are impacted by development projects. World Bank Operational Policy (OP) 4.12 states that its involuntary resettlement policy cover any expropriation of land that results in "(i) relocation or loss of shelter; (ii) loss of assets or access to assets; or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location, or...the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons." A key footnote to the policy further clarifies that the definition of "displacement" includes restriction on the use of resources for people living outside the area, or for those who continue living inside the park after its creation. As the definition has been adopted, the world's major development agencies have moved towards policy consensus that restricted access is a form of displacement."<sup>16</sup>

*Compensation.* The World Bank requires that compensation measures to mitigate impacts of displacement be determined with the participation of affected people during the design of the project. This participatory process helps establish the criteria for eligibility of displaced individuals, and measures to assist them in their efforts to improve their livelihoods, while maintaining the sustainability of the protected area. The World Bank also has an operational directive on indigenous peoples (OD 4.20) that instructs the bank to assist borrowers in helping to establish or strengthen traditional peoples' land rights prior to any project developments that may impact land titles.

The Organization for Economic Cooperation and Development (OECD),<sup>17</sup> Asian Development Bank,<sup>18</sup> Inter-American Development Bank,<sup>19</sup> the IFC,<sup>20</sup> and others have instituted similar guidelines for the protection of local and indigenous people.

## **Discussion**

In conflict resolution, fairness of outcomes is mainly determined by the adequacy and perceived equity of the process by which those outcomes were achieved, and thus international guidelines on displacement focus on insuring equality of



stakeholder participation and requirements for free, prior, and informed consent of all participants in a conflict situation.

Conservationists have intrinsic motivation to support the fair distribution of costs and benefits of protected areas, as achieving this goal has both ethical and practical components for the implementation of conservation. Conservation organizations, as members or partners to IUCN, have implicitly endorsed the resolutions against physical displacement of local people except under the rarest exceptions and only after high standards of free, prior, and informed consent have been met. On the practical side, it is self-evident that protected areas should be easiest to manage when they have community support. It would therefore seem that conservationists have powerful, built-in incentives to avoid displacement, or at least to manage it with utmost concern for ameliorating local peoples' grievances.

In examining the repeated, increasingly emphatic and comprehensive resolutions, recommendations, and guidelines put forth by the international human rights and conservation communities, it is difficult not to conclude that conservationists have in fact been quite responsive to the concerns of indigenous and local communities; indeed, one could argue that conservationists have been natural allies with local people, at least through formal policy-setting mechanisms in IUCN and the CBD. Why, then, have these guidelines, some adopted decades ago, not been effective at deflecting criticism by local people, indigenous rights groups, and social scientists? If we accept as given that these criticisms and grievances have a legitimate basis, only three possible explanations remain: 1) The laws/guidelines are inadequate; 2) the guidelines aren't followed by practitioners; and/or 3) conflicts are real and intractable at some level and simply must be managed more effectively.

A significant shortcoming of international covenants of any kind is that all of the exhortations of the international community imply some foundation of good governance at the national level to provide for the impartial and equitable application of those covenants. Good governance relies on such factors as fairness and legitimacy of political actors, voice and participation by those closest to the resource (subsidiarity), the possibility of legal recourse, transparency, and accountability.<sup>21</sup> These characteristics are sadly lacking in many polities.

Implementation of best practices on displacement is also hindered by questions over land tenure and the need to determine the legitimacy of various claims as a prerequisite to even managing a fair participatory process. This issue extends far beyond the scope of conservation, but yet is integral to our work to establish fair and effective governance mechanisms for protected areas.

Despite the apparent policy consensus that the support of local communities is vital to the success of protected areas, in practice achieving this support is a substantial undertaking. At a minimum, success requires a legitimate participatory process in which all parties have the opportunity to defend their rights. Even after a decision is reached, ongoing accountability and transparency is necessary to provide community groups assurance that arrangements are being implemented as agreed. Monitoring and evaluation of management effectiveness, and of the long-term impact of restricted access, are important components, but are often overlooked in park management planning. Given these complexities, it would indeed be surprising to find a protected areas project that did not falter in some aspect, leaving some stakeholders dissatisfied and critical of the process. Land use policy clearly can sometimes bring parties into conflict that is not amenable to negotiation.

Resolving displacement issues has increasingly been seen by international development agencies as integral to their missions of development and poverty alleviation, rather than as just the sacrifice which can be mitigated by a cash payment.<sup>22</sup> This perspective may provide a useful model for conservation as well.

This is not to suggest that conservation organizations divert their mission to resolving poverty alleviation problems, but rather that working in partnership with indigenous and local communities to resolve the conflicts surrounding human access to protected area resources is inherent to the task of conservation and in fact provides a more relevant model for the future. At a time when 12% of Earth's land surface is already under some form of formal park designation, it is difficult to imagine a substantial expansion of the current state-managed protected areas portfolio. Displacement conflicts in the future are less likely to revolve around the establishment of new protected areas than around managing land uses more generally. Of greater potential interest is how to adjudicate "displacement" or "access" issues as they relate to zoning and other restrictions (e.g., hunting bans) on private lands, forestry concessions, or other multiple-use lands on which more wildlife-friendly policies might be suitable. In this context, managing "displacement" is just one aspect in development of a broader public policy consensus on the integration of conservation and development goals more generally. Significant opportunities for conservation organizations to influence this discussion exist at the local, national, and regional levels, but our influence in part depends on our ability to forge alliances with affected rural communities.

The development of new paradigms for governance and management of protected areas can help us negotiate these alliances. WCS has notable opportunities to provide input to international-level policies on governance in a way that supports our conservation goals while underscoring our common cause with local communities. WCS has already shown itself able, through various programs, to develop site-specific solutions to these inherent conflicts (c.f. McNab, Karanth, Castillo, this volume) With our deep commitment to sites and to science-driven conservation, we have both the local knowledge and the technical expertise to help convince a broad group of stakeholders of the value of conservation among competing claims at a site. Our effectiveness in this process may be aided by a more explicit institutional commitment to working with a broader range of stakeholders on the basis of principles established by a number of the international policy instruments noted in this paper.

<sup>1</sup> Universal Declaration of Human Rights, in G.A. res. 217A (III), U.N. Doc. A/810 at 71. 1948.

<sup>2</sup> International Covenant on Civil and Political Rights (1966), entered into force March 23, 1976.

<sup>3</sup> International Covenant on Economic, Social and Cultural Rights (1966), entered into force March 23, 1976.

<sup>4</sup> Committee on Economic Social and Cultural Rights, The right to adequate housing (Art.11.1): forced evictions: 20/05/97. 1997. Office of the High Commission for Human Rights.

<sup>5</sup> Office of the High Commission for Human Rights, Forced Evictions and Human Rights. Fact Sheet No. 25. 1996. Available at <http://www.unhchr.ch/html/menu6/2/fs25.htm>.

<sup>6</sup> Expert Seminar on the Practice of Forced Evictions, The Practice of Forced Evictions: Comprehensive Human Rights Guidelines on Development-Based Displacement. June 1997.

<sup>7</sup> Office of the High Commission for Human Rights, Forced Evictions and Human Rights. Fact Sheet No. 25. 1996. Available at <http://www.unhchr.ch/html/menu6/2/fs25.htm>.

<sup>8</sup> Borrini-Feyerabend, G.K., Ashish; Oviedo, Gonzalo, Indigenous and Local Communities and Protected Areas: Towards Equity and Enhanced Conservation. Best Practice Protected Area Guidelines, ed. A. Phillips. 2004: IUCN-World Commission on Protected Areas; Commission on Environmental, Economic and Social Policy.

<sup>9</sup> See, for example, Decision VI/10.

- <sup>10</sup> Convention on Biological Diversity, Vth Conference of Parties, Decision V/6: Ecosystem approach. 2000. Available at <http://biodiv.org/decisions/default.asp?lg=0&cm=cop-05&d=06>.
- <sup>11</sup> Convention on Biological Diversity, Addis Ababa Principles and Guidelines - Full Text. 2003. Available at <http://www.biodiv.org/programmes/socio-eco/use/addis-principles.asp#2>.
- <sup>12</sup> Convention on Biological Diversity, Conference of Parties, Decision VII/28: Programme of Work on Protected Areas. 2004. Available at <http://biodiv.org/decisions/default.aspx?m=COP-07&id=7765&lg=0>.
- <sup>13</sup> Pronounced “agway-goo,” a Mohawk term meaning “everything in creation.”
- <sup>14</sup> Secretariat of the Convention on Biological Diversity, Akwé: Kon Voluntary guidelines for the conduct of cultural, environmental and social impact assessment regarding developments proposed to take place on, or which are likely to impact on, sacred sites and on lands and water traditionally occupied or used by indigenous and local communities. CBD Guidelines Series. 2004, Montreal: CBD.
- <sup>15</sup> World Bank, The World Bank Operational Manual: Operational Policies, OP 4.12. 2004. Available at <http://wbIn0018.worldbank.org/Institutional/Manuals/OpManual.nsf/tocall/19036F316CAFA52685256B190080B90A?OpenDocument>.
- <sup>16</sup> Cernea, M. 'Restriction of Access' is Displacement: A Broader Concept and Policy. Resettlement News (2005). Available at <http://www.displacement.net/issue12.htm>.
- <sup>17</sup> OECD Development Assistance Committee, Guidelines for Aid Agencies on Involuntary Displacement and Resettlement in Development Projects. 1992, Organization for Economic Cooperation and Development.
- <sup>18</sup> Asian Development Bank, Involuntary Resettlement. 1995. Available at [http://www.adb.org/Documents/Policies/Involuntary\\_Resettlement/default.asp?p=rsttImnt](http://www.adb.org/Documents/Policies/Involuntary_Resettlement/default.asp?p=rsttImnt).
- <sup>19</sup> Inter-American Development Bank Indigenous Peoples and Community Development Unit, Operational Policy on Indigenous Peoples (GN-2296). 2004.
- <sup>20</sup> International Finance Corporation, Performance Standard 5: Land Acquisition and Involuntary Resettlement. 2006. Available at [http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/pol\\_PerformanceStandards2006\\_PS5/\\$FILE/PS\\_5\\_LandAcqInvolResettlement.pdf](http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/pol_PerformanceStandards2006_PS5/$FILE/PS_5_LandAcqInvolResettlement.pdf).
- <sup>21</sup> World Commission on Protected Areas, Recommendations of the Vth IUCN World Parks Congress. 2003. Available at <http://www.iucn.org/themes/wcpa/wpc2003/pdfs/outputs/wpc/recommendations.pdf>.
- <sup>22</sup> Asian Development Bank, Involuntary Resettlement. 1995. Available at [http://www.adb.org/Documents/Policies/Involuntary\\_Resettlement/default.asp?p=rsttImnt](http://www.adb.org/Documents/Policies/Involuntary_Resettlement/default.asp?p=rsttImnt).

# PART 8

## ACADEMIC PERSPECTIVES

### 8.1 From Displacement Conservation to Place-Based Conservation

David Barton Bray  
Florida International University

The viability of biodiversity conservation based on a model of protected areas is being questioned in the developing world, and new evidence is emerging on the social and ecological costs of displacing people in order to “impose wilderness” (Neumann, 1997; Igoe, 2004). At the same time, new data shows that certain forms of land use and tenure regimes can conserve most biodiversity, although there are tradeoffs in all forms of conservation land use. A vigorous debate that was frequently based on fragmentary data is giving way to a more nuanced appreciation of the costs and benefits of varying forms of land use and their benefits to conservation. This is greatly assisted by the maturation of models of community forest management such as for timber in Mexico and indigenous reserves in Brazil (Velásquez et al. 2004; Bray et al. 2005; Nepstad et al. 2006)

Strict protected areas or “parks” were a US creation, as in the iconic parks of Yellowstone and Yosemite, although it is now known more clearly that in both cases wilderness was created by banishing or placing under strict controls indigenous peoples who had managed the landscape for millennia. As the strict protected area model has vigorously expanded in the developing world over the last several decades, parks have commonly been created in areas where indigenous and local peoples are still resident, and where displacement, when attempted, receives a good deal more attention than it did in the 19<sup>th</sup> century US.

Human displacement for the creation of parks has a troubled history in the developing world. Despite some early examples, active displacement of long resident peoples in Latin America is rarely done (Bray and Anderson 2005). Displacement efforts are slightly more common when external colonization by land-hungry settlers overruns a protected area, but barely so, since even quasi-democratic governments prefer a few angry environmentalists over thousands of poor citizens. Active displacement does, however, continue to occur in other parts of the world. For example, an estimated 40-45,000 people were displaced from nine protected areas in six Central African countries (Cernea and Schmidt-Soltau 2003). This assessment estimated that as many as 250,000 may have been adversely affected by these displacements, largely without compensation. That these large-scale recent displacements take place in the some of the poorest societies and most authoritarian governance systems in the world should cause conservationists to question the defensibility and future of this strategy.

Overall protection strategies are shifting from strict protected areas to “people-centered protected areas” (Naughton-Treves et al. 2005). It has been estimated that only around 9% of the world’s 98,400 terrestrial protected areas are in the strictest IUCN categories of I and II (Naughton-Treves et al. 2005: 231). Parks are bureaucratic top-down creations of central governments and

are thus dependent on the vagaries of public policy and unstable budgets, particularly if there have not been sustained efforts to co-manage them with local residents, as is normally the case. Given pressing economic problems, governments are unlikely to consistently dedicate adequate funding to biodiversity conservation. Recent experience in the US shows how shifts in public policy can quickly reduce protection on federal lands.

When public parks also alienate resident people or shut them out of decision-making, a crucial conservation opportunity is lost. People defend places from which they derive their livelihoods and their identity (Kates et al. 2001; Cheng et al. 2003). Long-resident local peoples may indeed contribute to biodiversity loss, particularly through subsistence and commercial hunting. But new efforts to combine traditional knowledge and scientific knowledge are emerging as indigenous people struggle with new constraints.

As well, long settled rural peoples are showing that even relatively intensive human use can be compatible with a substantial degree of biodiversity. Timber production has been heavily criticized (Rice et al. 1997; Rice et al. 2000) but there is evidence that many forms of selective logging have minimal effect on biodiversity (Putz et al. 2000). We are also at a stage of research into the relative effectiveness of various land tenure regimes for biodiversity protection. This allows for better data in the determination of what works effectively in different situations and the costs and benefits of different strategies. For example, Naughton-Treves et al. (2005) call for “expanding the frontier of research into protected area effectiveness and deforestation” and suggest more research on buffer zones. The most appropriate comparison by which to gauge protected areas is not “no protection” but community-based management (Bhagwat et al. 2001). This analysis can be made with the increasing emergence of community forest management in Mexico and Guatemala and the emergence of indigenous territories elsewhere in Latin America.

In Mexico, the presence of many large forest *ejidos* (common property land grants) have some similarities to indigenous or extractive reserves in other countries, although with a much longer history and more secure land tenure (Bray et al. 2003; Bray et al. 2005). Community forest enterprises (CFEs) are a mature social and economic sector which compare with protected areas in terms of the preservation of forest cover and other measures of biodiversity conservation (Antinori and Bray, 2005). Bray et al. (2004) found that a region of community forests managed for the production of timber had the lowest rate of land use change recorded anywhere in southeastern Mexico, and was lower than two other regions that had protected areas at their heart (see also Bray and Klepeis 2005). Duran et al. (2005) found that community forests in Quintana Roo and Guerrero, in tropical and temperate forests, had similarly low rates of deforestation to a national sample of 74 protected areas. In collaboration with the Wildlife Conservation Society, a study is underway that examines the conservation performance of community timber management with protected areas at the level of the Maya Forest, including the Petén of Guatemala (Bray et al. 2005). Early evidence suggests that community managed forests may be significantly superior at maintaining forest cover in the face of advancing agricultural frontiers, although both parks and community forests protect similarly in areas under less pressure. In both the Mexican and Guatemalan cases, multi-level forest governance institutions have been created by the communities, with both community level institutions and inter-community organizations, with forest extraction regulated by the state under its environmental laws. These institutions have as much chance of resilient and effective management as underfunded government bureaucracies.

But what is happening under the canopy in these timber-extracted community forests? WCS studies have shown that community harvest intensities in the Guatemalan Petén are among the lowest in the world and have little impact on biodiversity (although there is the long term and debated issue of mahogany harvest sustainability, see also Snook 2005). A recent study by Conservation International scientists found that mahogany logging in the southeastern Amazon Basin had little impact on small mammals, habitat structure, and seed predation (Lambert et al. 2005). Earlier studies showed that the community logging in Quintana Roo is “benign” to both migrant and resident bird species.

Many protected area advocates argue that only large uninhabited forests can preserve keystone predators like jaguars. However, Gerardo Ceballos, the head of the only large scale study of jaguar populations in Mexico, has compared jaguar habitat in both protected areas and community managed forests. He and his team noted that “in the Calakmul Biosphere Reserve, there have been invasions of *ejidos* all along its southern border, where several have penetrated the nuclear zone.” Braking this accelerated advance of the agricultural frontier is the most important challenge to resolve in the next decades. The forest *ejidos* present a viable alternative in this sense. For example, in the *ejido* Caobas, in Quintana Roo, great has been our surprise to find a diversity of species, including jaguar, tapir, and white-lipped peccary, in logging areas (Ceballos et al. 2005). The forest of Caobas has been logged by the community for over 20 years (Wilshusen 2005). Large predators and managed human use *can* coexist on landscapes, just as they do with difficulty in the American West.

All of these experiences in conservation are based in places where people live and where they defend their livelihoods. In most of these cases, no one can talk about displacing them because they are the owners or have secure legal access. The emergence of “place-based” conservation that has little to do with so-called “integrated and conservation and development projects” is a new robust form of biodiversity conservation, and merits full inclusion as the second major pillar of biodiversity conservation (after protected areas). The emergence of community conservation economies can form part of landscape mosaics with stricter public protected areas in regions where they are accepted as part of broad consultative processes and supported by local stakeholders.

## 8.2 Reflections on Conservation, Displacement, and Exclusion

J. Peter Brosius  
University of Georgia

*[Before offering the following comments, it is important to note the social science position from which I write. First, as a long-time observer of indigenous rights movements, I view some of the contemporary challenges to conservation by local/indigenous communities in the broader context of these movements and their histories. Second, I write as one who has often written about conservation from a critical theoretical perspective. At the same time, I have also been challenged repeatedly by my students and others who are weary of critiques that speak only to academic audiences. They have convinced me that when analyzing conservation, if we don't have anything to say to the conservation community, our analyses are of limited value. Third, I write as one who has devoted a great deal of attention to analyzing tensions between conservation and the social sciences. Though a strong proponent of fostering more productive links, I believe social scientists have to aspire to something more than just being allies with the conservation community: Being liked and being effective in changing the world are not necessarily the same thing. Fourth, as an anthropologist, I think it is important to recognize that culture exists not just in out-of-the-way places, but also in places like Gland, Washington, DC, and New York. Institutional cultures guide the way conservation organizations do their work, and I believe most would benefit from institutional ethnographies. Finally, I write as somebody who has been a witness to logging and plantation development in Southeast Asia my entire professional career. Ecological degradation and loss of biodiversity are not abstractions for me, and I regard conservation as a fundamental value commitment. At the same time, conservation is not the only ethical proposition that we must consider in making decisions about particular places or about the future of the planet as a whole.]*

Not only have conservation organizations been severely criticized in high profile publications, they are also the subjects of trenchant critiques by local/indigenous advocates, academics, and others. It is difficult to foresee the long term consequences of these critiques, but they could be very important for the future of conservation. In several contemporary forums, local community advocates have put forward propositions for organizing truth and reconciliation commissions to inquire into past injustices promulgated in the name of conservation, and the idea of restitution is receiving increasing attention.

### **A Confluence of Critiques**

It is a rather striking development that conservation has now become one of the latest targets of the global indigenous peoples' movement. After all, this is a movement that began gaining momentum in the 1980s by mobilizing against extractive industries and national governments encroaching on their traditional territories. Today some in the indigenous peoples' movement have come to equate conservation with the extinguishing of rights, merely the latest in a long line of attempts to dispossess them. Whether this is justified or not is beside the point: Conservation organizations have entered a new era. The arguments indigenous advocates are making have gained a great deal of attention in

international forums such as the World Parks Congress, World Conservation Congress, and Convention on Biological Diversity Conference of the Parties meetings. They make persuasive demands that are continually gaining traction. If not addressed constructively, the consequences for global conservation efforts could be devastating. A constructive response is necessary, one that directly engages with indigenous and local critiques rather than responds defensively or without solution.

Indigenous and local communities are not the only ones that have developed trenchant critiques of conservation. In the last ten years or so, we have witnessed a remarkable proliferation of academic critiques of conservation, particularly from anthropologists and geographers. This trend is evident in the work of figures such as Jim Igoe, Roderick Neumann, Paige West, Kai Schmidt-Soltau, Janice Harper, Celia Lowe, and Peter Brosius. What accounts for this proliferation of academic critiques? Two factors might be suggested.

First, because of the nature of the work they do, anthropologists and geographers find themselves in or near protected areas. Some researchers have long histories of work in those places, long pre-dating the appearance of conservation initiatives. They speak local languages and have strong connections to the communities in which they have worked. They are thus highly sympathetic when they learn of hardships imposed on those communities that result from protected areas or resource restriction.

Second, many academics are drawn to the study of conservation through their interest in a series of theoretical trends that emphasize issues of power and knowledge. These academics tend to arrive at conservation sites after boundaries have been drawn. The perspective they bring to bear is often framed by colonialism and other forms of Northern domination of the Global South, and they tend to portray conservation organizations as powerful actors: agents of dispossession whose practices value nature at the expense of local communities. As Kent Redford (pers. comm.) has put it, such anthropologists might have their goal be to “bag a BINGO” in order to establish their research credentials (perhaps since development agencies and corporations have already been critiqued). Research done in this way rarely has any substantive effect in changing conservation practices, not only because it alienates practitioners, but also because it usually reaches only a small academic audience and it employs too much jargon.

Recent years have also seen the publication of a series of high-profile critiques in popular media, disseminated widely over the internet (for example, those of Mac Chapin and Mark Dowie). Unlike academic critiques, these reach large audiences and thus have a greater potential to impact the work of conservation organizations.

The question that confronts conservation organizations is how they should respond to all of these critiques. In their essay, Agrawal and Redford provide a series of response options (see first chapter), of which only a “positive program of action” would be viable and acceptable. On a philosophical level, one might allow that “aggressive conservation” may sometimes be justified. This, however, is the rare exception, and the burden of proof is great. On the alternate end of the spectrum, “aggressive compensation” may not be an adequate solution, because merely throwing money at a problem can create further problems. So what does a “positive program of action” entail? It would have three key elements: (1) engage with critics and their questions, (2) examine current conservation categories and knowledge-making practices, and (3) examine conservation legitimacy and moral authority.



## **Engaging with Critics and the Questions They Pose**

Before one can adequately engage with critics, it makes sense to begin an assessment of the current situation, as was done at the White Oak meeting in May 2006. However, as this process of self-assessment progresses, it becomes necessary to engage more directly with critics.

However, at the White Oak meeting, there was little mention of engagement. At times it seemed that an attitude of pure empiricism prevailed; that is, that the primary challenge facing conservation organizations was to demonstrate that the claims of critics are inflated or inaccurate, and that if that could be demonstrated and truth prevailed, criticisms would evaporate. While such a strategy may assuage the concerns of some audiences, it is naïve to think it will have much effect in the long run. Serious engagement with key critics is imperative.

Who are these “key critics”? At the forefront of any such effort are indigenous actors. There is, of course, an intrinsic difficulty in defining such a program of engagement, given the variety and particularity of indigenous and local actors. However, there are a number of key nodes through which this engagement can begin: organizations that work with, or have credibility with, or represent indigenous and local actors. The Forest People’s Programme is one such actor, but numerous other regional and global alliances exist as well.

Engaging directly with other kinds of critics, especially academics, may be even more difficult, but is just as necessary. It is difficult because academic critiques vary widely, and thus demand a variety of potential responses. Some academic critiques are firmly grounded in observation of local contexts, while others are motivated by conceptual concerns. It is also important to recognize that among academics who work on conservation there exist two broad ranges of opinion. On the one hand are those who believe that if academics want to have a place at the conservation table, they should learn to work in ways that deliver the social science that conservation actors say they need. Those in this category are concerned about the proliferation of academic critiques that may only serve to aggravate conservation practitioners, perpetuating a view that the social sciences have little to contribute to conservation. On the other hand are academics who believe they have something to contribute beyond helping conservation practitioners. This group is wary of participating in projects that they perceive to be about managing people and engineering consent. Further, they believe, the conservation community may not be asking the right questions. They believe that they have insight as to why conservation programs are not working. Some of those insights, they recognize, may not agree with the missions or practices of conservation organizations. Those who produce analyses of this sort do not believe that they should soften their critiques. At the same time, there is a group of influential academics who are weary of critique simply for the sake of critique. They are interested in serious engagement with the conservation community so that it understands the conceptual source of the questions being asked.

A second question pertains to the nature of engagement with critics of conservation. Two broad approaches are suggested. One approach is to debate a series of major questions: Is displacement of people ever justified? Who should determine conservation priorities in a world of trade-offs? However, this approach is rarely productive because it can only ever provoke categorical responses. Anthropologists and academics have the luxury of dodging the answers, but practitioners do not. These questions would serve to solidify a series of polemical positions that would continue to pit each viewpoint against the other to the detriment of conservation.

Another approach is to engage with a more modest set of questions or contexts. This is a much more promising approach. This means to focus on specific places. It might also mean to focus on narrower conceptual concerns; how specific social science approaches, for instance, can inform the practice of conservation. While there remains much potential for disagreement, such an approach also has a great deal of potential for progress through collaborative engagement and allows both sides to look at the highly variegated details of each conservation situation.

### **Categories and Knowledge-Making Practices**

In their framing essay, Agrawal and Redford argue that the scientific basis for displacing people requires additional research. Indeed, there is a serious need to re-examine some of the categories that define what conservation actors do, and some of the tools that are used to produce information about places.

From a social science point of view, one of the most troubling developments in conservation has been the proliferation of rapid methods that are designed for the convenience of hypermobile expatriate experts. Such rapid methods are flawed not only because they mostly produce shoddy research, but also because they only serve to reinforce pre-existing assumptions and categories. This concern extends beyond the displacement issue, of course, and to other fields of international field research. However, there is a need for conservation organizations to take stock of the social science methods they use, or don't use, in conservation planning and implementation.

One area that deserves special attention is methods that address histories of land use in areas of conservation interest. Until recently much conservation thinking has been guided by the idea of wilderness: that the places most worth protecting are those that exist untouched by human presence. Humans have been viewed primarily as an invasive species, encroaching on otherwise pristine areas, their activities leading inexorably to the erosion of biodiversity. This assumption has had two major consequences for the practice of conservation. First, much conservation planning has mandated the exclusion of humans from biologically diverse landscapes, or the restriction of livelihoods of local people in such areas. Second, anthropogenic landscape processes have been viewed almost exclusively as threats to biodiversity. Conservation research has focused overwhelmingly on elements or patterns of biodiversity, while largely ignoring histories of land use in areas of conservation interest. As a result, the ways that previous generations of local peoples have shaped current patterns of biodiversity composition have been overlooked. As several researchers have demonstrated, actions taken in the past without thorough knowledge of historical patterns of land use have resulted in the exclusion of people from areas where human activity has shaped species composition and density over millennia. In short, the identification and creation of protected areas has not been much informed by an historical perspective.

In recent years, this assumption has been challenged on several fronts. First, a substantial body of critical scholarship has emerged challenging the idea of pristine wilderness on conceptual grounds. Second, archaeologists, geographers, and ecologists have produced empirical studies demonstrating the anthropogenic nature of much of what had been deemed "pristine" natural areas. Third, against the assumption that anthropogenic landscape modifications are inherently destructive, researchers have demonstrated that human modification of landscapes can actually enhance soil and water quality and maintain or increase levels of biodiversity, and that agroecological biodiversity as a result of landscape management by local communities may be an important means of *in situ*

conservation. Fourth, as noted, indigenous communities have challenged the assumptions of conservation practitioners that indigenous lands are *terra nullis*. Taken together, these studies and critiques have questioned the strict separation between pristine nature and humans, and argued for recognition of the role of human history in the creation of landscapes.

In spite of these challenges, few in the conservation community have responded to critiques of the wilderness concept or to empirical studies of biodiversity-rich anthropogenic landscapes. While conservation planners may recognize the anthropogenic nature of landscapes targeted for conservation, it does not translate into significant changes in conservation planning. Do conservation organizations, in planning conservation interventions, actually devote effort to a thorough assessment of the historical ecology of the places they are trying to save? Perhaps such knowledge would change the way that places are managed – or perhaps not -- but without this knowledge, conservation is foreclosing the possibility that human displacement or exclusion might not actually be best for achieving conservation goals.

There are, of course, many places where a recent influx of people is having truly devastating effects on wildlife, and where efforts to control this may be justified. But there are other cases where exclusion is undertaken without adequate justification. In such cases, displacement is part of a categorical inertia that reflects an historical legacy of simplistic assumptions that lead conservation practitioners to “misread” landscapes and threats. For instance, in Pulong Tau National Park in Sarawak, Malaysia, the government has decided to enforce strict protection with park boundaries rather than acknowledge long histories of use of forests in ways that are in no way contrary to conservation goals. In Nanda Devi National Park in Nepal, local communities were prevented from grazing their livestock within park boundaries, despite the fact that there was little evidence that grazing was a threat to biodiversity. Categories of protection themselves need to be challenged, because when these categories translate into actual regimes of management, they have real impacts on people’s lives. The question is whether these categories can be reconfigured in light of recent research in ways that are less antagonistic to local livelihoods.

### **Legitimacy, Credibility, and Moral Authority**

As the previous discussion illustrates, examining the categories we use and understanding how those categories are made is not just an academic preoccupation. There is a lot at stake in the categories used to guide decisions about conservation, and this question of categories is directly related to the topic at hand. When discussing the displacement or exclusion of people from protected areas, it matters whether it is framed as a matter of *livelihoods* or as a matter of *rights*. Of course, this distinction between livelihoods and rights is one that has received considerable attention. In making this distinction the bottom line is that a focus on livelihoods economizes the equation. The question for practitioners is limited to how people who are displaced can be helped to develop alternative ways of making a living, and what level of investment is necessary to accomplish that. On the other hand, a focus on rights introduces a moral or ethical dimension to the question of displacement: questions as to who has the standing or legitimacy to displace people, under what conditions is displacement justified, whether rights can be extinguished against the will of those who possess them, and whether they can be extinguished through monetary transactions. The discourse of rights is fundamentally about human dignity, about the exercise of power, and about a prior context of histories of marginalization.

When WCS or other conservation actors become involved in contexts which dictate the need for displacement or exclusion, their legitimacy becomes a key issue. Conservation organizations should not assume that rights-based arguments against displacement are softened due to the noble mission of conservation. As noted, to many protesters against displacement, conservation organizations represent the Global North, and bring to mind legacies of colonialism and exploitation. For all the talk of working with “local partners,” many critics propose that conservation organizations have no legitimate role in making decisions about exclusion and displacement.

Often when faced with challenges of this sort, the response, regardless of their field of practice, is to advocate development of a code of ethics to guide their practice. While this may be a useful starting point, developing a code of ethics will probably not solve the problem. Many enterprises that are of questionable moral status – the PR and advertising industry being perhaps the best example – are bound by codes of ethics. Such codes may be a good starting point for defining responsible forms of practice, but they are nothing more than that.

This does not mean that the situation is hopeless and that conservation organizations should give up. There is a crucial role for organizations like WCS, WWF, TNC, and CI in those places where biodiversity is disappearing. And there may be limited cases in which displacement or exclusion is the only option for achieving biodiversity goals. One of the greatest challenges facing NGOs today is to take steps to maintain and enhance their moral authority and legitimacy, rather than undermine it.

First, it is imperative to recognize that legitimacy is plural and multidimensional. This questions actions premised on the assumption that legitimacy is unidimensional and is derived from those in authority: that if activities are regarded as legitimate by national governments, all potential challenges to legitimacy have been considered. Conservation organizations working in the context of authoritarian nations such as Burma should especially heed this warning. The legitimacy to act derives not only from “above,” but from “below” as well. Conservation organizations need to do much more to enhance their efforts to establish their legitimacy at a number of levels, and at the local level most of all. Many of the ways in which conservation organizations work undermine that.

Second, like legitimacy, credibility is also plural and multidimensional. Much conservation practice is driven by an overriding concern that planning and implementation be based on credible scientific research. The flaw here is that such an assumption produces a form of conservation practice that only “looks up” to members of the scientific community. This is problematic. Credibility is first and foremost a form of relationship, premised on the trust that one set of actors has in the reliability of information provided by another. In the domain of conservation, organizations and practitioners are confronted by multiple regimes of credibility. Those who consider credibility as pertaining exclusively to the production of scientific information ignore or disregard forms of credibility that are important to other kinds of actors, including local communities. The goal of conservation organizations should be to establish credibility not only with the scientific community, but with as broad a range of actors as possible. Accepting this proposition exposes the limits of expert knowledge and recognizes that establishing credibility requires much more than just doing good science. All the expert knowledge in the world will not make rights claims disappear.

Third, when thinking about displacement, it is crucial that conservation organizations recognize the broader contexts in which they operate. That is

to say, one is judged in part by one's company, and associations may limit the issues that NGOs can legitimately address. Increasingly, conservation organizations have embraced big industry both because of the need to build larger conservation portfolios and because they believe (with perhaps a bit of misplaced idealism) that they may be able to influence industry for the better. The question to ask is whether institutional partnerships with industry reduces credibility in addressing the issue of displacement? Broadly speaking, when we look at contemporary sources of environmental degradation, we can recognize two primary causes: The practices of local people, perhaps farming or burning too intensively near areas of high biodiversity value,<sup>1</sup> and the practices of large, extractive industries – mining, forestry, and increasingly the plantation sector.

As conservation organizations have shifted to more strategic approaches to conservation planning – most notably ecoregional conservation and its entailments – they often get involved in developing conservation strategies and thereby engaged in regional or national land-use planning exercises. In the process, conservation organizations are involved in negotiating land-use trade-offs – this area for timber extraction, that area for conservation. All the while, local communities continue to be construed as threats or ignored while extractive industries are embraced as partners. This does not come without cost to credibility.

### **Some Final Points**

First, on a specific note, what has been suggested here is that conservation organizations considering projects that may involve displacement need to significantly raise the bar on accountability and action. When is displacement really necessary and when is it merely convenient? At the very least, any decision regarding the possibility of displacement must be better informed by historical and ethnographic understanding.

Second, on a more general note, conservation organizations, despite their rhetoric about engaging communities, tend to “look up” to the science community, to national governments, to donors, and to industry. One of the consequences of this tendency is that it has created a set of institutional practices of incredible complexity that, from “on the ground,” looks like one big gated community, impenetrable to those on the outside. At the same time, seemingly incommensurable with the tendency to “look up,” in assessing how or why conservation actions succeed or fail -- conservation organizations continually “look down,” consistently directing their focus on specific sites of implementation.

These two seemingly incommensurable tendencies were clearly in evidence in the discussions at the White Oak meeting. In addressing the politics of displacement and exclusion, we heard constant reference to conditions on the ground, in actual places. What was not much discussed was the broader institutional context of how organizations do their work, make decisions and how institutional histories determine their partnerships and ways of working, or how the funding environment conditions their priorities. Part of the work of addressing displacement and exclusion, and positioning conservation organizations in a stronger, more legitimate, more defensible position in the years ahead, is to think about institutional contexts in more fundamental ways.

<sup>1</sup> Of course, one of the lessons of political ecology is that in analyzing the sources of environmental degradation caused by local actors, we need to pay attention to larger structural and institutional factors that drive local actions in the first place.

# PART 9

## PERSPECTIVES FROM OTHER INTERNATIONAL CONSERVATION NGOS

### 9.1 Perspectives on Protected Areas and Displacement from within Conservation International<sup>1</sup>

Katrina Brandon  
Conservation International

The issue of human displacement has many sides to it, and touches upon many different policies and programs within Conservation International, including the policy, program, and research perspectives.

The definition of displacement used at the White Oak meeting is from the Asian Development Bank: “*displacement that includes individuals or communities who, through park creation, may lose land, means of livelihood, social support systems, or ways of life.*” This broad definition, used by a multi-lateral development bank, helps to trigger “safeguards” policies and a more thorough review of a suite of possible actions. But it is worth considering what is really implied by this definition within the routine context of conservation activities in real-world settings. There are at least six separate concepts imbedded in the ABD definition:

**resettlement**, both voluntary and involuntary  
**ownership and governance** over resources or land  
**access** to or use of land or resources  
**livelihood** means  
**social support systems** – social structures and relationships among people and institutions  
**traditions** and ways of life

It is essential to note that involvement with “resettlement” is negative whereas involvement with the other five concepts is generally viewed positively – conservation actions, for example, often help to clarify ownership, governance and rules of access; to identify alternative or sustainable livelihoods; and to strengthen social support systems and traditions. While this ADB definition triggers a safeguards policy for social assessment, the “flip” side is that it is likely that most conservation organizations spend a significant amount of money and effort supporting these five positive elements. For this reason, it is important to understand that the review that follows will exclude, for example, hundreds of site-based activities that are underway worldwide to enhance or support “social support systems.” It will also not account for the millions of dollars that go from conservation into supporting sustainable livelihoods. These clarifications are needed, because otherwise it could be misconstrued that CI or other conservation organizations are not concerned with livelihood or traditions, when they are in fact the basis for a great deal of conservation action. Each of these concepts implies very different things in different social settings – as well as very different efforts within an organization, including social assessment, policies, and the people they affect.

## Key Policies at CI

CI has no formal organization-wide policy on either displacement or resettlement, although there have been discussions about developing such a policy. CI has a policy on indigenous peoples and virtually all elements of that policy are closely aligned with the ADB definition of displacement. CI adopted a Policy on Indigenous and Traditional Peoples (ITP) in 1996, amended it in 2003, and the Board of Directors formally adopted it in 2004. The policy will be reviewed in 2007 to determine whether some components should be revised to reflect the Convention on Biological Diversity and UN Permanent Forum on Indigenous Issues, or the OAS draft declaration on the Rights of Indigenous People. There has also been discussion on whether the policy should be expanded, or a similar policy developed, to cover local and non-indigenous communities.

The ITP policy includes mention or directly addresses each of the six concepts included in the umbrella definition of displacement (see Annex 1). In particular, the policy strongly recognizes ownership, governance, and indigenous rights, and pledges that CI will: "...support legal designation and management authority over ancestral lands and their resources, while respecting issues of national sovereignty...Where overlap with legally designated parks and protected areas and lands customarily owned or used by indigenous peoples, we support collaborative management initiatives that recognize customary uses while ensuring that natural resources are not depleted and that actively involve indigenous communities in planning, zoning, and monitoring."

The policy recognizes the links between traditional knowledge, livelihoods, and territories and supports co-management where overlaps exist between protected areas and traditional territories. While the policy does not directly address resettlement, it insures that CI would not support involuntary resettlement, since the policy requires the "the informed consent of formal representatives of indigenous groups prior to undertaking any actions that are directly tied to indigenous peoples, their territories or natural resources."

One contextual issue that has been under discussion echoes discussions that took place within the multilateral development banks (MDB) in the 1970s-1980s concerning resettlement. In the MDB context, questions arose on how "direct" the MDB involvement had to be before safeguard policies for resettlement, indigenous people, or biodiversity were triggered. If there is a direct loan for a project, then safeguard policies are triggered. But what about sectoral loans – where the government is loaned money for activities within a certain sector (e.g., forestry) and the government begins an action that was not included in the proposals for sectoral reform? Or, what about funding for institution building? Suppose an institution undertakes actions that the MDB does not support? At CI, we face similar questions. As a direct implementer of projects, we do not support involuntary resettlement of indigenous or traditional peoples. But what happens if we work with a government on Park A but that government decides to displace people from Park B? Should we cease all work with that government, including financial and technical support? Or suppose we are working in Parks A and B – but are supporting research in Park B and the government resettles people. Do we continue research efforts in Park B? Or what if the traditional peoples had not resided in an area for 50 years but wished to reclaim land that was now already included in a protected area?

When such gray areas exist it can be challenging to say how a policy applies, or whether all funding should be withheld from a certain park, or whether relations with a particular authority should cease. On the other hand, it is seemingly straightforward to say that we would not support involuntary displacement of traditional peoples. The criticisms of conservation organizations, including CI,

rarely refer to cases where the situation is direct. In most cases, the social terrain is complex, changes quickly, and competing interests and information may be unclear. When such conditions exist and/or when CI's involvement is not direct, staff need better guidance on what to do. Furthermore, CI is moving from an implementing organization to one that tries to broadly leverage actions by others. In these cases it is important to have clear knowledge of circumstances on the ground and have the ability to conduct site-based and stakeholder assessments to better inform how we should act. To better understand CI's activities in these areas and to systematize our engagement, CI developed the Indigenous and Traditional Peoples Initiative, described below.

## **Key Programs at CI**

CI is an organization that may be broadly summarized as:

1) science and research; 2) regional (field) programs and support; 3) conservation funding; and 4) international policy. Programs are briefly described below.

### **Science and Research**

The Center for Applied Biodiversity Science (CABS) is the science and research program within CI where science and technology experts analyze and share data. Within CABS, two programs are relevant to human displacement: the Human Dimensions Program and the Indigenous and Traditional Peoples Initiative.

The Human Dimensions Program (HDP) was created in 2001 to explore the complex dynamic between people and conservation by assessing the current and historic impact of demographic, economic, and political trends on species and their habitats over time and by developing predictive models and long-lasting solutions for conserving biodiversity. Using social science expertise from a range of disciplines, HDP analyzes the threats to biodiversity at different scales and analyzes the strategies that support biodiversity conservation, ecosystem services, and human welfare. HDP has several efforts underway to understand displacement. We are in the preliminary stages of research on displacement across a sample of protected areas (PAs) throughout biodiversity hotspots and wilderness areas. Also, we are compiling all cases that we can find on displacement from protected areas within non-Brazilian Latin America, and mapping the cases to more fully understand the biological, social, and political context underlying controversy at these sites and the impacts of displacement. HDP is looking at ways that protected areas make positive contributions and is compiling cases where communities have asked to have their lands incorporated into a PA. Finally, HDP is producing what we understand to be the first comprehensive map of legally-recognized indigenous territories throughout the Americas.

The Indigenous and Traditional Peoples Initiative (ITPI) was created in 2003 to enhance CI's commitments to indigenous and traditional peoples and the vital role of their territories in conservation landscapes. More than 250,000 km<sup>2</sup> of critically biodiverse areas coincide with indigenous lands in the hotspots and high-biodiversity wilderness areas where CI works. ITPI's work began in Latin America's Andes region, responding to indigenous calls for collaborative conservation action. ITPI directly supports CI programs and partners, local indigenous leaders, communities, and other critical players to build a common agenda for conserving biological and cultural diversity. The program's activities strengthen the collaboration among these groups and their ability to effectively manage their lands and resources, maintaining their livelihoods and their natural and cultural patrimony. The ITPI is working with the rest of CI to develop



appropriate knowledge and resources to support CI, partners, and traditional groups.

Another aim of the HDP and ITPI is to ensure that CI's staff and partners are sensitive to the concerns and issues of indigenous peoples. Specific activities underway that relate to understanding displacement are mostly "internally" oriented: 1) identifying best practices among our field programs and partner organizations both in the field and globally (i.e., UNDP Equator Initiative); 2) systematization (database development and analysis of CI's work with indigenous and traditional peoples, beginning in the Andean region); 3) sponsoring events for discussion, dialogue, and exchange within specific regions. The results of these dialogues and consultations have helped identify issues of key importance to indigenous and traditional people in different regions. For example, in Guatemala the Ministry of Natural Resources was one of eight conveners of a dialogue to build a common agenda among ITPI and conservation; one result of the meeting catalyzed the launching of the indigenous advisory unit within the Ministry. ITPI also organized a seminar at the Society for Conservation Biology annual meeting in Brasilia in 2005 that brought together indigenous representatives from the Kayapó of Brazil, the Macuna Peoples of Colombia, Asháninka of Peru, and Maya of Belize with professional conservationists to present their experiences on building conservation alliances in the Amazon. The symposium marked the first time that indigenous representatives formally participated in the Society for Conservation Biology meetings.

### ***Regional Programs Division***

The Regional Programs Division (RPD) oversees and provides support to CI's field implementation in the 28 countries where CI has offices and the 40 countries where CI works. All of the field offices should be aware of the Policy on Indigenous and Traditional People and the Initiative. Many CI field offices work extensively with and support indigenous peoples in gaining recognition for their lands and resources and provide support for monitoring and management. For example, CI has worked closely with the Kayapó Indians of Brazil<sup>2</sup> and with the government of Guyana in consultation processes with the Wai Wai that led to the ownership of 650,000 hectares of their ancestral land in 2003. In Ghana, CI teamed up with the indigenous Akan peoples to build a canopy walkway in Kakum National Park that has become one of West Africa's most popular ecotourism destinations. CI also worked with Ashanti clan chiefs to develop a campaign on the disappearance of symbolic animals or totems traditionally considered crucial to clan survival but threatened by uncontrolled hunting. In Asia, CI's China program works with the Tibetan Sacred Lands initiative, which is mapping sacred sites, assessing their biodiversity, and reviving traditional Tibetan land-management practices that focus on sustainability. Tibetan sacred sites have historically protected some of the most pristine natural environments in southwestern China, but are now facing threats from modern development and associated erosion of traditional cultural values. Tens if not hundreds of similar examples of partner projects can be cited.

Yet it is safe to assume that not all stakeholders are happy with all outcomes, since, in complex social conditions changes favor some groups over others<sup>3</sup>. Conservation actions resulting in displacement occur, but reports of conflicts at sites (Chapin, Bray, Dowie) rarely provide the full story. While conservation organizations are often criticized, in reality, the situation in the field is often complex with many more players and issues than are illustrated. This vastly oversimplifies the context at sites and fails to adequately represent positions of the many parties involved. By oversimplifying the real conditions it makes it

seem that there are clear “right” and “wrong” positions when the social reality is much more nuanced. Field programs and governments often need greater guidance, but such guidance will not always satisfy everyone. For example, if CI provides aerial photographs showing illegal settlements in an indigenous territory, and these settlers would be made to leave if the photos were handed over to the indigenous leaders, what displacement are we causing or avoiding?

Another example illustrates these complex relationships. CI was criticized by a reporter for supporting efforts to “remove Mayan communities” from the Montes Azules Biosphere Reserve (MABR) in Mexico. The areas in between the Montes Azules Biosphere Reserve in Mexico and Sierra del Lacandon National Park in Guatemala is the La Cojolita communal reserve, owned by three indigenous groups, the Choles, Tzeltals, and Lacandonas, who disagree on whether the reserve should be logged or preserved and who has what rights within the MABR. CI has worked with different communities in the Selva Lacandona forest region in Chiapas for 13 years, and denounced invasions of Montes Azules territory by recent outside settlers. In fact, a May 31, 2005 communique from Subcomandante Marcos of the Clandestine Revolutionary Indigenous Committee – General Command of the Zapatista Army of National Liberation -- thanked the national and international community for providing financial support to resettle seven Zapatista communities out of MABR.<sup>4</sup>

This brief description surrounding displacement in the Montes Azules Biosphere Reserve highlights some of the challenges. For the sake of demonstrating the complexities faced by field programs, following is a set of rhetorical questions based on the example above:

**Resettlement:** Do all indigenous groups have equal rights and standing? Would resettlement be inappropriate of indigenous groups that lived elsewhere, but found themselves landless so they claimed land in the park, even though it was not their traditional territory? If recent migrants enter a protected area and settle for a week/a month/a year before they are discovered, what compensation is due them? Will others who settle after them be entitled to this compensation?

**Ownership and governance:** The Mexican government is the owner of the reserve. How should ownership prior to reserve creation be judged if Mexican lands belong to the state? Should CI be held responsible for the creation or governance of the reserve if they only have project activities near the reserve? What about if there are only research projects underway? Who should pay for the process and lead the process of clarifying ownership and governance?

**Access to or use of land or resources:** Because Montes Azules is a Biosphere Reserve and people can live within it, should different rights be accorded to different groups within the zoning plan? Is it fair for one group to log and sell timber but another group not to? Should these concerns be tied exclusively to the degree of “indigeness” of residents – e.g., forest peoples can’t log but indigenous agriculturalists can? How is this to be overlaid with the biological zoning? What makes someone a biosphere reserve “insider” versus an “outsider”?<sup>5</sup>

**Livelihood means:** Is CI open to criticism for working with one indigenous group in the area and not all three? In considering the community reserve, would CI be acting in an inappropriate way if it supported the indigenous communities that did not want to log the community reserve because they felt the short-term revenue boom would bring social instability? Clearly there are issues of liveli-

hood raised here but what is the appropriate position in such a discussion? Is it wrong to get people to stop traditional practices that are unsustainable?

**Social support systems:** What consideration should CI give to these relations both inside and outside of the reserve? If CI supported voluntary resettlement out of the reserve and that was conducted by the Zapatistas, would CI then be seen as supporting the Zapatistas?

**Traditions:** If indigenous groups had traditions or beliefs that extinctions are not possible, would CI be wrong to introduce scientific evidence? Would supporting health clinics undermine traditional healers? Should the traditions or beliefs of peasants migrating from elsewhere (who may be indigenous but have retained less strong ties to culture and language) be counted less than of indigenous peoples who have retained more of their history and practice?

These questions are meant to outline the gray areas that are faced in one form or another by almost all conservation groups on a daily basis. An allegation such as the one above that simply says that CI (or any conservation organization) supports resettlement without describing even some basic contextual information seems designed to create an uninformed polarization. It fails to acknowledge the social reality and social science that makes up much of conservation action.

Critiques of conservation continue to claim that conservationists or biologists “don’t get it.” Yet conservationists are faced with the challenges of reconciling complex and competing interests on a daily basis and usually are *very* aware. The challenges lie in making decisions in an open and transparent way that will be agreed upon and accepted by all parties that, at a minimum, “do no harm” to anyone. Equally important, oversimplified critiques point the spotlight onto conservation organizations who are often bit actors in a much more complex drama. They shine the spotlight on us while distracting from greater problems that should be addressed by social scientists. In the case of Chiapas, these include unequal distribution of land and resources, income inequality, landlessness, poverty, development pathways, resource degradation, corporate interests, corruption, and civil conflict.

This highlights the challenge for CI to provide clear guidance to field programs. While the ITPI can help convene stakeholders when those involved are indigenous, in many situations it is even challenging to define who is indigenous or traditional. Developing the social assessment tools for the six concepts under displacement is relatively straightforward. Conducting research on the impacts of protected areas for these six categories is also relatively straightforward. Developing a policy that clearly lays out what is appropriate for each of the six concepts is more difficult. Providing guidance to field programs in a simple social context is relatively straightforward. But defining the right action and stance, and institutionalizing it, when there is disagreement among the advocates for different people, is challenging.

### **Conservation Funding**

CI is increasingly moving from a model of direct field-based conservation to a model that is more closely aligned with that of a donor that can leverage funds and channel them to in-country partners while providing technical assistance. In FY 2005, CI awarded grants totaling 35% of the budget (\$40 million) directly to partner organizations. Two larger funding programs – the Critical Ecosystem Partnership Fund and the Global Conservation Fund – provided \$23.2 million

of the \$40 million. CI's regional programs – largely the Centers for Biodiversity Conservation in the Andes, Brazil, Madagascar, and Melanesia – awarded \$14.7 million to local groups. A third component of the Conservation Funding division is Verde Ventures, which invests in ecotourism and other businesses in key CI terrestrial and marine regions.

The Global Conservation Fund (GCF) has perhaps the greatest potential for funding activities that could lead to displacement. The GCF has been operating for five years with a mandate to support the creation of protected areas in Biodiversity Hotspots and High Biodiversity Wilderness Areas and has developed a portfolio of 86 projects. Notably, the fund has also supported the creation of Indigenous Reserves, Community Conservation Areas, and Conservation Concessions. Many of these protected areas were created by or in collaboration with indigenous groups and local communities, particularly in Latin America and Central Africa.

GCF encourages project applicants to include broad stakeholder involvement in protected area planning and all proposals are reviewed for impact on local communities. GCF rigorously scrutinizes any proposed resettlement activities, relying on the expertise of qualified organizations and individuals to ascertain whether a resettlement scheme will violate human rights, has undertaken the necessary consultative processes, and has been endorsed by all relevant national and local stakeholders. To date, GCF has not funded any projects involving resettlement, but there is the possibility that they could. For example, if the GCF was helping indigenous peoples claim and secure their territory, it is conceivable that a community of recent, non-indigenous migrants would have to be resettled. It is because of the possibility of such situations that within CI it is unwise to have a blanket policy on voluntary or involuntary resettlement. Instead, strong social assessment and stakeholder consultations are critical to inform appropriate actions.

Critical Ecosystem Partnership Fund (CEPF) has given more than \$84 million to 900+ nongovernmental organizations, community groups, and other sectors of civil society in Africa, Asia, and Latin America to enable conservation action and build the capacity for sustainability. The information for prospective CEPF grantees says that "...funds may not be used for the purchase of land, involuntary resettlement of people or the alteration of any physical cultural property."<sup>6</sup> To date, this has not been an issue in CEPF projects and a significant amount of funding has been directed to activities that support indigenous and traditional peoples.

## **International Policy**

Through the Indigenous and Traditional Peoples Initiative, CI has been actively engaged in monitoring global policy issues related to indigenous communities. Within that array of policy issues (which include protected areas, conservation, human rights, participation, access-benefit sharing, land tenure, etc.) is traditional knowledge. The major issues being addressed at UN conferences and forums, particularly the UN Permanent Forum on Indigenous People, include the need to: 1) have free prior informed consent; 2) develop unique and adequate intellectual property mechanisms by which to protect traditional knowledge; 3) design databases and registers for an international traditional knowledge protection system; 4) ensure equitable sharing of benefits associated with the use of traditional knowledge; 5) include traditional knowledge practices in project design and resource management; 6) establish culturally appropriate indicators to adequately assess traditional knowledge loss; 7) increase participation and involvement of indigenous organizations in global policy discussions. CI has

supported open forums for indigenous groups to share perspectives on global policy issues, has facilitated regional meetings with indigenous groups to share regional and local perspectives, and has provided funding of indigenous representative participation in international conventions and forums. We do not expect that the perspectives of indigenous peoples will always be aligned with those of the conservation community, but we believe that their participation in fora such as the World Parks Congress, World Conservation Congress, and the Convention on Biological Diversity is essential.

## Conclusion

Much of the recent social science literature on displacement and conservation does a disservice both to conservation and social science fields. Numbers of people purportedly resettled for conservation are estimated in ways that are vastly overinflated. Conservation is blamed for many rural problems that conservation organizations have no impact on, and conservation organizations are easier to attack than development organizations, corporations, national governments, and international policy institutions. There is no doubt that colonial legacies influenced a great deal of conservation policy and action decades ago. But the assumptions that conservationists blindly want to push people off the land to have strictly protected areas everywhere is very far from the truth. The number of multiple-use protected areas that include human residence and use shows that conservationists are trying to figure out the pathways to sustainability.

Conservationists largely recognize that we must take on the challenges of both conservation and development (and the ones that don't tend to be either old or not "plugged in"). While there are many significant contributions from social science to conservation, unfortunately the critiques related to displacement overshadow them. The tremendous gains and partnerships being established in the field are largely ignored while controversy gets more attention. Where critiques are appropriate, and where there are problems, the full social complexity should be analyzed and presented. Was more information needed in local languages? Was there a lack of transparency? Did one group gain at the expense of another? Was that the "fault" of conservationists or were they manipulated? Was more social assessment needed? Would power-sharing work? Social science has immense opportunities in dual areas: identifying and addressing the root causes of rural poverty and biodiversity loss and giving advice on the "gray areas." Without this, the conservation community will do its best to actively engage and strengthen civil society, deal with what are largely development issues, and provide options for current and future generations through many different tools – among them, protected area creation and management.

<sup>1</sup> This paper reflects the views of the author and do not reflect any formal or informal positions of Conservation International, its staff, or its Board of Directors.

<sup>2</sup> Schwartzman, S., and B. Zimmerman. 2005. Conservation Alliances with Indigenous Peoples of the Amazon. *Conservation Biology* 19(3): 721-727.

<sup>3</sup> Brandon, K., K. H. Redford, and S. E. Sanderson, eds. 1998. *Parks in Peril. People, Politics, and Protected Areas*. Washington, DC: Island Press.

<sup>4</sup> <http://www.eco.utexas.edu/~archive/chiapas95/2005.06/msg00044.html>.

<sup>5</sup> Brandon et al. 1998 (op cit). See chapters 13, 14, 15.

<sup>6</sup> [http://www.cepf.net/xp/cepf/home/faq/faq\\_about\\_cepf.xml?USE\\_TEXT\\_ONLY=true](http://www.cepf.net/xp/cepf/home/faq/faq_about_cepf.xml?USE_TEXT_ONLY=true)

## 9.2 Protected Areas and Local Peoples: The Experience of The Nature Conservancy in Latin America

Tarsicio Granizo<sup>+</sup> and Paulina Arroyo<sup>\*</sup>

<sup>+</sup>South American Conservation Region, The Nature Conservancy, <sup>\*</sup>Ecuador Parks in Peril Program Director

Since the early 1980s The Nature Conservancy (TNC) has been working in Latin America on different issues related to biodiversity conservation, particularly in protected areas. This work has been done through USAID and TNC-funded programs such as the Parks in Peril Program (PiP). Since the beginning of its work in protected areas, TNC has developed a close relationship with local communities because of their strong link with natural resources and biodiversity inside and outside protected areas. In some countries, the most important biodiversity areas are inside indigenous territories.

Protected areas in Latin America have a long history, Mexico being the pioneer with the creation of the Monte Vedado del Mineral El Chico National Forest in Hidalgo in 1899. Other countries followed the Mexican example by creating their first protected areas: Jamaica in 1907, Panama in 1917, Argentina and Belize in 1922, Chile in 1926, Cuba in 1930, Dominican Republic in 1933, Ecuador in 1934, Brazil and Venezuela in 1937, Bolivia in 1940, and Colombia in 1948.

Different to the United States where the creation of protected areas is linked to government-led land acquisition, in Latin America the most important areas for conservation are in private or communal lands, and protected areas have been created without the consent of the local inhabitants (often for centuries) in those areas. For instance, in countries like Costa Rica 54% of their national park system is on private lands and in Uruguay, 70%. Only five of the 41 protected areas in Colombia belong entirely to the government, yet in contrast, in other countries like Chile, 96% of the protected area system is government owned.

Generally, when a protected area is created there are no modifications to the land tenure, which is why constant land use and tenure conflicts between local communities and national park systems exist throughout the continent.

Despite the instability and permanent conflict in the history of creating protected areas in Latin America, there have been relatively few experiences of displacing local communities. Although in Latin America the general trend has been to promote the incorporation of local people in park management, what is yet to be fully explored is the economic consequence on local people when protected areas are created. Are protected areas contributing to poverty alleviation? Or are they making local social and economic conditions more difficult because access to natural resources is regulated? Are there experiences in Latin America of people forced to move out of parks once a protected area is created? We have not found in the literature any significant incidence, and there are none in those sites where TNC is working. It would be impossible to consider human displacement in countries such as Mexico where almost a million and half people live in protected areas; or in Brazil where nearly 280,000 indigenous people live inside protected areas; or in Peru where more than half of their protected areas have indigenous peoples.

Another important consideration to take into account is that almost all Latin American countries have signed different international agreements (Agenda 21, United Nations Draft Declaration on the Rights of the Indigenous Peoples,

The Inter-American Draft Declaration on the Rights of Indigenous Peoples, among others). One of the most important is the Convention No. 169 of the International Labor Organization on Indigenous and Tribal Peoples which emphasizes the respect for their specific identity “...and their right to participate in the decision-making process in all questions and programs directly affecting them, that is to say, to participate in the making of decisions and the determination of their own destiny.” The Convention addresses issues of vital importance to indigenous and tribal peoples including the rights of ownership and possession over the lands they traditionally occupy, or have had access to (Article 14); the rights to natural resources including the right to participate in the use, management, and conservation of such resources (Article 15); displacement (Article 16); and land alienation (Article 17).

### **The Nature Conservancy and Local Communities**

Although TNC does not have a specific policy with regards to human displacement and protected areas, the Conservancy has a profound recognition and total respect for local populations and the places where they live. For more than 50 years, The Nature Conservancy has developed partnerships with local communities to conserve some of the most biologically critical and threatened landscapes on Earth. Our approach is rooted in a “commitment to People” and based on “respect for the needs, values, and traditions of the communities in which we work.” Our mission requires that we seek solutions that conserve biological diversity while enabling people to live productively and sustainably in the landscape.

Understanding the complexities of indigenous and traditional communities and incorporating their knowledge into conservation planning is a continuous process. It requires a long-term commitment to learning about community needs and concerns, building trust, and developing and refining joint solutions that integrate local knowledge, best conservation practices based on sound science, and lessons learned from our experiences working at sites around the world.

### **Examples of TNC Intervention with Local People**

#### **Bosawas, Nicaragua<sup>1</sup>**

In the 1.8 million acre Bosawas Biosphere Reserve, TNC is helping the Mayangna and Miskito people address the threats of illegal settlement, unsustainable agricultural practices, and deforestation. TNC has assisted indigenous peoples in developing legal claims to their ancestral lands. Bosawas is the only case reported where a displacement process took place, although TNC was not directly involved.

#### **Canaima National Park and the Pemon Territory, Venezuela**

Work in Canaima National Park started with the exchange of concepts with the Pemon indigenous people to address what they understand as resources, management strategies, and use of space within their economic, social, and spiritual realms. To talk about conservation implies an alteration to social and cultural relations in an indigenous group, since there are two different visions of what “environment” means. Since there were conflicts between the Pemon and the agency in charge of protected area management, TNC served as mediator between the Pemon and the federal park rangers, and recently launched a conflict resolution project to help alleviate tensions between the two groups.

### **Amazon, Brazil**

TNC has engaged in a participatory mapping process in which TNC staff and local communities map important areas for ecological and cultural value. These layers of information are digitized and returned to the communities where the maps are used as strategic tools for developing natural resource management plans. TNC is also helping to strengthen the capacities of indigenous groups to build a skilled cadre of indigenous environmental managers.

### **Sierra Nevada de Santa Marta, Colombia**

The Sierra Nevada de Santa Marta in Northern Colombia is a 4.1 million acre reserve where TNC has worked with the Gondawindua-Tayrona Organization and local NGOs on the first co-management agreement between indigenous groups (Kogi, Wiwa, Armario, and Arhuaco) and the National Parks Management Unit. This project is supporting the indigenous peoples of the Sierra Nevada de Santa Marta to recuperate their ancestral lands.

### **La Amistad National Park, Costa Rica and Panama**

In La Amistad, a 2.5 million acre bi-national protected area, TNC with support of USAID is working with four indigenous groups (Ngobe, Naso, BriBri, and Cabecar) as stewards of the park and leaders of activities such as ecotourism and environmentally friendly agricultural practices.

### **The Condor Bioserve, Ecuador**

This region is made up of seven protected areas and contiguous private lands. TNC and Fundación Antisana have worked with the Cofan indigenous group in Sinangoe for over 10 years, most recently on a food security project with the 18 families.

Other examples of TNC's work with indigenous peoples and local communities can be found in Alaska, Canada, China, Indonesia, Minnesota, Wisconsin, Montana, and Papua New Guinea.

## **Some Ideas to Improve TNC's Work with Local Communities**

As mentioned before, human displacement from protected areas is not an issue in the areas where TNC works. However, working in park conservation with people living inside them requires constant innovations and long-term commitment for sustainable use. TNC has developed many tools and skills in our work with indigenous peoples that need to be systematized and analyzed.

Besides basically excluding human displacement from our scope of possible practices, The Nature Conservancy and all NGOs working with indigenous peoples should develop clear principles to work with local communities such as those developed by the World Conservation Union (IUCN) and WWF.

## **Recommendations**

We suggest that TNC adopt the following:

1. Systematize TNC's work with indigenous peoples and local communities to gather best practices, learn from the lessons, and share it with our partners and other large NGOs.



2. Establish communication channels with NGOs with strong experience working with indigenous peoples and local communities to learn from their experience and build our own position.
3. Review IUCN/WCPA/WWF general principles to work with indigenous peoples and local communities and begin a discussion to adopt them or develop similar guidelines.
4. Develop policy papers on some sensitive issues regarding indigenous peoples and local communities and protected area management.
5. Participate actively in international fora regarding protected areas and human populations, such as the UN Permanent Forum on Indigenous Issues.
6. Develop internal networks to share best practices with indigenous peoples and local communities, and incorporate in the short term partners and allies.
7. Develop communication bridges with major indigenous organizations to develop and work in common conservation agendas.
8. Promote special units within large NGOs devoted to indigenous and community issues.
9. Work more closely with indigenous groups to reconcile their interests and conservation interests. Conservation projects should not put in danger their rights to livelihoods and development.

<sup>1</sup> Information provided by Edgar Herrera, TNC-Nicaragua.

### **9.3 Addressing the Social Impacts of Conservation: Strategies, Experience, and Future Directions**

Jenny Springer  
World Wildlife Fund

As a social process involving decisions about access, use, and the long-term viability of the Earth's natural systems, conservation inevitably entails both social costs and social benefits. Benefits include clean air and water, the survival and growth of nature-based economies and ways of life, and the cultural and aesthetic values of wildlife. Costs include limitations on resource use for economic purposes as well as social change to modify human impacts over time.

Costs of some conservation strategies have the potential to be distributed very broadly – for example, the cost of reducing greenhouse gas emissions. In the case of protected areas, however, there is increasing recognition that “many costs of protected areas are borne locally – particularly by poor communities – while benefits accrue globally...” (IUCN 2005). Costs, particularly associated with stricter forms of protected areas, include physical displacement, restrictions on use of natural resources, restrictions on access for religious and cultural purposes, conflicts arising from enforcement activities, and human-wildlife conflict.

Concern with the social costs of conservation is not new. It has developed as part of broader concerns about social justice in conservation policy since the 1970s (Fortwangler 2003; Adams and Hutton 2005), and in practice since the 1980s through approaches such as integrated conservation and development projects (ICDPs) and community-based natural resource management (CBNRM). This paper argues, however, that analysis of this experience reveals a range of issues that need to be addressed through more explicit attention to social impacts in conservation planning, in organizational policies, and in conservation partnerships.

#### **Definitions and Scope**

In the context of development policy and, more recently in relation to conservation, concern about social costs has focused primarily on displacement, which was initially defined as physical relocation. However, in recognition of a wider range of social costs, definitions of the term displacement have expanded over time to encompass restrictions on resource access and use. In 2002, the World Bank formally revised the definition of displacement in its resettlement policy to include “involuntary restriction of access to legally designated parks and protected areas, resulting in adverse impacts on the livelihoods of the displaced persons” (Cernea 2006; World Bank 2002). This paper uses the term “social impacts” to encompass the broad range of costs and benefits associated with conservation and “social costs” for negative impacts, reserving use of the term displacement for physical displacement. While much of this paper focuses on social costs, a broader framework of social impacts is important to keep positive impacts within view, as part of a fuller understanding of the variable impacts of protected areas on different social groups (Mascia and Claus, this volume) and as a basis for attention to increasing positive impacts.

As regards conservation strategies, public protected areas have been a main focus of discussions regarding social impact because of the state's power of eminent domain in establishing them, situations of overlap and conflict with indig-

enous and community lands, and relatively greater restrictions on use within them. At the same time, the issue of social impacts is relevant to a broader set of conservation strategies.

### **Social and Conservation Impacts**

Concern for social impacts in conservation has both practical and ethical foundations (Wilshusen et al. 2003; McShane 2003). Practical foundations stem from the linkages between social impacts and conservation impacts. These linkages operate in a number of ways. For example, it is widely recognized that where local people receive positive benefits from well-managed resources they are more likely to actively conserve them over the long term. Conservation and social impacts also are linked by the broader forces that threaten both biodiversity and social welfare of local people, such as commercial over-extraction of natural resources. These synergies and shared threats form the basis for collaboration between conservationists and indigenous and local communities, and are reflected in conservation policy through recognition of community stewardship and promotion of proactive collaboration to achieve conservation objectives. For example, WWF's Statement of Principles on Indigenous Peoples and Conservation commits to assisting indigenous peoples with organizational strengthening, recognition of lands and territories, conflict resolution, and their own conservation initiatives where these activities are consonant with conservation objectives (WWF 1996).

Ethical foundations of concerns regarding social costs stem from recognition of the rights of local people to protection against costs or, at a minimum, to compensation for them. These ethical dimensions rest on social justice values and legal human rights frameworks, and are not necessarily linked to conservation impacts. At the same time, negative social impacts can erode local support and global constituencies for conservation, making conservation more difficult and less sustainable over the long term. Ethical and legal foundations are reflected in conservation policy in the form of social safeguards, especially where these are grounded in recognition of rights. WWF's Statement of Principles on Indigenous Peoples and Conservation, for example, recognizes the right of indigenous peoples not to be removed from the territories they occupy, and adopts the principle of free, prior, informed consent as a requirement for WWF support of conservation or development activities in indigenous lands (WWF 1996). As indicated by these principles, safeguards have both procedural and substantive dimensions – that is, they seek to address rights and equity issues in relation to decision-making processes as well as in relation to impacts.

### **Conservation Strategies**

As noted above, conservation practitioners have experience addressing the social costs of conservation, through at least three clusters of strategies – identified here by the shorthand terms of “ICDPs,” “CBNRM” and “targeted compensation.”

Integrated conservation and development projects (ICDPs) developed in the 1980s from the work of conservation agencies in protected areas, and – while taking a range of forms – have generally linked support for protected area management with community development initiatives in surrounding areas. While one aim of community development activities has been to reduce human impacts on biodiversity, another important aim has been to provide a form of compensation for reduced access to resources inside relatively strict protected areas (Larson et al. 1998; Brown and Wyckoff-Baird 1992). The term ICDP is

no longer widely used and project approaches are changing; however, the experience of these projects remains relevant for ongoing efforts to link alternative livelihoods with protected areas management.

As a means to address social costs, analysis of ICDPs indicates several limitations. One is that, in their association with relatively strict forms of protected area management, ICDPs have tended to pursue a strategy of compensating for social costs, rather than a strategy of preventing them. At the same time, a growing body of research has questioned the rationale, even in ecological terms, for displacements and restrictions on resource use (and the social costs they generate) in many places where they have been applied. Some critiques trace persistent images of “wilderness” through the history of conservation, and argue that resulting assumptions of a fundamental incompatibility of people and wildlife have driven actions to separate people from nature in particular places (Colchester 2004; Adams and Hutton 2005). Other critiques, deriving from practice, highlight problems of flawed or insufficient social analysis in project design (GEF 2006; Seymour 2004). This includes the tendency within ICDPs to focus on local problems and solutions (Larson et al. 1998), as a local focus risks exaggerating impacts of local use activities on biodiversity, and obscuring broader drivers and external factors. An overall implication of these critiques is that, even where the intention of ICDPs has been to address negative social impacts, the approach does not necessarily challenge assumptions about the incompatibility of people and nature that give rise to them.

Analysis of alternative livelihoods activities as a form of compensation reveals an additional set of limitations. One is that the link between benefits and costs has generally been vague; without concrete assessments of the nature and distribution of impacts of protected areas, compensation is less likely to be appropriate or directed to the most affected people. The sequencing of protection and development activities within ICDPs has also tended to be de-linked. Because increased restrictions on access and use of natural resources can be put in place much more quickly than benefits from enterprise-based development activities, benefits often have not started to flow until long after costs have been incurred. Of course, where flows of benefits have been limited or not realized, the compensation aim has also not been achieved. Finally, while the intention of ICDPs has been to generate social benefits, the accountability of implementing organizations to communities for these benefits – linked to defined and articulated costs – has tended to be limited.

Forming a contrast to ICDPs is an alternative cluster of strategies – various forms of community-based natural resource management (CBNRM) – that take as a starting point the connectedness of people, especially indigenous and traditional peoples, with their lands and resources. Seen in relation to social impacts, these “place-based” conservation strategies (Bray, this volume) tend to take an approach of preventing or avoiding negative impacts. While support for CBNRM strategies among conservationists also has a considerable history, interest and attention is increasing due to growing recognition of indigenous and traditional peoples as owners and managers of high-biodiversity areas, increased understanding of the role of humans in shaping ecologies and landscapes, shifts in conservation focus to larger scales and across broader landscapes, and lessons learned regarding the need to build local constituencies for conservation. CBNRM strategies recognize that not all human uses are ecologically sustainable, but seek to address sustainability through capacity building, support for protection against negative, external impacts, and support for key enabling conditions – such as secure tenure – for sound management.

A third cluster of strategies, termed here as targeted compensation, seeks to address conflicts between specific conservation objectives and particular aspects of human use. Examples include compensation to forgo specific types of hunting, harvesting, or cultivation activities (such as grazing or underplanting in forests) or payments for attacks on livestock by predator species of high conservation priority. Key elements are that both the specific conservation objective and the social impact are clearly defined, the form and extent of compensation is negotiated and accountability for compensation is clear.

## **New Directions**

This brief overview of issues and strategies to address social impacts points to needs for future work in at least three areas.

One need is for more in-depth analysis, in project planning and monitoring, of how human activities affect specific aspects of biodiversity (positively and negatively) *and* how specific proposed conservation interventions are likely to affect local people (positively and negatively). To date, social research in the context of conservation planning has focused overwhelmingly on analyzing human impacts on biodiversity, especially those seen as having negative impacts. While efforts are underway (for example, Reed 2006), more work remains to ensure that strategies are grounded in concrete understandings of how human activities relate to specific conservation objectives (Agrawal and Redford 2006; Brockington et al. 2006), including with greater attention to the influence of broader policy and institutional factors.

A much larger gap is integration of analysis to understand how conservation interventions impact local people, comparable to Social Impact Assessment in the context of development interventions (Geisler 2003; GEF 2006). Within specific projects, lack of social impact analysis limits the ability of practitioners and affected people to define and develop appropriate responses – such as alternative strategies or compensation measures – to ensure against negative impacts or promote positive ones. Consistent integration of social impact analysis as part of conservation planning is therefore a critical need.<sup>1</sup> Impact analysis should be part of and, in turn, can strengthen and inform collaborative planning and decision-making processes with indigenous peoples and local communities.

As conservation organizations develop more rigorous systems to measure the conservation impacts of projects over time, social impacts need also to be integrated in these. At the project level, monitoring of social impacts provides a basis for changing course, where negative impacts arise, as well as for demonstrating – through better documentation of positive impacts – the relevance of conservation to the social agendas of broader constituencies. In the aggregate, documented experience can usefully inform broader policy debates over the social impacts of conservation strategies, particularly protected areas, where data is currently limited (Agrawal and Redford this volume; Brockington and Igoe 2006).

A second need is for clear institutional policies and positions regarding the social impacts of conservation. Institutional policies establish standards and provide guidance to field managers in ensuring social safeguards and contributing to positive social benefits from conservation. Relevant standards have been developed through a growing set of international instruments and in operational guidelines of development agencies (Krueger, this volume). While principles and standards related to indigenous peoples have been a focus of attention in conservation policy, social impact issues also need to be addressed in relation to non-indigenous communities and require relevant policy and guidance. In addi-

tion, there is a need to periodically evaluate policy implementation and ensure that policies are effectively integrated in practice through awareness and capacity building, guidance on implementation in different local situations, monitoring and adequate financial support (Springer and Alcorn, forthcoming).

Along with providing guidance for staff, policy communicates institutional values and commitments to others. This provides a basis for collaboration with others who share concerns for socially-equitable approaches to conservation and development. Policy also provides a clear statement to other potential partners regarding the terms on which the organization can engage in a partnership or activity, and the kinds of activities it cannot support.

The issue of conservation partnerships is especially important because conservation interventions often take place in contexts where basic conditions to guard against negative impacts – such as protection of human and civil rights, channels to participate meaningfully in decision-making, and rights to land and resources – are not secured. Collaboration with indigenous and local communities and their organizations is essential in order to hear their concerns, understand their issues in relation to the potential negative and positive impacts of a conservation activity, identify common interests, and resolve conflicts or differences as they arise. In the context of specific partnerships with governments and other powerful actors, conservation organizations share responsibilities for ensuring that social costs and benefits are equitably addressed. At the same time, it is much more difficult to undertake socially-sound conservation work in the context of constraining policy and institutions. Expanded alliances with peoples' organizations along with engagement with governments offer important opportunities to address broader policy issues that affect the linkages between biodiversity and social values.

<sup>1</sup> Relevant frameworks for social impact assessment in the context of conservation include the Akwé Kon guidelines (CBD Secretariat 2004), the World Bank's Impoverishment Risks and Reconstruction model (Cernea 1997), and Sustainable Livelihoods Analysis (DFID 2001; Igoe 2006).

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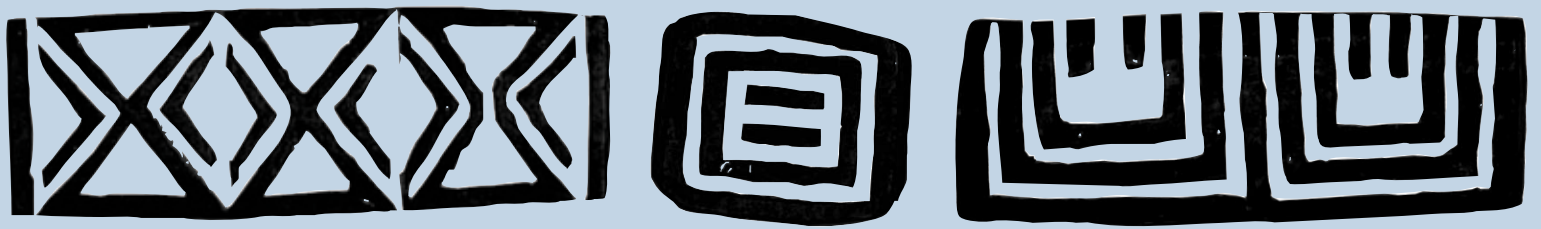
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**Wildlife Conservation Society**  
2300 Southern Boulevard  
Bronx, NY 10460  
Tel: 718-220-5100  
[www.wcs.org](http://www.wcs.org)

