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

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Physical Description of Madidi Protected Area

Madidi is recognized as one of the most biodiverse protected areas in the world: Globally Outstanding according to the World Wildlife Fund Conservation Assessment of Terrestrial Ecoregions of Latin America, Global 200 (Olson and Dinerstein 1998); and Biodiversity Hotspots (Mittermeier et al. 1999). This diversity is the result of an amazing altitudinal gradient from majestic snowed mountain tops at 6,000 m, where you find condors (Rios-Uzeda and Wallace 2007), vizcachas, and pumas; down to the paramo through globally endangered patches of *Polylepis* forest and cloud forests with spectacled bear (Rios-Uzeda et al. 2006), through the most biodiverse vegetation type of the world; tropical montane and piedmont forests and the lowland Beni alluvial plain, home of jaguars (Wallace et al. 2003; Silver et al. 2004), spider monkeys, tapir, and white lipped peccary. Furthermore, there is a swath of dry forests around the area of Apolo (Hennessey 2007) formed by a "rain shadow" caused by the Andes. In the northernmost tip, large areas of pristine grasslands are surrounded by gallery forests with important populations of maned wolves and marsh deer (Boris Rios pers. comm.).

Madidi Protected Area fulfills several ecological functions, for example soil and watershed protection, rain and moisture capture by cloud forests, and local climate regulation. It is also part of a bi-national protected area conservation corridor running from the Bolivian Andes to southern Peru which is part of an important bird migration route along the Andes.

In terms of goods used by local populations, the Puna and high Andes are centers of origin and diversification of Andean tubers and grains such as oca (*Oxalis tuberosa*), papalisa (*Ullucus tuberosum*), potato (*Solanum tuberosum*), quinoa (*Chenopodium quinoa*), and canihua (*Ch. pallidicaule*). In the montane forests people depend on native species such as Caccharis, Fabiana, and Parastrephia for firewood and on several species for medicinal purposes based on ancient Kallawaya knowledge (SERNAP, WCS 2005). In the piedmont and lowland forests, the Tacana and Quechua-Tacana people hold an impressive traditional knowledge of hundreds of species which can be used as food, handicrafts, building materials, and medicinal purposes, including several palms. These habitats are also particularly rich in precious woods such as cedar (*Cedrela odorata*), mahogany (*Swietenia macrophylla*), sandbox tree or possumwood (*Hura crepitans*), South American oak (*Amburana cearensis*), rosewood (*Aniba canelilla*), goncalo alves (*Astronyum graveolens*) and others (CIPTA, WCS 2001).

In terms of wildlife use, fish such as the Pseudoplatystoma, Zungaro, and Phractocephalus cat fish, the tambaqui or pacu (*Colossoma macroponum*), and the bocachico or sabalo (*Prochilodus nigricans*) are important for subsistence and commercial purposes, particularly in the lowlands. The *Podocnemis expansa* and *P. unifilis* turtles are hunted for meat and their eggs, sold commercially. Peccaries, agoutis, deer, monkeys, and armadillos are used mainly for subsistence but some local trade exists (SERNAP, WCS 2005).

Historical Changes in Natural Resource Use

This area has been inhabited by several ethnic groups since pre-Hispanic times by some of the Arawak linguistic families such as the Tacana and Araona (Silva et al. 2002). This area had important economic and cultural exchanges between the lowland and highland indigenous cultures and also was accessed by several Inca and pre-Incan trails, linking Cuzco with Pelechuco, Moxos, Pata, Santa Cruz del Valle Ameno, and Apolo. During the expansion of the Inca Tupac Yupanqui in the last third of the fifteenth century, coca production and gold mining took place around the head waters of the Tuichi, Amantala, Queara, and Camata rivers (Saignes 1985).

In 1536 the Spanish colonization of this area began in search of El Dorado or Paititi using the same routes that the Incas had previously used, and 12 missions were established. This had huge impacts on the spatial, social, and productive organization of the indigenous population and on natural resources as agricultural production of coca, tobacco, cacao, peanuts, quinine, incense, vanilla, feathers, wildlife skins, and monkeys intensified. At the beginning of the republican era (1825-1880) there was another extractive boom linked to the use of the quinine bark (*Cinchona officinalis*), which resulted in the disappearance of the species from extensive areas and overhunting and fishing in the area to which many people had migrated. Additionally, areas for intensive agricultural production were established to supply the quinine collectors with grains, meat, and cane alcohol (Soux et al. 1991).

Rubber replaced quinine bark as the next best natural resource, fueling an economic boom that resulted in the establishment of rubber concessions in over 1.5 million ha, as well as private "haciendas" producing goods for the rubber concessions. The "haciendas" continued to proliferate from 1917-1964 and specialized in coca, sugar cane, and cattle production for the markets in Peru and the mining areas in Larecaja. Later, in the mid-sixties, wildlife in the region (in particular affecting caimans, peccaries, cats, otters, macaws, and parrots) suffered the effects of a quarter century of commercial trade in live animals and skins. In the 1970s a development policy called "March to the North" began; it focused on developing an agricultural center based on cane sugar production around San Buenaventura, the construction of a hydroelectric dam, and hydrocarbon exploitation. In order to facilitate exploitation of these three natural resources, an aggressive campaign of new roads and colonization resulted in a large influx of Quechua and Aymara people, the establishment of forestry concessions, cattle ranches, land speculation, and a large informal trade in precious woods such as mahogany and South American oak (Silva et al. 2002).

All these historical processes resulted in indigenous groups of the lowlands gradually losing ancestral land and natural resources, and only since the state reforms of 1994—such as the agrarian reform, forestry, environmental, and popular participation laws—have the indigenous people been able to demand actions to build a more just and equitable society, respectful of the environmental and cultural characteristics of the region. In particular the recognition of their rights over their natural resources and territories are a result of the efforts of the indigenous movement which culminated in their historical national level march for "Territory and Dignity" in 1996.

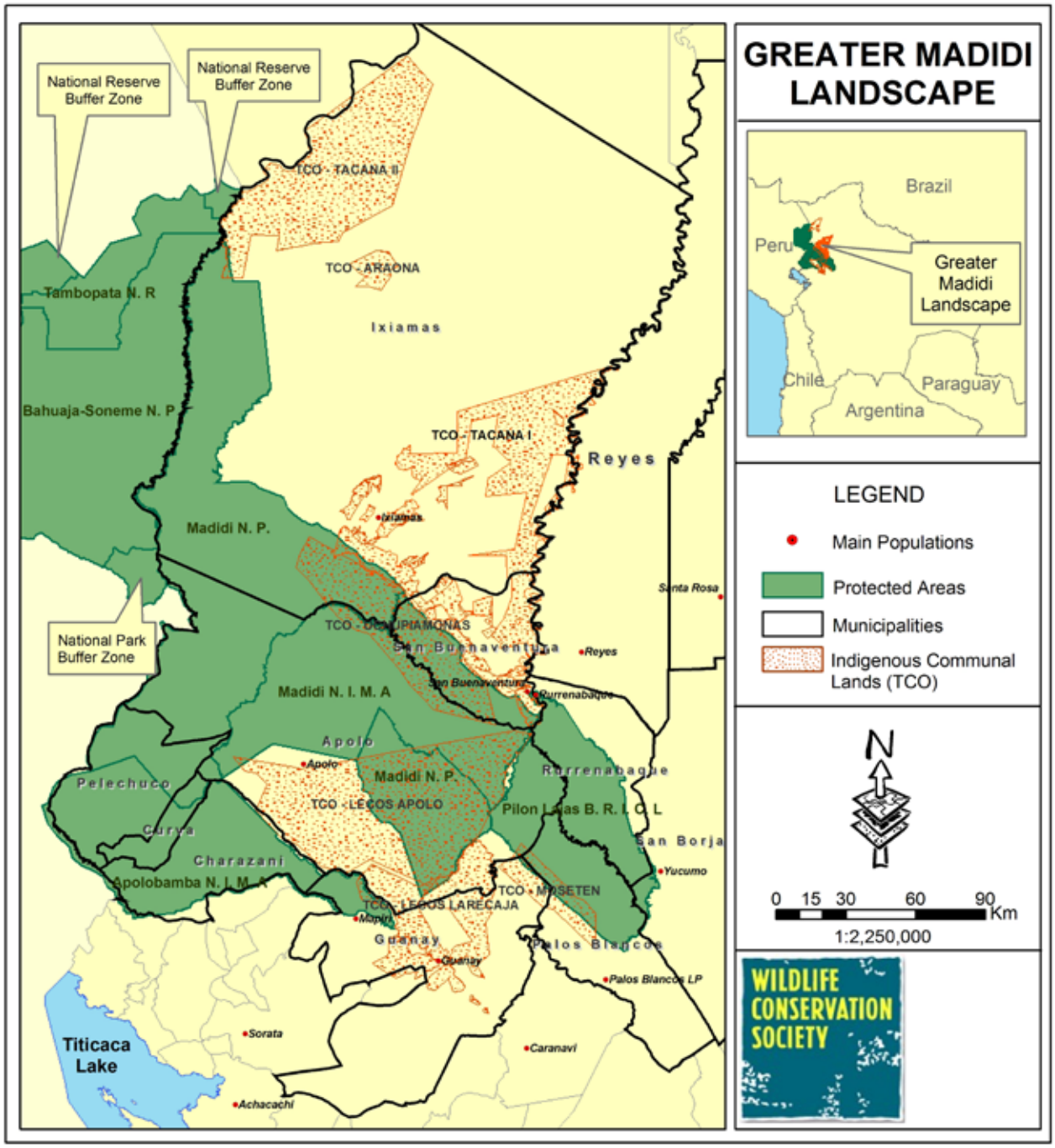
Cultural Setting

This area holds great cultural diversity because of the historical processes described above: There are Tacanas in the east, Lecos in the south, traditional Quechua settlements in the Apolo and Pelechuco region, and colonists along the San Buenaventura to the Ixiamas axis. The urban centers of Apolo, Pelechuco,

San Buenaventura, Guanay, and Ixiamas are made up of people who identify themselves largely as "mestizo" (Lehm et al. 2002).

Within Madidi protected area there are nine communities in the national park and 22 communities in the integrated management area, totaling close to 4,000 people. Additionally, the protected area overlaps with four indigenous territories which are in different degrees of consolidation (**Figure 1**). Around 11,500 indigenous people are within these territories, whereas the Mestizo, Quechua, and Aymara population is twice that (National Population Census 2001, INE National Institute of Statistics).

Figure 1: Greater Madidi landscape.



All municipalities overlapping the protected area had positive growth rates between 1992 and 2001, particularly Ixiamas and San Buenaventura. These increases in population result in a growing demand for land and natural resources and increasing social conflicts (**Table 1 and 2**).

Table 1: Inter census population increase rates in Municipalities of Madidi Protected Area. (Source: INE National Statistics Institute, Bolivia)

Municipality	1992	2001	Inter census growth rate	Annual Growth Rate
Ixiamas	3.618	5.625	55%	5%
S. Buenaventura	4.608	6.203	35%	3.3%
Apolo	12.877	13.271	3%	.3%
Pelechuco	4.742	5.115	8%	.8%
Guanay	27.319	28.365	4%	.4%
Total	53.164	58.579	21%	1%

Increases in provincial populations since 1950 shows the same tendency, in particular in Abel Iturralde and Larecaja, where the population tripled in half a century. Though population density is low, clearly there is growing pressure on resources.

Table 2: Provincial population increase. (Source: INE National Statistics Institute, Bolivia)

Province	Extension in Km^2	Census 1950	Population Density	Census 1976	Census 1992	Census 2001	Population Density
Franz Tamayo	15.900	13.666	0.9	16.437	17.619	18.386	1.2
Abel Iturralde	42.815	3.076	0.07	5.132	8.226	11.828	0.28
Larecaja	8.110	30.684	3.8	46.269	68.762	68.026	8.4

Social Services

The communities within Madidi protected area do not have good access to health services. Only some communities have small health posts and most of these do not operate because of lack of medicines or trained personnel. Access to basic sanitation has improved via investments by development organizations such as CARE in integrated conservation and development projects. Currently, 37% of communities within the protected area have drinking water and 30% have latrines. Only the urban centers have constant electric supply, those communities (53%) which have solar panels only have it in the schools. Only 20% of all communities have communication radios and only 10% have telephone coverage. Most communities only have primary schools (73%), some go up to middle school (23%), and 4% have no school (SERNAP, WCS 2005).

Establishment of the Protected Area

Madidi National Park and Natural Area of Integrated Management was established on September 21, 1995, by Supreme Decree No. 24123. It was created for the conservation of biological diversity, natural landscapes, archaeological sites, geomorphological formations, ecological processes and services, indigenous knowledge, and also to respect the rights of traditional communities over their natural resources and to promote sustainable natural resource use, environmental education, research, ecological monitoring, and ecotourism.

The protected area includes two categories: National Park, corresponding to IUCN Category II, and Natural Area of Integrated Management, corresponding to Category VI. The national park covers 1,271,500 ha and prohibits extractive use of renewable or non-renewable resources but permits scientific research, ecotourism, environmental education, and subsistence activities of traditional populations, dependent on recommendations in the zonification management plan and specific regulations of the protected area. The Natural Area of Integrated Management covers 624,250 ha and aims to balance the development needs of the local population with conservation objectives.

When the protected area was established, some intensive use areas of traditional communities and even whole communities where erroneously placed within the national park area. Furthermore, certain areas without any human population and important biological attributes where placed within the integrated management category. Because of this there is a proposal to re-categorize the protected area.

Current Resource Use and Tendencies

In the high valleys the main economic activities are ranching cattle, llamas, and sheep, and on average each family manages around 700 ha of communal lands. Small animals such as chickens, pigs, and guinea pigs are raised for subsistence purposes and occasionally wildlife is hunted to supplement the family diet. Small agricultural plots are placed next to streams and rivers where the best soil accumulates. The most important agricultural product is potatoes, followed by other Andean tubers and broad beans; in the lower valleys maize, manioc, beans, and rice are also planted. Accessible precious woods such as *Junglans australis* and *Podocarpus cf. oleifolius* have been extracted, and currently species such as *Inga* sp. and *Cedrela odorata* are only used for furniture and as building materials. The highest forests of *Buddleia* sp., *Polylepis* sp., and *Baccharis* sp. have disappeared from the most accessible areas because of over harvest for firewood. Gold panning is a traditional activity and mercury pollution associated with it affects the Tuichi River. A modest flow of 100 tourists a year walking the pre-Columbian routes linking Pelechuco to Apolo generates ready cash to buy school materials and attend medical emergencies (SERNAP, WCS 2005).

Most of the communities are found in the lower montane valleys, some in areas which have suffered the results of inappropriate resource use and are on severely degraded soils and hence have limited options. In these areas people survive on marginal agricultural production based on coffee, sugar cane, beans, bananas, maize, yucca, rice, coca, and citrus fruits. Every family works on 0.5 to 1 ha per year. Some families have cows that are managed very extensively because of the historical soil degradation. Small animals such as sheep, guinea pigs, and pigs are raised for domestic use and some local trade. There are some conflicts with wildlife such as foxes, spectacled bear, pumas, and peccaries that predate on crops or domestic animals. Fishing of *Prochilodus nigricans* is an important activity during the dry season.

In the better conserved areas of the lower moist and dry montane forests, the sale of firewood to merchants who transport it to Apolo, illegal timber extraction, and collection of incense broadens the economic options for local people. Shade-grown coffee production has also been successful for these communities on soil which is still fertile. In the better conserved areas, people focus more on small animal production than on cattle. Their access to palm fruits and medicinal plants as well as abundant fish increases their well-being.

In the piedmont and Beni alluvial plains along the San Buenaventura and Ixiamas road, the colonist communities depend on agricultural production of rice, maize, banana, and manioc. This is complemented by small animal production and, to a lesser degree, cattle production. Some communities have participated in programs to promote agro-forestry, and there is interest in changing to these systems because of the limited economic benefit of traditional agriculture. Additionally, a large portion of the population works in sawmills or in illicit timber operations.

In contrast, the Tacana communities are also settled outside the protected area, but have important hunting, palm, and medicinal plant use areas, as well as sacred grounds within the protected area. Agriculture is the main activity for the Tacana families, followed by hunting, fishing, small animal rearing, and forestry activities, mostly legal and under management plans. The Tacanas have a wide and varied use of forest resources for food, building materials, medicinal purposes, dyes, ceremonial uses, and handicrafts. Organic and native cacao groves are also being managed and sold to certified markets. Finally tourism is an important activity for the communities of San Miguel and Villa Alcira, close to San Buenaventura. The Quechua-Tacana community of San Jose de Uchupiamonas also relies heavily on tourism and manages the world class Chalalan lodge. The Tacana communities in the north of Ixiamas municipality rely mostly on Brazil nut harvest and gold mining in the dry season. The monitoring efforts WCS has supported in Tacana communities have shown that wildlife represents a subsidy from nature of $100,000 a year from fishing (100-200 tons) and $35-97/month per family from game (calculated by the replacement cost of beef). The protected area is an important source of game and fish for the neighboring indigenous territories (CIPTA, WCS 2001).

Resource Use and Conservation Targets

History shows that different economic booms based on natural resource extraction have benefited very few, have marginalized and displaced indigenous populations, and caused habitat and soil degradation. Because of its topography, the Madidi area does not favor productive activities which maintain forest cover: Only 37% of the area is found in areas of gradients of less than 15%. Additionally, most of the valuable timber has already been extracted from accessible areas and current remaining stocks are in isolated areas. Furthermore, the socioeconomic conditions of the local population do not present a favorable scenario for traditional local economic development as their capacity for capital investments and a significant labor force is low. Hence impacts on conservation from traditional small scale agriculture, hunting, and fishing are localized. However, increasing demand for valuable timber and political interests are fueling demand for several roads crossing the protected area. These roads would open up the protected area to greater illegal extraction of timber and colonization, particularly in the Apolo region. Should this occur it would cut the conservation corridor for spectacled bears and the altitudinal corridor for plants and wildlife, a corridor that is incresingly important as the climate warms. Illegal timber extraction particularly affects the dry forests of Azariamas which is a specific conservation objective of the protected area. Park guards were able to control most of the illegal timber extraction by establishing control and vigilance posts, resulting in important recuperation of wildlife after the removal of more than 40 logging camps in the Tuichi and Quendeque valleys. Also, important alliances have been developed with the local indigenous populations for joint patrolling of common critical areas.

The most worrying trend is the alignment of individual economic timber interests with local and regional political interests. For example, regional and local political figures have used the demand for large scale development projects as a way to gain the support of the population and develop their political profile by questioning the protected area. Parallel to this, people involved in illegal timber trade take the opportunity to promote raids on the protected area and illegally open new roads to facilitate access to precious timber clusters.

An important activity that has been promoted by the protected area service and their partners is ecotourism, for which there is a specific regulation. However, in particular in the Iturralde region, private tourism interests have also fueled conflicts against indigenous territorial demands overlapping areas of tourism interest (Salinas 2007).

Conclusions

Nationally, the main challenge is establishing institutional alliances based on respect of the rights of different stakeholders at all levels: community, grassroots organizations, local, regional and national government, and civil society. In order to achieve this there must be clarity in rights over different resources established through a transparent land titling process and long term institutional strengthening in order to build a solid foundation for promoting activities that improve local people's living conditions.

This region is characterized by many of Bolivia's social and environmental conflicts and amongst the most serious are those related to establishing clarity in land tenure, in particular over indigenous territorial demands: conflicts over legitimate representation of different local actors; jurisdictional problems between neighboring municipalities; illegal extraction of valuable woods; distribution of benefits arising from the protected area; political party issues; illegal tourism operations; and demands for the construction of large scale infrastructure (Salinas 2007).

The consolidation of Madidi as a protected area will only be possible if the different local actors become involved in its management. Community and municipal authorities, and the population as a whole, must be better informed. However, environmental education must focus on promoting debate and analysis of local development options through institutions with local legitimacy—a process to be supported by outside institutions (such as international NGOs) providing technical and logistical assistance while building local capacity.

There must be a legitimate consensus building mechanism that allows for interaction and consultation between the protected area administration and local actors. Those local actors with established or traditional rights over natural resources and land within the protected area should have co-management. There should be differentiated participation by other actors in the establishment of protected area management strategies and plans. This is stated in the Bolivian constitution, environment law, forestry law, popular participation law, land reform law, and the Bolivian adherence to the 169 International Labor Organization treaty.

Once clear land tenure rights are established and a basic institutional structure exists with clear rules for consensus-building and conflict resolution, there are several productive options available for the region that are compatible with the proposed zoning for the protected area. But this must be limited to those local actors with established or traditional rights over natural resources to avoid an open access scenario.

Conservation organizations can also help increase benefits. An often overlooked economic benefit comes from the direct purchase of goods and services in the northern La Paz region for protected area management activities. Park related spending contributed $1.21 million per year over the period 1999-2004, with an additional $1.38 million from tourism (Fleck et al. 2006). These figures represent a significant underestimate because they do not include other investments in surrounding communities or personnel working in La Paz and outside of Bolivia. Increasing local capacity for natural resource management and conservation is a priority. This will capture benefits arising locally from conservation by allowing a greater percentage of conservation funds to purchase goods and services locally, where most of the costs of conservation are borne. Nevertheless, even today these costs are only short term and, in the medium and long term, the presence of the protected area is in fact an opportunity to improve the local livelihood alternatives of the poorest and more marginalized populations.

International Multilateral Organizations have a role to play because there are geopolitical obstacles to increasing the benefits of conservation for local livelihoods. There are insufficient mechanisms in international markets to value public goods, so that the benefits of conservation can be distributed in a more just and equitable way to compensate for the local opportunity costs (Kremen et al. 2000). For example, though the deforestation of tropical forests represents 25% of carbon emissions to the world's atmosphere, most of the costs of protecting these forests are paid by the local forest people. One obstacle for the development of different market mechanisms is the absence of democratic participation in international debate. This participation is even less in multinational corporations where only majority stockholders have a voice, though their impacts are global. It seems that market mechanisms working through incentives and disincentives have the greatest possibility of success in promoting conservation while benefiting local livelihoods.

PART 4
WCS CASE STUDIES – NORTH AMERICA

4.1 How Landscape and Socio-economic Transitions Impact Human Livelihoods within a Mosaic of Wilderness and Communities[1]

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The 24,000 km^2 Adirondack Park in northern New York is a mosaic of public and private lands, wilderness and communities, and wildlife and people. During the last 200 years the areas encompassed by the Adirondack Park boundary—the blue line—have experienced numerous transformations. The land itself has evolved from virgin forests to clearcuts and exposed mountain slopes and then back to managed and protected forests with intermittent human settlements. It has transformed from a landscape home to the full suite of mammals native to the northeastern United States, to a landscape devoid of some critical members that once were there: wolf, cougar, golden eagle, and wolverine. The transitions have been integrally related to socio-economic changes: from a landscape with minimal human intrusions to one in which humans play a central and defining role; from an economy of resource-based extraction to an economy driven by amenity-based use; and, finally, from a forbidden wilderness to an accessible frontier with complex state protections in place. These transitions have had both positive and negative repercussions on the livelihoods of those living inside the blue line. Although the Adirondack Park was created in 1892, its designation as a protected area has created sustained and ever-changing impacts on human livelihoods that continue to evolve today.

Background

The Adirondack Park is part of the Champlain Adirondack Biosphere Reserve and a critical component of the Northern Forest in the northern regions of New York, Vermont, New Hampshire, and Maine. It is one of the best examples of northern temperate forest globally, and the largest protected area in the lower 48 states—larger than Yellowstone, Yosemite, and Glacier National Parks combined. It is ecologically diverse, with rugged mountains of spruce-fir forest, rolling hills, hardwood forests, lakes, bogs, vast freshwater wetlands complexes, and open agricultural lands mostly adjacent to Lake Champlain. The park has more than 40 peaks over 1,200 m, 48,000 km of streams and rivers, and 11,000 lakes and ponds. It is home to 90% of the species that exist in the Northern Forest, including many species of boreal birds, many birds that require extensive areas of interior forest, and a host of large mammals such as black bear and moose, which are returning on their own from New England and Canada after having been extirpated at the turn of the century.

Prior to the 1800s, the majority of the Adirondack region was largely devoid of permanent human settlements; however, members of the Iroquois and Algonquin nations regularly passed through and used the region as a hunting ground (Terrie 1994). During the early 1800s, Europeans began clearing the land for agriculture and creating small settlements based on traditional resource extraction. Extensive railroad systems enabled the proliferation of logging and mining operations as well as the development of stately hotels to serve the urban elite who summered on the lakes. Today, the human population of the park is approximately 135,000 full-time residents and over 200,000 seasonal residents, located primarily in small hamlets and around waterways. Nine to 12 million people visit the Adirondacks each year, and the park is within a day's drive of over 90 million people, making the potential for increased demands from the resources in the Adirondacks quite large. The park is becoming a popular retirement locale, as well as a place from which many people choose to telecommute.

During the first century of its existence, the Adirondack Park was touted as a conservation success model of humans and wilderness coexisting. Due to the extent of the public lands and restrictions on the private lands within the Adirondacks, some wonder why the park even needs additional protection. However, the Adirondack Park is an oasis of wildlands within the rapidly urbanizing northeastern United States. Pressures from development, tourism, and pollution threaten to alter the park dramatically. If the Adirondack Park model is to have another 100 years of conservation success, then more work is needed to protect the area's natural and cultural resources.

Socio-Economic Characteristics

The socio-economic characteristics of the park are fairly similar to those of other rural areas in the US. Culturally, the Adirondacks is relatively homogenous—roughly 96% Caucasian. What ethnic diversity the area has is largely attributable to Native Americans residing on the Mohawk reservation located in the northern Adirondacks and state and federal prisons located in the Adirondack Park. Today, economic class rather than ethnic background is the defining mark for park residents. The extremes of US economic stratification extend inside the park, with significant implications for educational access, health care, and access to amenities from neighboring urban areas. In general, park residents have adequate access to schools, and the percentage of residents who achieve a high school degree is only slightly lower than the national average (US Census Bureau 2000). Access to adequate health insurance and proximity of medical facilities varies for park residents. Northern New York has a higher number of uninsured residents compared to the nation as a whole due to the prevalence of small business and service sector employment related to tourism. However, those employed by the government receive full health insurance. Basic medical care is readily available in all areas of the park but access to special units such as dialysis, cardiology, or oncology often requires patients to travel one to two hours by car to larger facilities. Economically, the average per capita income for all 13 counties in the park is lower than both the average per capita income for New York State and the United States as a whole. Currently, government (local, state, and federal) is the largest employer in the park, followed by the tourism and services sector. Many of the government positions are directly related to maintaining the Park's natural resources or providing services to visitors. Other government jobs are in state and federal prisons and in the public sector, including schools and local government.

A Wilderness Protected

Prolonged clear-cutting in the Adirondacks in the 1800s had a profoundly negative impact on the waterways providing drinking water to residents in southern New York, including Albany and New York City. The state first purchased lands and designated a "Forest Preserve" in the Adirondack region in 1884, just 12 years after President Grant designated Yellowstone National Park. This was an effort to protect the watershed and downstream trade and transportation, with a stipulation that allowed timber harvest to support a newly formed Forest Commission. In 1892, the New York State Legislature designated the Adirondack Park as a 12,000 km^2 region within which eventually all private lands would be purchased as Forest Preserve (Terrie 1994). Between the acrimonious response from local communities and the economic impossibility of this plan in part due to issues of eminent domain, the state resigned to a park with a checkerboard of public and private lands. In 1894, the public lands of the Adirondack Park were afforded constitutional protection to be "forever kept as wild lands," effectively prohibiting the harvest or sale of timber from these lands. Today, the Adirondack Park is a 24,000 km^2 mosaic of public and private lands. Hunting and other forms of recreation are allowed on the public lands, but resource extraction such as logging or mining is not. Activities on private lands include logging, hunting, mining, recreation, and residential development.

In 1968, a state government-led study found that increased residential development and over-use of recreational resources was threatening the park. Starting in 1973, the newly formed Adirondack Park Agency (APA) began overseeing land-use and development on all private lands within the Adirondack Park boundary and created a State Land Master Plan to guide recreational use on public lands. The new Adirondack Land-use and Development Plan divided the private lands into six density-based development zone types and required landowners obtain a permit if they wished to subdivide land, build principle dwellings, or make substantial additions to an existing structure (**Table 1**). These regulations were intended to keep higher density development concentrated near hamlet areas and already existing development. Lower density areas were placed adjacent to the Forest Preserve with the idea that lands in resource management and rural use protection would remain as working lands in forestry and agriculture. The State Land Master Plan, which is now administered by the New York State Department of Environmental Conservation (DEC), designated seven management categories based on characteristics of the Forest Preserve lands: motorized use was restricted in some areas (Wilderness) and permitted in other areas (Wild Forest) and intensive use such as campground facilities were a separate designation (**Table 2**).

Table 1: APA Land Use Classifications: Private Land Use and Development Plan (Adapted from Adirondack Park Agency 1982)

Classification	Appropriate Uses	Intensity Guidelines
Hamlet	Growth and service centers of the Park. The Plan permits all uses within hamlet areas	No limit
Moderate Intensity	Most uses are permitted, but relatively concentrated residential development is most appropriate.	500 principle buildings per 2.59 square kilometers. .53 hectare average lot size
Low Intensity	Most uses are permitted, but residential development at a lower intensity than above is most appropriate	200 principle buildings per 2.59 square kilometers. 1.29 hectare average lot size
Rural Use	Most uses are permitted, but rural uses are most appropriate. Low intensity residential development is also suitable.	75 principle buildings per 2.59 square kilometers. 3.44 hectare average lot size
Resource Management	Suitable uses include agriculture and forestry, game preserves and recreation. Residential development at a very low density is permitted	15 principle buildings per 2.59 square kilometers. 17.28 hectare average lot size.
Industrial Use	Existing industrial uses and future industrial sites.	No limit

Table 2: APA Land Use Classifications: State Land Use Master Plan (Adapted from Adirondack Park Agency 1989)

Classification	Definition/Appropriate Uses	Management Guidelines
Wilderness	Areas where earth and its community of life are untrammeled by humans. Hiking, XC skiing, snowshoeing, back country camping, etc.	No additions or expansions of non-conforming uses, i.e. roads, buildings. Use of motorized vehicles and off-road bicycles strictly prohibited.
Canoe Area	Like Wilderness only dominated by water. Canoeing, hiking, XC Skiing, back-country camping, etc.	Same as Wilderness designation
Primitive	Essentially wilderness, but contains structures and other improvements. All forms of recreation permitted.	Motorized vehicles and bicycles allowed. Additional structures and expansions prohibited.
Wild Forest	Similar to wilderness or primitive area only frequently lacks the sense of remoteness. All forms of recreation permitted.	Motorized vehicles and bicycles allowed. Additional structures and expansions prohibited unless a formally adopted unit management plan exists.
Intensive Use	Areas where the State provides facilities: campgrounds and day use areas	Motorized vehicles and bicycles allowed. Areas include boat lunches, visitor centers, campgrounds. Unit Management Plans required for all improvements.
State Administrative	Areas where the State provides facilities. Administrative, Scientific, and Visitor information related.	Provide administrative facilities on a scale which is in harmony with surrounding setting. Adhere to wetland regulations.
Historic	Buildings or structures with historical significance owned by the tate.	Preserve the character of the site. Adhere to wetland regulations.

When the state formed the Adirondack Park Agency, the local residents perceived the implementation of the regulations as a "takings" of their property rights (Kenney 1985). From the park residents' perspective, the state authority decided what was "best" for the Adirondacks and imposed the regulations without much input from the local residents, who were struggling to make a living. The implementation process did not include education efforts, outreach, or work with the local communities. The new regulation process, coupled with a struggling US economy, globalization, and loss of industry from the Adirondacks left the perception that the government had ended the Adirondacks' last hope for economic autonomy: development (Keller 1980).

The APA zoning regulations have generated resentment from local town governments. Although towns have the option to adopt their own land use plans with APA approval, many towns still do not have plans in place. As a result, local towns are often at odds with the APA regarding building permits. Since the 1970s, all large developments, many smaller scale developments, state land purchases, and management designations for state land have endured close scrutiny from local watchdog groups concerned about human livelihoods in the park. In response to these groups and to the existing development threats from continued building along shorelines and in the backcountry, more conservation organizations were formed.

Today, numerous non-governmental organizations have fulfilled niche roles in advocacy, economic development, and community issues. In 1994, the Wildlife Conservation Society started a program to focus on wildlife research and community-based conservation. Our conservation targets are to:

- Maintain connections with other northern forest landscapes;
- Maintain continuous area and distribution of native habitats on private lands;
- Maintain the wild experience of the Adirondacks;
- Improve the ecological integrity in human dominated landscapes;
- Minimize human-wildlife conflicts and restore wild behavior of wildlife;
- Maintain ecosystem services and ecological integrity in wild areas.

Our specific species targets include maintaining viable populations of black bear, marten, moose, boreal birds, and common loons. To achieve these targets, we must understand how resource use influences our targets as well as how conservation activities impact human livelihoods.

Resource Use, Governance, and Conservation Impacts

The Adirondack Park encompasses a multitude of resources with varying ownership and extent of restrictions. We grouped the resources into seven categories and detail the issues related to their use, how governance shapes their use, and how their use impacts conservation targets (**Table 3**). The resources include timber, non-timber forest goods, wildlife, land, water, wind, and air.

Table 3: Summary of resource use, governance, and impacts to conservation targets

Resource	User	Market	Governance	Access	Conservation Impacts
Air	Local residents and visitors	Common pool resource	Federal and State Governments	No restrictions	Yes
Land	Local residents, NYS residents, out-of-state residents	Local and commercial use	NYS DEC, Adirondack Park Agency, Local Town Governments	Development restricted on private lands, prohibited on public lands. Restrictions exist for access to public and private land for recreation.	Yes
Non-timber forest goods	Local residents	Local and commercial use	NYS DEC	Illegal on all public lands. Legal on private lands.	No
Timber	Local landowners and timber companies	Local, national, and international commercial markets	NYS DEC, Adirondack Park Agency	Illegal on all public lands. Legal on private lands. Restrictions apply.	Minimal
Water	Local residents, municipalities, and some businesses	Subsistence and local use	State Health Department, NYS DEC	Legal on public and private lands. Some restrictions on surface water.	Yes
Wildlife	Local residents, NYS residents, and out-of-state residents	Generally subsistence, some commercial use, and other illegal uses.	NYS DEC, Migratory Bird Treaty Act, Endangered Species Act	Legal on all public lands and some private lands. Some restrictions apply.	Minimal (Unknown)
Wind	Local residents, and limited commercial use	Subsistence, local, and commercial use	Adirondack Park Agency	Illegal on public lands. Legal on private lands subject to regulations.	Unknown

Timber

Access to timber resources within the Adirondack Park depends on land ownership. Timber harvest is explicitly prohibited on all public lands inside the blue line. However, harvesting is allowed on private lands, with a number of restrictions. Many local people, including small family-owned logging companies and residents working for large multi-national companies, work in the forestry industry in the Adirondacks. Many thousands of hectares have been harvested for commercial use. However, numerous logging operations in the park are closing down due to globalization of the industry. Since 2000, the four largest forest land owners have either sold or announced the sale of their properties. In the past decade, over one million acres (405,000 ha) of land has changed ownership. Some of these lands will stay in forestry through state conservation easements that allow investment companies or small private timber companies to manage the land. The rest may be used for other purposes such as development. Non-industrial private landowners also engage in small-scale forestry. Most of the wood harvested from these lands is milled locally, creating added value. In 2000, the forestry industry provided around 500 of the 35,000 jobs in the Adirondacks (50 years ago the forestry industry along with agriculture and mining were the largest employers). The market for construction of high end homes is booming, while the pulp and paper markets have declined significantly with only one paper mill left inside the park (compared to 10 in 1920). The extent of violations related to forestry is uncertain given the vast size of the

park and the small number of enforcement officers: Fewer than 150 DEC forest rangers, DEC environmental conservation officers, and APA enforcement officers are responsible for enforcing local regulations and guidelines for resource use on public and private lands in the park.

Habitat loss is one of the key threats to conservation targets in the Adirondack Park. Although timber harvesting on the private lands does disturb habitats, the regulations and best management practices often adhered to by local foresters minimize the impacts to local fauna. Timber harvest poses the greatest threat to birds that rely on intact interior forests but probably also has significant impacts on the American marten, as well as reptile and amphibian species in some areas. Given the extent of land protected from timber harvest in the Forest Preserve, the negative impacts are generally localized and do not result in population-level impacts. However, the changing nature of land ownership may pose more serious threats; when companies who have owned Adirondack lands for 50 to 100 years sell to timberland investment management organizations (TIMOs) and/or other industrial timber companies, the management priorities shift. These groups may manage the forests for a short period and then, to maximize financial return, sell within 10 years. This transition may be detrimental to conservation and local people who rely on sustainable resource extraction for long-term employment.

Non-timber forest goods

The harvest of tangible non-timber forest goods is explicitly prohibited from all public lands inside the blue line. Non-timber forest goods can be taken from private lands, so access depends on land ownership. No rules or regulations apply to non-timber forest goods on private lands. Given the extent of the forest preserve, enforcement for collecting on state lands is minimal. Examples of direct uses include berry picking for personal or commercial use and collection of wood and bark products for use by local artisans who design "Adirondack" furniture or use the "Adirondack" style for interior decorating. Artisans sell their products commercially at craft fairs, local businesses, and via the internet. Contractors who build Adirondack "great camp" style homes often hire artists to create custom pieces for their clients. To date, there are no known negative impacts of harvesting non-timber forest goods on our conservation targets.

The market for intangible forest products is also booming. Local artists and photographers use the Adirondack landscape as their subject and they sell their products locally, regionally, and sometimes internationally. Many Adirondack artists maintain galleries in local communities and support a vibrant arts economy. Future demand for these goods is likely to increase.

Wildlife

Use of wildlife in the Adirondack Park is fully governed by the DEC under NYS Environmental Conservation Law and the Migratory Bird Treaty Act. Hunting, fishing, and trapping may occur with a valid license on public and private lands during open seasons for white-tailed deer, black bear, fisher, mink, weasel, skunk, bobcat, marten, beaver, raccoon, fox, coyote, fish, turkey, and many species of migratory waterfowl. These activities are mostly limited to recreation and subsistence; however, some resources end up in wildlife trade, e.g., black bears' gall bladders sold to China. and turtles in the pet trade. Furs and taxidermy animal products may be sold commercially.

While the number of animals taken has remained steady or slightly increased for all species, the demand for hunting, fishing, and trapping has declined substantially during the last 25 years due to cultural change. The pelt market has been depressed since the mid-1980s. If the trends continue, demand for wildlife-related products will decline in the future. Even so, there is evidence of ongoing poaching—not only for the regulated species but also for species whose collection at anytime is strictly prohibited. While detection of violations may be difficult, the DEC does levy fines for illegal animal collectors or poachers. Aggregate impacts of wildlife use on conservation targets is considered minimal, but data is scarce. Population estimates based on hunting records indicate that most game populations are increasing; however, no independent assessments have been conducted to confirm these trends. Martens may be more negatively affected by trapping compared to other animals. We suspect that a variety of turtles and other herptile populations are especially susceptible to animal collectors, e.g., wood turtles.

Land

Access to land for development and recreation creates the most contention for human livelihoods in the Adirondack Park. Development, except for state facilities such as campgrounds, ski centers, or administrative buildings, is explicitly prohibited on public lands in the Adirondack Park. Development on the private land is governed by the APA. Depending on where the land is located within the park, it can be used for private or commercial venues. In hamlets, land is used for typical commercial and community venues including restaurants, motels, companies, schools, shops, galleries, libraries, and housing. Areas where hamlet-intensity development can occur are extremely limited to <10% of the park. Outside the hamlets, the uses become more residential mixed with some farming and small scale forestry. Areas where low-density rural development can occur are extensive, roughly 35% of the park. All of these uses are legal and regional and local land use plans direct and limit where and what types of development can occur. As the park and its resources have gained popularity, demand for these lands has increased dramatically, and low-density rural development is expanding.

Land values inside the park and even in individual towns vary widely. In the same town, a prime waterfront residence may be worth $2 million compared to a river front residence on a larger parcel that is worth $96,000. This value discrepancy highlights socio-economical and cultural disparities associated with the Adirondack Park community. In some ways, it represents the traditional class and spatial divide between seasonal and permanent residents: Seasonal residents live, relatively isolated, along lakeshores, and permanent residents reside in hamlet neighborhoods, rural upland areas, or on marginal waterfronts. While the park has always attracted seasonal residents, its lands and communities are becoming increasingly attractive to second-home and investment home owners as well as retirees and those wishing for a change of lifestyle. As waterfront properties become expensive, affordable only to the wealthiest people, interest in buying properties in the hamlets and in rural uplands has increased. Permanent residents cannot compete with second home and investment home buyers in part because employment inside the park typically pays much less compared to that outside the park. Since 2000 the cost of housing has continued to rise, posing challenges for middle income families to find affordable housing (Kretser, unpublished data). The cost of housing and rents is too high for those

of the lowest income to find adequate and affordable housing (Kretser 2005). The pace of low-density residential development also has a negative impact on conservation targets (Glennon and Kretser 2005).

Access to recreational amenities complicates the issue of land use. Recreational activities are marketed for tourism but are also important quality of life resources. Access to recreation on public lands is governed by the DEC via the State Land Master Plan. All types of recreation are permissible on private lands; however, access for recreation on private lands is restricted based on landowner preferences. The DEC governs what uses are permitted as well as which areas are open to the public, what signage to post for promoting visitation and informing visitors, and what facilities to maintain for visitors.

Under the State Land Master Plan, all state lands within the park are subject to Unit Management Plans (UMP). The UMP process allows for residents and communities to review and make recommendations on how the DEC should manage the state lands for recreation. Tourism and recreation support the local economy and sustain human livelihoods. The UMP process clarifies which types of recreation are allowed on which state lands, and, in theory, serves as a method by which communities can help shape conservation to their benefit. Many local residents perceive restrictions of motorized use as negative and limiting, yet studies have documented substantial economic returns of both motorized *and* non-motorized recreation (Merwin Rural Services Institute 1998; Omonhundro 2002).

Motorized and non-motorized recreation negatively impact our conservation targets by disrupting breeding and nesting of loons, habituating bears and martens to human food, and in general creating over-crowding that spoils the wild characteristics of the area. If use is concentrated in high use areas, it allows for better enforcement of recreation activities. However, the vast amount of land compared to the number of personnel patrolling makes adequate enforcement impossible.

Water

Without the water resources of the Adirondack Mountains, the park would not exist. The aesthetic, recreational, and consumptive value of water is immeasurable. As a common pool resource, it requires complex management. Access to surface waters in the Adirondack Park is regulated by the DEC and the NYS Department of Health (DOH). Surface waters are used for drinking water in local camps and some municipalities. Access to surface waters for recreation is controlled by land ownership; state access is needed for the general public to use a waterway, otherwise only those who own shoreline have access. The types of recreation permitted on waterways are governed by the APA and the DEC.

Recently, access to groundwater in the Adirondack Park has gained much attention. With most of the population growth in the United States occurring in urban areas and the arid west, the bottled water industry is booming. The demand for bottled water is expected to increase dramatically in the future. The DOH has issued bottled water permits for areas at the fringe of the Adirondack Park for corporations such as Coca Cola, Pepsi Cola, and Nestle, including businesses from Iceland, Italy, Canada, and the United Kingdom (NYSDOH 2007). However, no regulations govern the extraction of groundwater for commercial use. Selling Adirondack water has the potential to improve the local economy if local people become involved in the process. However, the trend appears to be that corporations secure permits, but conservation groups and state regulators have not formed policies to address the issues of groundwater extraction

by outside corporations. Without proper regulations governing groundwater extraction, the impacts to conservation targets could be substantial. Moreover, the region's water resources may be increasingly valuable and contentious under climate change, and this issue has the potential to play a large and politically-loaded role in the future of the region's conservation.

Air

At the turn of the 20th century, people sought a summer in the fresh air of the Adirondacks to escape urban pollution. Today, the same holds true. Between nine and 12 million people visit the Adirondack Park each year and part of their journey is to enjoy the fresh mountain air. However, acid rain and mercury pollution from power plants, and recent accounts of ozone at high elevations, make this resource particularly complex in terms of governance and conservation target impacts (Appalachian Mountain Club 2007). In some places in New Hampshire, with similar mountains and wind patterns, the ozone is comparable, if not worse than urban pollution levels. These impacts negatively affect human and wildlife health, and have the potential to harm human livelihoods.

Wind

Wind as a resource has gained attention with several recent proposals for commercial energy production in and around the Adirondack Park. Building wind turbines on the protected lands of the Adirondack Park is strictly prohibited. However, wind turbines may be located on private lands inside and adjacent to the park. Locations of wind turbines are governed by the APA. Currently a height restriction limits most locations but small scale turbines are actively being used for subsistence in several areas of the park. Proposals for commercial wind farms are growing in number, and the demand for wind resources will likely increase given the rising costs of fuel oil. Their contribution to the energy grid could reduce energy costs to families facing very high oil costs throughout the winter. Outside the park two major wind farms are in operation. Little is known about the specific impacts that wind turbines will have on our conservation targets but data from other parts of the country demonstrated the negative effects wind turbines have on birds and mammals (Johnson et al. 2002; Rabin et al. 2006). However, compared to the damaging impacts of energy generation from oil, gas, or coal on our conservation targets, the negative impacts from wind energy generation is relative.

Protected Area Impacts to Human Livelihoods

When the Adirondack Park Agency was formed in the 1970s, death threats, arson attempts, and protests ensued. These types of activities, mostly conducted by property rights activists and local town government leaders, continued at a lower rate through the 1980s and escalated again during the early 1990s following attempts to strengthen the restrictions on private land development. The relationship between the protected area and local people varies. There is a great deal of suspicion of the state (and federal) government. Some local people welcome restrictions by the state for the wilderness, wildlife, and water quality that have been protected, and the resulting economic benefits related to tourism and second home development. Others view the protected area as a hindrance to economic development, especially to job creation and affordable housing. The restrictions on land and timber resources are most contentious. While recreation on public lands has the potential to be an alternative resource use, management of state land is also contentious, and the economic benefits of recreation have not been fully realized.

In general, where public lands dominate townscapes, locals view the public land as prohibiting development of local businesses and affordable housing. Yet there is no direct relationship between the amount of Forest Preserve and key economic indicators such as the poverty rate or unemployment rate (Keal and Wilkie 2003). Some local leaders have even suggested land swaps to allow for developable state lands within townships to be traded with non-developable, and perhaps more ecologically interesting, private lands. Many officials see this option as too complicated given the amendments that would be necessary to the State Constitutional protection of the Forest Preserve.

The creation of the Adirondack Park Agency created severe animosity toward conservation efforts. Since that time, many conservation actions that have excluded local residents' perspectives have proved unsuccessful, such as the proposal for a Bob Marshall Wilderness and the proposal to reintroduce wolves. State officials, conservation groups, and local residents continue to have strained relations, especially as the amount of protected lands increases each year. However, much progress has been made in addressing the needs of local people with relation to the park during the last 10 to15 years.

Conservation Approaches Must Include Community

Numerous state and local government and non-governmental organizations in the Adirondack Park address concerns relating to human livelihoods, while many non-governmental organizations address conservation issues. However, only the Wildlife Conservation Society has successfully integrated conservation concerns and human livelihoods. Because we engage communities, we are changing the way other conservation groups approach problems. We are working with people to manage their natural resources by providing science, engaging and empowering communities, and developing community conservation stewards. By partnering with communities, we help them to see the importance of the protected areas and work with them to identify sustainable economic activities. For example, we host Community Exchange Days which bring together regional leaders to discuss ideas for development compatible with the natural resources such as the arts and green technology. We have been able to engage local communities by positioning ourselves as non-advocacy information brokers and have become a go-to resource for communities, providing salient data on a variety of topics and working with local communities on different issues in which we incorporate conservation principles.

We have not found solutions for—nor is it our intention to find solutions for —all of the human livelihood issues in the Adirondacks, but we have bridged a divide in a way that no other group has: We approach conservation with a willingness to consider the impacts it may have on human livelihoods. Two specific steps that may be taken in the Adirondacks to improve human livelihoods: 1) developing a comprehensive economic plan for the entire park that specifically identifies successful models of economic development within the constraints of a protected area; and 2) building the capacity for as many communities as possible to engage in visioning and planning for their future.

Conclusion

The transitions that have taken place within the Adirondack landscape have shaped human livelihoods. The issue of resource use and human livelihoods in the Adirondacks really is a story about disparities and the growing differences between the haves and the have-nots. This trend holds true across North America, where high demand for attractive places with abundant natural amenities has increased the value of areas near nature and protected areas.

Wealthy people can buy experiences afforded by and the resources provided by these protected lands. The power of the purse is, more often than not, held by in-migrants, seasonal residents, second home owners, corporations, and investment companies, rather than permanent residents. Those who are willing to move to or remain living in the Adirondacks and sacrifice economic prosperity do so because of the quality of life afforded by the natural resources and quaint communities. Our challenge is pursuing conservation without creating a place where only the wealthy can access resources afforded by more than a century of protection.

[1] Much of the information presented here, unless otherwise noted, can be found in more detail in Jenkins and Keal (2004).

PART 5
WCS CROSS-REGIONAL THEMATIC PERSPECTIVE

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

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Introduction

Biodiversity continues to be lost at alarming rates, despite decades of conservation efforts. The causes of the current biodiversity crisis are clearly anthropogenic, the over-use of nature for human consumption, globally and locally. Our best hope for conservation rests in steering people towards less environmentally destructive, resource-intensive land uses and activities.

Conservation approaches nowadays often combine the establishment and management of protected areas with landscape-scale approaches that try to affect human activities in the wider landscape surrounding protected areas. Regardless of which conservation paradigm is employed in a particular setting, decisions have to be made about where and how best to allocate conservation funds. Often faced with tight budgets, conservation practitioners have to ensure that their resources achieve conservation outcomes as efficiently as possible, in other words to get the greatest conservation benefits at the least cost.

This paper explores the concept of direct incentives for conservation, and summarizes current discussion on their benefits and potential drawbacks. It then highlights the current experience at the Wildlife Conservation Society (WCS) with various forms of more or less direct incentives for wildlife conservation.

Paying for the Invaluable

People's land use decisions are largely driven by economics. Because biodiversity is a public good, the benefits that conservation provides accrue to everyone, but private users often benefit more from the destruction or overuse of biodiversity than from its conservation. Economists would say that the public benefits (or the public costs) need to be internalized to arrive at the real economic value of biodiversity for the private user. For example, if a farmer could earn US$100 by cutting down a section of rainforest to plant a cash crop, then in order to entice him/her to set aside that land instead, s/he has to perceive that conserving the rainforest is worth at least that much.

Although many conservationists do not like to think of biodiversity as an economic good—preferring instead to emphasize the intrinsic worth of nature—most recognize that economic incentives for people living adjacent to or in areas of high conservation value can be useful for achieving the needed behavior

change. The non-economic values of biodiversity often appear insufficient to overcome the economic forces that drive its destruction. The question then is how best to make the link between conservation and economic value—or the link between conservation and livelihood security—explicit in people's minds.

To date, at the local level, most attempts to ensure an economic benefit for people that will result in biodiversity conservation have been project-based. In developing countries such initiatives tend to be grouped under the mantle of "community-based conservation," "sustainable forest management," or "integrated conservation and development projects (ICDPs)," and rely mainly on fairly indirect incentives to affect people's behavior. Typically these involve alternative income-generation projects in cases where people's traditional livelihood strategies lead to biodiversity loss, and attempt to get people to utilize natural resources sustainably. Examples commonly include support for the establishment of "biodiversity enterprises" such as collection and selling of non-timber forest products (NTFP) or ecotourism ventures, or quotas on hunting or collection of biodiversity products, such as turtle egg collection limits. The track record of such initiatives in achieving conservation is, however, checkered, often neither achieving the desired results for people or for conservation (Newmark and Hough 2000; Ferraro 2001; Agrawal and Redford 2006).

One of the principal problems of ICDPs and other indirect approaches appears to be that the desired results (simultaneous achievement of biodiversity conservation and development) are often not achieved. One of the main concerns is that people may welcome the new income-generation activities promoted by projects as complementary, providing *additional* income, but not *substituting* for activities that destroy or over-use biodiversity (Ferraro and Kiss 2002). In other words, if people can derive additional income from, say, ecotourism and still hunt threatened wildlife in the forest, they may choose to do both, since it will improve their livelihoods. If, however, income is provided for **not** hunting threatened wildlife, and this income is sufficiently attractive, then the hunting should stop. Therefore, in recent years, some economists have argued that direct incentives for conservation are likely to be superior in terms of efficiency and effectiveness (Ferraro and Kiss 2002).

What are Direct Incentives, and Why use Them?

Direct incentives for biodiversity protection can range from conservation land purchases, leases, and conservation easements (retirement of biodiversity use rights), to performance payments (for example, paying for successfully hatched turtle eggs) and tax incentives. A hybrid form between direct and indirect methods are payments for environmental (or ecosystem) services. They may be deemed less direct than strict performance payments because typically one is not paying for outcomes, but rather for services which, it is hoped, will lead to the desired outcomes (Ferraro and Simpson 2002).

All of these are increasingly being employed in the United States, Europe, and Australia through a myriad of different schemes. Direct incentive approaches to conservation are still in their infancy in the biodiversity-rich tropics. Most of the pioneer experiences written up in published literature are from Costa Rica and other Latin American countries.

Figure 1: Comparing different conservation approaches in terms of "directness" and level of use of economic incentives (Source: Wunder 2005)

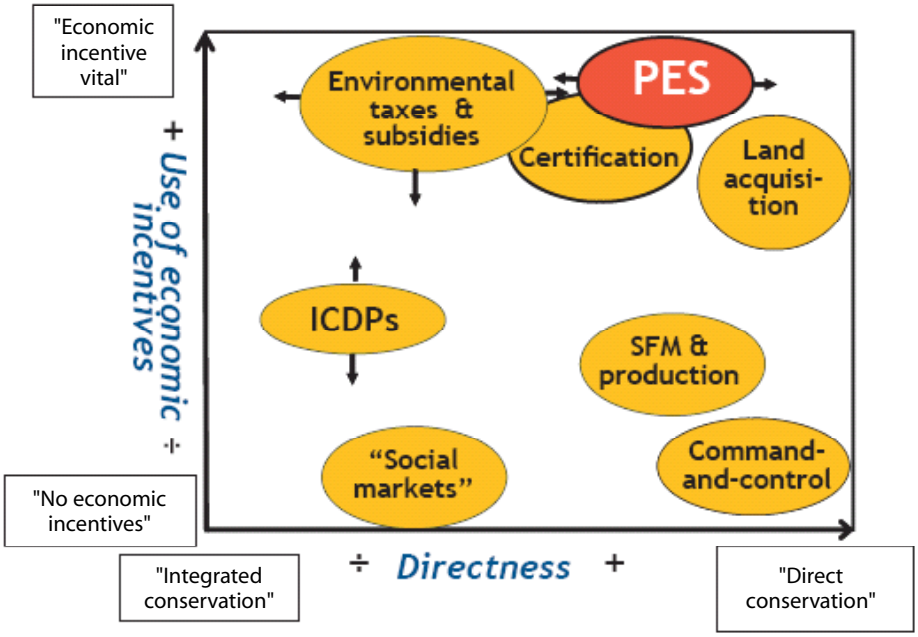

Figure 1 illustrates that different conservation approaches tend to rely on the use of economic incentives to varying degrees and may seek to achieve conservation results relatively indirectly (for example ICDPs) or directly (for example through land acquisition), or via an array of intermediate approaches. Payment for environmental services is one of the most direct approaches that also relies heavily on economic incentives. Missing from the figure are performance payments, which would feature in the upper right hand corner of the graph, being the most direct and economically driven approach to conservation.

The key to direct incentives such as performance payments and payments for ecological services (PES) is that they are conditional, i.e., they are only made if a certain action is undertaken or, as the case may be, avoided. For example, land owners may be paid for watershed protection services that they provide through avoided deforestation and afforestation on their lands. Direct payments can be seen as a form of compensation for forgone land uses, where destructive actions are not undertaken based on a contractual obligation, or as a payment for services rendered, the service here being biodiversity conservation, where people actively engage in agreed-upon pro-biodiversity activities. Most usefully, such conditionality emphasizes the link between biodiversity and the benefits it provides to people *if* it is conserved.

Proponents argue that direct payment approaches are also likely to be more cost-efficient than indirect approaches because conservation is being paid for directly (Ferraro and Simpson 2002) rather than within the framework of a complex conservation and development project. This does not mean, however, that direct payments do not also yield development benefits, or that they should be employed in a vacuum without ancillary activities. It could be argued that direct payments provide multiple development choices for the payees in that they usually get to decide for themselves how to use this income, whereas in ICDPs and similar initiatives the types of economic activities people undertake is sometimes pre-determined or recommended by the project (Ferraro and Kiss 2002).

Critics of the direct payments approach contend that it does not work well under all circumstances, especially because it requires fairly sophisticated contractual frameworks and monitoring capacity to maintain the crucial element of conditionality. It may also be that political or cultural barriers exist to receiving payments for environmental services. Evidence from initial lessons learned indicates that PES systems work best (are most cost-efficient) when the services provided are visible and beneficiaries are well organized, and when secure property rights are accompanied by strong legal frameworks, and relatively wealthy and well structured land user communities (Mayrand and Paquin 2004). These conditions often do not exist in some of the most biodiversity-rich countries.

Payments for Environmental Services (PES)

PES are based on the principle that people who provide environmental services should be compensated for their efforts, while those who benefit from such services should pay, or, in economic terms, "internalize the benefits" (Mayrand and Paquin 2004).

Typically, environmental services providers are compensated for one or more of the following:

- Biodiversity protection (both in and outside protected areas, including in agricultural landscapes)
- Watershed protection
- Protection of landscape beauty
- Carbon sequestration

Direct Incentives in Practice: The WCS Experience

WCS staff have been experimenting with a number of direct incentive approaches, although for most of these the experience is too recent to allow an assessment of long-term results. Nevertheless, there are some preliminary findings and lessons from cases in Cambodia, Lao PDR, Tanzania, and Russia, discussed in this section, and the excellent example of Community Markets for Conservation (COMACO) in the Luanga Valley in Zambia, addressed later in this Working Paper. These cases all employ one or the other type of economic incentive designed to stimulate a conservation response, but the degree of directness varies. It should also be pointed out that none of these initiatives are stand-alone. Rather, they all were/are being implemented as part of broader site-based conservation programs. As such, it is sometimes difficult to judge whether results achieved are due mainly due to the economic incentives provided, or influenced by some of the other project activities, such as education and outreach.

Cambodia: Paying Local People to Protect Crane Nests and Paying Not to Convert Wetlands into Flooded Rice Paddies

Case study details provided by Tom Clements, WCS, 2005 and 2007

An experiment with direct incentives for conservation hails from Preah Vihear, Cambodia. This project is an integral part of the overall conservation program of WCS Cambodia, which includes other components such as environmental education, protected area establishment and management, and support for ecotourism ventures, such as the Tmatboey Ibis Ecotourism Project. (Although the ecotourism project has resulted in income generation for local families and

conservation of ibis and their wetland habitat, it is not reported here because it belongs to the class of initiatives typically undertaken by traditional ICDPs.)

Preah Vihear is important for its populations of at least six globally threatened large waterbirds: two ibis species (*Pseudibis gigantea* and *Pseudibis davisoni*), rare greater adjutant storks (*Leptoptilos dubius*) in addition to colonies of lesser adjutants (*Leptoptilos javanicus*), black-necked (*Ephippiorhynchus asiaticus*) and woolly-necked storks (*Ciconia episcopus*), and sarus cranes (*Grus antigone*).

All these large waterbirds are threatened by human disturbance and collection at nesting sites. Sarus cranes, for example, are known to fetch a high market price (more than the equivalent of US$100 per bird in Thailand). The collection is mostly done by local communities who sell the chicks to cross-border traders.

Since 2003 WCS has been working to locate and protect the nesting waterbirds. Initially the research, protection, and monitoring was undertaken by WCS staff and rangers. However, a much greater number of nests can be found and successfully protected by working in cooperation with the local communities. Under a direct payment scheme, local people are now offered a reward for reporting nests, and for monitoring and protecting the birds until the chicks successfully fledge. To administer the scheme, WCS staff issue standard contracts to protectors, which include rules and a code of conduct.

In 2003 and 2004 nest protectors were paid $60 at the end of the month, assuming that the nest went undisturbed during that period. In 2005 the payment system was changed, following community consultations, to $1/day for protecting the nest with a bonus $1/day provided if the chick(s) successfully fledged. The value of a nest thus increases with time: after two months of guarding a nest, if the chicks do not fledge, a protector stands to lose $60.

The monitoring system for this project is quite rigorous, involving regular visits of protection teams by Wildlife Sanctuary or Protected Forest staff to check on the status of the nests (and to collect research data), and monthly visits by WCS monitoring staff. In addition, local rangers locate the nests and are responsible for weekly monitoring of the nest protectors in their immediate vicinity.

The total cost of the program was US$25,000 for 2005-6, of which 80% was direct payments to 115 local people. The average income of a typical household in the target population is $300-400/household annually, while the average amount paid to nest protectors annually can reach $400 per individual. Funding comes from WCS and a UNDP/GEF project that ends in 2013.

The scheme has been very successful, protecting 74 and 170 nests of globally threatened species in 2003 and 2004 respectively. The payment scheme fulfills other functions as well. It is a good demonstration to villagers and authorities in these remote places that there are benefits from species protection. Wildlife Sanctuary and Protected Forest staff also conduct awareness-raising activities in local villages to inform people about the nest protection scheme and the importance of conserving these species, as well as enforcing the law against wildlife traders and monitoring local and border markets.

The value of the direct payment was initially set based on knowledge of the local economy (e.g., $2/day is a suitable minimum wage; $100 is the value of a crane chick). WCS Cambodia staff feel that for future projects it would be advisable to use standard economic valuation techniques to determine the correct payment value, i.e., the actual opportunity cost for involvement in the scheme.

Lao PDR: Incentive Payments for Eld's Deer Conservation in Savannakhet Province

Case study details provided by: Renae Stenhouse, WCS Lao PDR, based on inputs from Souvanny Ounmany, Arlyne Johnson, Christopher Hallam, Dominic Cooper, Somsanouk Nouansyvong (WCS Laos staff), Chanthavy Vongkhamheng (WCS Laos staff and PhD student), and William McShea (Smithsonian Institute)

Rare Eld's deer (*Cervus eldi siamensis*), recently discovered to still inhabit the open dipterocarp forest in Savannakhet Province of Lao PDR, are under threat from the activities of villagers living close by. The species has already vanished from neighboring Thailand, but persists in very low numbers in Myanmar and southern Laos. Its habitat consists of large expanses of lowland areas of dry forest, patches of evergreens, streams, and seasonal pools. This habitat also supports an assemblage of other rare and unusual species such as Asiatic jackal, silver langur, barking deer, and wild pig, many of which have been eradicated from other areas of Laos due to overhunting. Villagers were initially unaware of the conservation importance of this deer and its habitat, and although the deer has been legally protected since 1995 under a wildlife conservation law, some villagers have hunted the deer and cleared its habitat.

WCS, together with the Smithsonian National Zoo's Conservation and Research Center [Smithsonian Institution (SI)], initiated a "payments for conservation" scheme in 2003 with the aim of reducing threats to the deer and increasing the size of the deer population. Villagers were asked to: (1) reduce or stop hunting, (2) maintain habitat, and (3) be involved in the conservation of Eld's deer. Under this project, WCS Laos paid an annual cash incentive (initially US$300, increased to US$450 in the second and third years) to each of three villages located near a population of Eld's deer in central-southern Laos.

The original agreement was a verbal one: WCS/SI would pay the incentives fund in return for a reduction in threats to the deer. The villagers and WCS did a threats analysis and it was agreed that if the threats did not decline, then the full incentives fund may not be paid out, but no criteria for how performance would be measured were set.

Villagers decided that the money would be divided into two uses: (1) a village development fund to benefit the entire village and (2) costs (*per diems*, amounting to around US$2/person/day of activity) for meetings, monthly patrolling, and education extension work by the Village Conservation Team (VCT). Thus payment is split between communal benefits and individual benefits. Additional *per diems* are paid to the team to assist WCS and the government in setting up biannual line transects for monitoring deer presence. Payments were complemented with education, protection/enforcement, and government capacity building. In 2004 the Eld's Deer Sanctuary was designated as a provincial protected area, and the three target villages developed rules and regulations for the sanctuary together with the district authorities.

The Village Conservation Team is made up of 15 people per village. The villagers decided on the composition of the VCT, resulting in representation from the Youth Union, militia, police, agriculture, and the headman. The remaining members were chosen by the villages' headmen, who favored friends and family members. There was some effort made to ensure inclusion of some poorer families, but no women were included.

Monitoring of the deer population is undertaken through formal surveys and reported sightings. WCS-SI-government staff and villagers monitor the deer population size by transect lines twice per year to see whether the number of deer signs is increasing, decreasing, or staying the same. WCS also asked the villagers to report all sightings of the deer to one literate person in their village, who then records the data. Shortage of funds and WCS staff resources did not allow for the more rigorous methodology required to accurately measure yearly conservation performance.

Pricing of the payment was not the result of an analysis of potential costs, but rather determined by the limited funds available to WCS for this project. The amount paid was increased after the first year so that villagers could finance complete village development projects, such as building a meeting house or fixing a bridge, and be able to say "that came from the Eld's deer incentives money."

Overall the project has had some successes. The deer population appears to be stable and slightly increasing, village-level awareness on the importance of the deer has increased, and the villagers have contributed valuable data on deer demography.

However, the WCS team also reported some weaknesses relating to inequity of villager participation (especially gender inequity). Another problem was that the payment was not conditional on performance and full cash payments were still made in the year when WCS learned of two deer killings (2005). The WCS team feared that reducing the cash payment would dissuade villagers from reporting to WCS if deer were poached.

In addition, and perhaps most significantly, the government counterparts (the Department of Forestry) asked that WCS pay the full amount even though deer were poached, as it would be unfair to penalize the entire village for one person's transgression, and because reducing the payments would lead to reduced cooperation from villagers in the future. WCS agreed to follow the government's advice. Thus in this situation, payments are in fact made for services rendered (the villagers' patrols and education activities), and not for performance. Rather than linking reduced populations to reduced payments (a disincentive), it might have been better to link payments to an increase in deer numbers. But even then, there would be opportunity for data to be falsified.

Long-term sustainability is also in question, as funding is no longer available to continue the cash payments, and it is uncertain whether hunting will resume if funding stops, or whether local "ownership" of the deer can be expected to develop to such an extent that direct incentives are no longer needed to ensure protection. It has been hard to measure success or the cost effectiveness of the incentives project.

Results cannot be clearly attributed to the cash payments: WCS conducts education and awareness-raising, and there is a law against poaching deer, so any desired conservation outcome may be due to a number of factors. The main successes in the overall project have been indirectly related to the incentives payments. The creation of the Eld's Deer Sanctuary was agreed to and then formally requested by the villages involved in the project. The project has also received very good government support, including a pledge of co-financing for the future.

Tanzania: Paying Local Communities Not to Convert Grasslands to Crops

Case study details provided by Charles Foley, WCS, 2007

An interesting case of a direct incentive comes from Tanzania, where villages are receiving communal economic benefits for maintaining traditional pastoral activities on grazing lands rather than converting these grasslands to agriculture.

The Tarangire ecosystem supports one of the highest densities of large ungulates in East Africa, including the largest population of elephants in northern Tanzania, now numbering close to 2,500 individuals. The Simanjiro Plains are the calving grounds for the majority of large ungulate species in this ecosystem, including wildebeest, zebra, eland, and hartebeest. The wildlife in Tarangire migrates seasonally. Because the soil in the park is deficient in phosphorus, the wildlife must leave the safety of the national park and disperse onto neighboring village lands in search of mineral-rich forage. The majority of the land in these dispersal areas belongs to the pastoral Maasai communities, who do not traditionally hunt wild animals and have therefore coexisted with the migrating herds. The continued tolerance of the local communities towards wildlife on their land is therefore essential for long-term conservation.

During the past two decades there has also been a steady change in land use outside the park. Rapid immigration and a growing human population have placed increasing strain on traditional pastoral activities and encouraged a shift to agriculture. Four of the nine main wildlife migration routes from Tarangire have disappeared entirely, and those remaining are all threatened to some degree.

The Tarangire Elephant Project is working with local communities and tour operators to protect the main dispersal area of the northern sub-population of elephants. Under an agreement with the local villagers, the area is to be used for livestock grazing, thus protecting both ungulate habitat and traditional grazing areas while supplying revenue to the village.

A direct payment scheme was set up by which the village council of one of the three villages (representing 2,500 to 3,000 people) in the Plains receives an annual cash payment conditional on the easement area remaining free of agriculture. The program was established through a long and elaborate buy-in process that involved input from the majority of villagers via village meetings.

The payment, supplied by photo-tourism companies, is $5,000 annually for a land easement of approximately 120 km^2. In addition, WCS provides salaries and equipment for four game scouts (from a local village), amounting to another $3,000 per year. The rules and conditions were negotiated between the business coalition and the village council and written up as a contract.

The money is paid through a local NGO set up by one of the tour operators rather than directly by WCS because it was important that the scheme be seen as a business endeavor and not a charitable donation. There has been considerable suspicion of the motives of wildlife NGOs in past years and some local people believe wildlife NGOs are seeking to expand the national park. They are therefore more willing to enter into agreements with businesses that they feel have a more transparent agenda. Instead, WCS provides technical support, such as training and finance for the game scouts. The villagers are eager to reduce illegal hunting in the area (for safety and other reasons) and have therefore welcomed the activities of the game scouts.

Payment is stipulated to continue as long as there is no agricultural activity within the easement area. It is expected that the contracts will not be broken, as it is in the villagers' interest to maintain the highly productive short grass area for cattle grazing. The easement therefore mostly represents added value to their cattle grazing activities.

In its first year of operation the program has been well received by the villagers, who see the payment as added value to their traditional pastoral activities. Protecting the land from agricultural activity is good both for their cattle and for wildlife, and therefore a powerful incentive. Other areas within the village less suitable for pastoralism have been zoned for agriculture instead.

The photo-tourism companies that operate in the Tarangire ecosystem funding this project do not actually operate in the easement area, but are funding it because of its value to the wider ecosystem. WCS only provides the game scout salaries (from donor funding). Currently funding is committed for a period of five years at $5,000 annually (plus $3,000 a year for game scouts). However, tourism revenues fluctuate and can be negatively impacted by any drop in visitors. A desired expansion of the scheme to include two other villages would require additional sources of finance. WCS staff expect that a trust fund will ultimately have to be set up for the area.

Problems other than financial sustainability could arise if a significant number of villagers decided that they would make a better living from cultivation than from pastoralism. Therefore, WCS feels that improving profits from pastoralism should also be a long-term project goal.

Russia: Linking Community Development and Biodiversity Conservation in the Russian Far East

Case study data provided by Dale Miquelle and Nikolai Kazakov, WCS

An example from the WCS Russia office uses a relatively indirect market-based incentive strategy to achieve conservation goals by developing a certification scheme for tiger-friendly non-timber forest products (NTFPs).

The Russian Far East provides habitat for the world's only viable population of Siberian, or Amur tigers (*Panthera tigris altaica*). Approximately 330-370 adult Siberian or Amur tigers are left in the wild, with 95% of these animals in the Russian Far East. The area has a unique assemblage of large carnivores, including tigers, brown bears, Asiatic black bears, wolves, wolverine, and Eurasian lynx. Living in northern temperate forests of low productivity, and hence low prey density, these tigers require large tracts of land to survive. Even under the most optimistic scenarios for habitat protection, it is unlikely that sufficient area will be protected to ensure conservation of Amur tigers in the long term. Therefore, managing habitat outside protected areas (in multiple-use areas) is a key issue in Amur tiger conservation.

Primary threats to tigers are: (1) habitat loss from intensive logging and development; (2) depletion of the prey base; and (3) poaching of tigers. Tigers are most commonly poached for their fur and for their body parts that are used in Traditional Chinese Medicine, but they are also perceived as a threat to domestic livestock and dogs and as competitors to hunters. Human-caused deaths are by far the largest mortality factor for Amur tigers, and poaching by hunters is its most common form.

The WCS team in Russia felt that the key to effective natural resource management and conservation on unprotected lands would be effective partnerships with local stakeholders. One of the potentially most influential and effective means of managing wildlife on unprotected lands is working with hunters and the hunting management structure. In 1995, new legislature provided opportunities for local people to create non-governmental "societies" (NGOs) that could obtain hunting lands. In lieu of the former large state-controlled hunting operations, today 67% of all leases are managed by NGOs. In Primorskiy Krai, 80% of hunting leases are on unprotected lands. This implies that local people are now for the first time allowed to manage wildlife populations and have a vested interest in proper natural resource management. Hunters have also traditionally been involved in other extractive activities in the forest, often having worked for the Soviet-era state agency GosPromKhoz in the collection of non-timber forest products.

WCS began working with hunting associations and hunting leases throughout Primorskiy and southern Khabarovskiy Krai in the Russian Far East to develop effective management regimes on unprotected lands. Key to success is resolving the perceived conflict between tigers and hunters for prey resources and establishing direct links between tiger conservation and economic improvement in local economies. The project goal is therefore to protect tiger habitat by supporting newly-established hunting leases. The aim is to increase the hunting associations' capacity for self-management and financial independence, and to undertake anti-poaching activities and habitat and population management for tiger prey species.

One of the key interventions within this framework is the increase of harvesting and sales of certified "tiger friendly" non-timber forest products with a focus on increasing capacity of forest communities and hunting associations to produce products marketable at either the national or international level. The "tiger friendly" certification provides value-added for NTFPs linked to tiger conservation for the hunting associations marketing the product.

Although the sale of NTFPs is, by itself, not a direct conservation incentive, the "tiger friendly" certification process establishes direct linkages between income from NTFPs and land and wildlife management. Income from these NTFPs is conditional in the sense that WCS will only grant certification if monitoring shows that the requirements have been met. Thus, by making this direct linkage, conservation objectives and improved livelihoods can be achieved through a market-based mechanism.

There are several problems that are prohibiting more rapid development of the NTFP business in the Russian Far East. They include, but are not limited to, multiple taxations on small businesses and on exports; illegal NTFP trading by Chinese merchants; massive smuggling of NTFP goods across the border to China; and a strong logging lobby. Data are not available on the costs of setting up a certification scheme, including the required monitoring, and how this would compare to setting up a more direct performance-based direct payment scheme.

Discussion

Although the above initiatives are still young, several have shown promising preliminary results and indeed appear to support the view that direct incentives, in addition to other market-based approaches, can be a good tool to achieve wildlife conservation results. As all of these activities were part of larger conservation programs, it is not entirely clear how much of the early successes in these projects is attributable to the direct payments (except perhaps in the Cambodian nest protection case), and how much is due to other activities simultaneously undertaken by the projects.

Critics of the direct incentive approach argue that uncertain or inequitable land tenure, limited experience with legal contracts and their enforcement, and limited prospects for investment or employment outside the agriculture sector make such approaches difficult to implement in developing countries (Ferraro and Kiss 2002). These concerns are valid, but also apply to indirect approaches. More important, perhaps, may be political or cultural barriers to performance-based payments, particularly to withholding payments in response to poor performance.

In the Cambodia case, an unforeseen cultural issue was that Cambodians had trouble with the concept of payments for results rather than for time worked. Another issue of philosophical dimensions is whether it is actually morally justifiable, in the case where a destructive activity is actually illegal (like crane egg collection in Cambodia), to pay people not to do it. Pragmatically, however, where law enforcement is not effective enough to prevent illegal acts, it may still be the simplest way to achieve the desired results.

Since economic efficiency is one of the arguments used to advocate for the direct payments approach, an important question is how much to pay, when to pay, and whom to pay. Services to be provided and results to be achieved need to be well defined and, theoretically, a price should be negotiated based on an assessment of their true value based on local market conditions. Economic valuation of ecosystem services is notoriously difficult, but various methodologies have been tried. The key here is that, for people to choose conservation over alternative land uses, the benefits of conservation have to be at least marginally greater than those which they feel they could derive from other (more destructive) land uses. In practice, all of the WCS experiments with direct payments relied on subjective estimates of the "right price" based on factors such as availability of funds and willingness to accept the payment.

Conditions and timing of payments are also important considerations. In the Cambodia nest protection example, initially the scheme was based upon "payments for work" (i.e., $2/day) rather than "payments for success." This led to perverse situations where WCS was perceived as an employer with responsibility for protectors' well-being, whilst the protectors shared little of the risk. In addition, the loss of benefit to a protector for collecting a mature chick (a few days at $2/day) was less than the trade value (although no cases of a protector actually selling chicks were reported). Subsequently WCS decided to increase the risk shared by the protectors by paying them $1/day for their work and $1/day for results upon successful fledging. This reinforces the point that it is essential to establish a link in people's minds between benefits and conservation outcomes. In the case of the less-direct payment for services rendered, it is possible that people may not assume responsibility for conservation results, whereas linking payment directly to conservation success ensures that this is the case.

The issue of timing of payments is also exemplified by the Cambodia cases. Cambodians value immediate benefits much higher than long-term benefits, and local discount rates may be very high. In such situations, an up-front or regular payment scheme will probably be more effective than those that promise future benefits. Similarly, long-term sanctions, if they are at all desirable, may not be effective.

Whom to pay can be a dilemma fraught with difficulties. It is relatively easy to determine in the case of well-defined individual property rights. However, where land tenure is insecure or lands are held in common (as is often the case in indigenous territories) or state-owned (for example in Laos), the payee may have to be a community organization or another body designated by the state. In the example from Cambodia above, control of land lies with the state, and marginalized rural communities living in close proximity to significant biodiversity have limited capacity to assert or achieve recognition of land rights. Securing their land rights and empowering local enforcement to protect these rights are crucial to any incentive scheme that seeks to affect land use decisions and are therefore one of the primary focuses of the WCS conservation program. Whether communal payments or individual payments are more appropriate can also be an issue of culture and local perceptions. In Cambodia, for example, individual benefits seem to be valued much higher than communal ones, perhaps because of its conflict-ridden history, which suggests that individual payments should be pursued where possible. In Laos, on the other hand, a mix of payments to individual members of the VCT for actual services rendered and to the village at large as a communal benefit was chosen. One problem that emerged from the communal payment approach was that withholding payment because of non-performance by one person (e.g., a poacher) would penalize an entire village, even if all other villagers hold up their end of the bargain.

Equity issues may arise, particularly when target communities are stratified along a gradient of income and land ownership patterns from landless to relatively well-off land owners. The Laos case shows how resentment can arise when certain members of a village are selected over others to receive benefits, or even when certain villages are selected as target villages over others. Another flaw of the Laos initiative was that gender issues were not dealt with and decisions on whom to include on the VCTs were left entirely up to the villages. WCS might have had an opportunity to involve women in the project and thereby promote objectives beyond wildlife conservation. In general, care should be taken so that inequitable power structures are not inadvertently exacerbated through direct payment schemes, if not for equity reasons, then at least because the wealthier individuals will also tend to be those with the power to make land use decisions. A stakeholder analysis to consider who owns or has access to biodiversity and who has the potential to protect or harm it should be a prerequisite to such schemes.

Another question is what form payments should take. Compensation does not always have to be in cash—it may be in kind (e.g., help to increase land tenure security or help to strengthen internal organization of community groups), or a combination of the two, depending on local preference. On the other hand, the more in kind assistance has to be provided, the more the initiative begins to resemble traditional ICDPs, and the more transaction costs will tend to increase, because of the likely need for consultants, community development specialists, lawyers, etc. (although some of these may also be needed for the establishment of any direct payment scheme). For projects to work, building up a relationship of trust with a potential community of service providers is an important first step in all cases.

Lastly, as in all conservation and development projects, sustainability is a key issue. If conservation outcomes are to last, a constant source of financing for payments will most likely be necessary. In that sense, market-based approaches, such as the COMACO model in Zambia (in this Working Paper) or the Amur tiger NTFP scheme, may offer some advantage, as they can become self-sustaining if the business model is successful. When payments stop, as is currently the case in Lao PDR, there is a risk that previous destructive activities may resume, although it is too early to judge whether awareness raising and a sense of ownership over the natural resources may mitigate this.

Conclusion

There is cause for cautious optimism from the preliminary findings by WCS field staff that support the utility of direct incentives and, more generally, market-based mechanisms. Hope for conservation results does indeed spring from making the link between conservation and livelihoods as explicit as possible. If a direct approach based on economic incentives is felt to be appropriate in a given context, the implementation details (such as whom to pay, when, and how much, from what funds, and through what mechanism) depend on factors such as local laws, preferences, capacities, and infrastructure, as well as the availability of funding. A direct payment to individuals (e.g., nest protectors) or groups (e.g., the village council) may be the best way to proceed where external factors such as political, legal, and cultural frameworks favor this kind of approach.

The most important advantage of direct incentives is, however, the conditionality of benefits. Even if direct cash payments prove too difficult to implement in a given situation, receipt of any type of benefit by a community could be made contingent on "biodiversity-friendly" behavior, thus increasing the likelihood of positive outcomes for biodiversity.

Finally, although the principal advantage of using direct incentives pointed out by economists is cost-efficiency, it may be worthwhile for conservation organizations working in developing countries that lack the requisite structures to help set these up or strengthen them. In such cases, they can be implemented as components of more traditional conservation projects. This of course increases the transaction costs of a project, but it serves the vital purpose of introducing conditionality as a motivator for conservation, and thereby leads people to better understand the links between conservation and their livelihoods.