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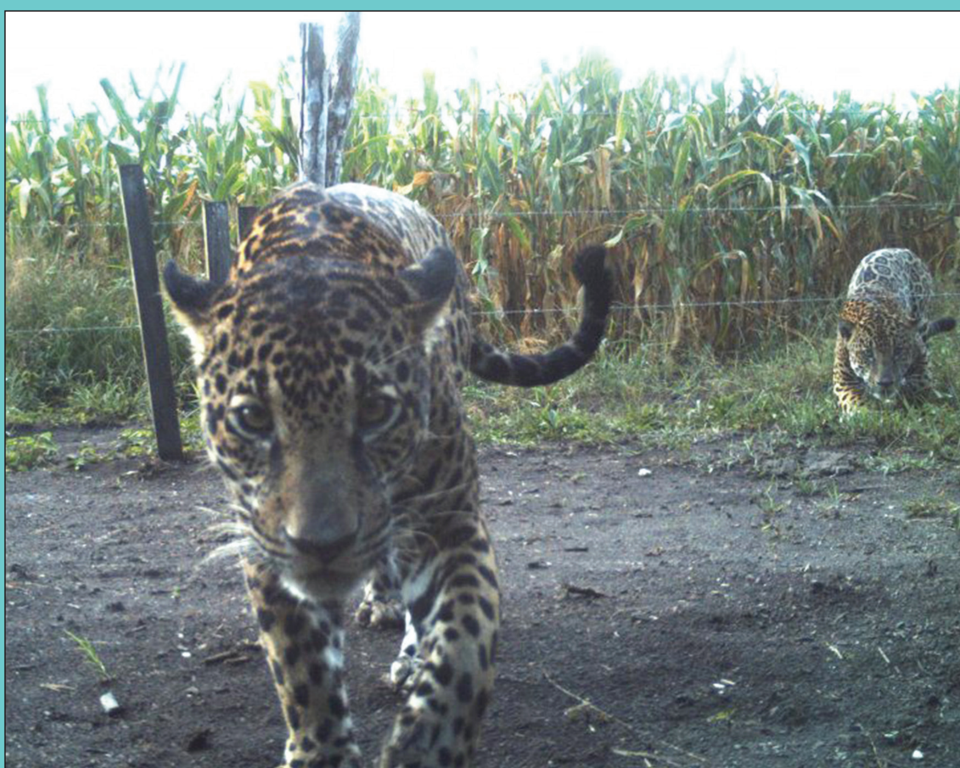

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Cover Photograph: Two Jaguars (*Pantera onca*) photographed adjacent to a corn field in Indian Church Village, Belize, using a Cuddeback Capture IR digital camera. Photograph © Venetia S. Briggs-Gonzalez.

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Camera Trapping Wild Cats with Landowners in Northern Belize

Venetia S. Briggs-Gonzalez[1, 2,*] and Frank J. Mazzotti[2]

Abstract - In contact zones where humans and wildlife are forced to share a landscape, conflicts usually arise because of socio-economic pressures, a lack of awareness of sustainable resource management, and a limited appreciation for wildlife conservation. After retaliatory killings of 2 *Panthera onca* (Jaguar), we implemented an incentive-based program using camera traps to engage landowners in wild-cat conservation efforts. Thirteen landowners participated in the project and we captured 21 photos of wild cats over 670 trap nights, for a trap success rate of 3.14%. Felid research has traditionally been conducted in protected areas, but this study area is highly human-dominated, and wild cats were photographed across the landscape mosaic. Here, we use effective scientific methods to directly impact not only wildlife conservation outside of protected areas but also community development by fostering a positive relationship with local communities that are in direct contact with wildlife.

Introduction

Human-wildlife conflict is the major factor threatening the survival of wild cats outside of protected areas in Belize (Foster 2008). Local perceptions about large carnivores, such as *Panthera onca* L. (Jaguar) and *Puma concolor* L. (Puma), historically show that most people fear Pumas less than Jaguars and that Jaguars are mostly responsible for killing cattle (Conforti and Cascelli de Azevedo 2003). Where large carnivores prey upon livestock, local people hold negative attitudes. In some places, landowners pay bounties of up to $500 USD for killing troublesome Jaguars or, usually, for any Jaguar present in cattle areas (Navarro-Serment et al. 2005; V.S. Briggs-Gonzalez, pers. observ.). In contact zones, where both humans and wild animals are forced to share a landscape, conflicts also include smaller carnivore species that affect fish stock, poultry, and crops (Ministry of Environment and Tourism 2005, Treves and Karanth 2003).

Too often, however, these human-wildlife conflicts emerge because of socio-economic pressures, lack of awareness of sustainable resource management, and a limited appreciation for wildlife conservation (Lindsey et al. 2011, Treves and Karanth 2003). There is direct competition between humans and wildlife for food and space as human populations grow and encroach into natural areas (Escamilla et al. 2000, Jorgenson and Redford 1993). Thus, to prevent conflicts, wildlife must be perceived as valuable, and benefits of wildlife conservation must extend to the community and private landowners (Treves and Karanth 2003).

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Over the years, wildlife conservation projects in developing nations have used indirect methods to encourage rural communities to maintain biodiversity by helping them to use resources sustainably. However, there is growing recognition that such initiatives fall short and are not cost-effective (Pattanayak et al. 2010). Initiatives whereby communities receive direct payment for environmental services are becoming increasingly successful (Agarwala et al. 2010, Ferraro and Kiss 2002). In this model, landholders/resource users make decisions on how best to meet their own goals, rather than being subsidized to carry out predetermined activities. Across the world, conservation-payment initiatives have been used to protect forested areas in China, Costa Rica, and Brazil; provide access to wildlife corridors and migration routes in Kenya; protect wildlife on private lands in South America; and develop effective cattle-ranching techniques that reduce predation in Mexico and Brazil (Chen et al. 2009, Conde et al. 2010, Ferraro and Kiss 2002, Hall 2008, Hoogesteijn and Hoogesteijn 2010). Additional initiatives are being developed in places like El Salvador, Colombia, Honduras, Guatemala, Panama, Russia, and Madagascar (Ferraro and Kiss 2002). Payments can be made for protecting entire ecosystems or specific species, and these initiatives involve a diversity of key players including governments, private sector entities, educational institutions, donors, communities, and individuals (Haas et al. 2009). When rural communities near wildlife areas become involved in conservation initiatives, they help to shoulder the burden of wildlife management and share in revenues earned by wildlife industries (Lewis and Phiri 1998).

With increasing human-wildlife conflicts, direct payments are usually in the form of compensation payments for losses of livestock or crop damage caused by wildlife (Agarwala et al. 2010). These programs have been successful in North America and Europe because value is placed on wildlife there, and wildlife ownership and protection is culturally ingrained and a part of socio-political decisions (Treves et al. 2009). Compensation is purported to work when a subset of the local community bears the costs of public wildlife conservation (Treves et al. 2009) and where costs of enforcing wildlife protection exceeds the costs of compensation (Verdade and Campos 2004). Though compensation platforms may garner short-term local support, programs can be subject to corruption and potentially create opportunities to undermine efforts not linked with financial incentives (Agarwala et al. 2010, Bulte and Rondeau 2005). It is important to note that compensation payments do not guarantee improved local perceptions and attitudes toward wildlife conservation or long-term management practices (Naughton-Treves et al. 2003). Here, we report on implementation of an incentive-based program to engage landowners in a wildlife conservation initiative.

Although wild cats and signs thereof have been sighted in the subject area for many years, the first documented human–cat interaction—the basis of this study—occurred in April 2010 with a calf kill, and a recorded sighting of a male Jaguar on the western boundary of Lamanai Archaeological Reserve. Over a 6-month period, a total of 8 calves were killed; consequently, a landowner-imposed bounty was placed on wild cats in the area, resulting in 2 dead Jaguars. We used monetary incentives to engage local, neighboring but culturally distinct communities of Indian Church, Indian Creek, and San Carlos to participate in a camera-trapping study as a way to monitor and conserve wildlife, especially wild cats. Our objectives were to 1) begin to involve landowners in conservation through camera trapping, 2) determine presence or absence of wild-cat species in the study area, 3) identify potential felid-habitat predictors, and 4) stop the killing of wild cats in response to livestock losses.

The felid guild of Belize includes the 3 largest cats of South and Central America—Jaguar, Puma, *Leopardus pardalis* L. (Ocelot)—and two smaller felids—*Puma yagouaroundii* (Geoffroy Saint Hilaire) (Jaguarundi) and *Leopardus weidii* (Schinz) (Margay). This felid assemblage is suffering widespread population declines throughout their range, and major threats are habitat loss and fragmentation, steady encroachment into natural areas, illegal trade of pets and body parts, and poaching of their wild prey base as game meat (IUCN 2014). Despite population declines of arguably the most charismatic component of vertebrate fauna, little is known about the ecology of wild felids and their responses to anthropogenic changes (Crooks 2002).

Field-site Description

Study operations were conducted at Lamanai Field Research Center, Orange Walk District, Belize (17°45'00.25"N, 88°39'56.91"W). The study site encompassed areas in and around New River and New River Lagoon and included villages and landowner properties of Indian Church, Indian Creek, and San Carlos. The area is a mosaic of savannah, secondary growth of moist tropical lowland broadleaf deciduous forest, and marshy scrubland (BERDS 2006, Meerman 2006), as well as private lands of pasture and small farms, or milpas. The area is bounded on the north by Lamanai Archaeological Reserve, on the east by New River Lagoon, and on the south and southwest by national protected lands of Programme for Belize. The northern part of the country is low-lying and is generally drier than other parts; elevation at the study site is 30 m above sea level (BERDS 2006, Lambert and Arnason 1978). Belize has a subtropical climate with a well-marked dry season from late February to May, with temperatures ranging from 18 °C to 35 °C, and monthly rainfall of 50–100 mm; the wet season is June through November with average temperatures between 30 °C to 33 °C and monthly precipitation of 200–220 mm in the study area (BERDS 2006, Meerman and Sabido 2001).

Thirteen landowners participated in this pilot program. Landowner properties ranged from small-scale vegetable farming (i.e., ~20-ha parcels for growing beans, tomatoes, onions, etc.) in San Carlos, and livestock-rearing of 15–30 cattle in Indian Church (~6–23-ha parcels), to larger farming and ranching operations in the Mennonite village of Indian Creek (i.e., ~44–100-ha parcels for 150 head of cattle). On our study site, land uses included forest, old milpa, pasture, and active agricultural crop fields. Land-use practice influenced camera placement, but we ultimately positioned cameras in consultation with landowners where there was recent wildcat sign, such as scat, prints, or recent prey kills.

Methods

We established 14 camera stations using passive infrared, remotely triggered Cuddeback Capture IR digital cameras (Cuddeback Digital, Green Bay, WI, USA) on a 3-km grid following standard camera-trapping guidelines (Karanth et al. 2006, Kelly 2003, Silver et al. 2004). We used neither bait nor lure to attract animals. We placed cameras on existing game trails, hiking trails, and old logging roads. We characterized trail use based on existing human traffic, and classified it as low (<1 per week), medium (weekly) or high (daily) use. We fastened cameras 50 cm above the ground and at a distance of no more than 5 m from the target spot. We cleared understory vegetation in the area in front of each camera station to prevent false triggers and maximize target captures. Cameras were programmed to run 24 h/day and take one photograph per trigger, with a 30-s delay. At each camera station, we recorded GPS coordinates, location (by village), landowner, height of camera from ground, width of trail/clearing, distance to nearest road (using GPS location and Google Earth), percent canopy cover, and land use (forested, pasture, milpa, crops). Cameras operated 14 August–9 October 2010, for a 57-day trapping period. Each GPS location was imported into Google Earth, and we created a 12.19-m (40-ft) buffer zone around each camera station to determine the effective area sampled beyond the immediate target spot photographed by each camera (Dillon and Kelley 2007, 2008). We sampled a total area of 112.5 km^2. We used Google Earth and ground-truthing to determine land use.

We taught landowners how to operate the cameras, to switch memory cards every two weeks, and to change batteries once a month. Landowners delivered memory cards to the field station on first and third Saturdays of every month to view photos and receive payouts. Initially, other researchers in Belize estimated that the area supported only 1 or 2 resident Jaguars because of land-use patterns and proximity to humans (B. Harmsen, ERI/Panthera, Belize, pers. comm.). Lamanai Field Research Center provided monetary incentives for photographs of felids captured on private lands. Date- and time-stamps on each photograph identified individuals and determined landowner payouts. For animals with spotted coats, we used coat pattern, body size, and timing and location of photo capture to distinguish individuals (Kelly 2003, Rabinowitz and Nottingham 1986, Silver et al. 2004). We identified solid-colored Pumas by body size, condition, scars, and visible skin parasites (Kelly et al. 2008). We used the color morph of Jaguarundis (red, brown, black) to help identify individuals, and when photographs were of the same color morph, we used time and location of capture to distinguish between individuals.

We analyzed photographs for species identification, individual identification where possible, and locality. We calculated total trap nights by subtracting the number of non-functioning days from the length of time each camera was in use. To calculate trap success, we divided the number of wild-cat photographs (each species and total) by total trap nights and then multiplied by 100. We classified felids photographed at the same camera trap within a 60-min period, but which were not individually identifiable, as the same animal. A chi-square goodness-of-fit analysis was used to determine whether observed capture success of each felid varied from expected (1:1:1:1:1). We used a forward, two-step full logistic regression model to examine capture success of wild cats in relation to habitat features at camera stations; features used in the model were land use, percent canopy cover, distance to nearest road, amount of human traffic, and width of trail. A non-parametric Spearman's rank correlation analysis was used to investigate potential relationships between photo-capture success and habitat features. All analyses were conducted using SPSS ver. 22.0.

We calculated monetary incentives (payouts) for each landowner as follows: each wild cat ($125 USD), repeat individuals ($50 USD), and mammal prey ($5 USD). We tallied bird captures, but did not include them in the incentive program. We tallied payouts by landowner and species and quantified the total payout.

Results

We recorded 21 felid photographs in the 57-d trapping period, and after subtracting the days when cameras did not function or were being replaced, there was a total of 670 trap nights. Overall trap success was 3.14 felids per 100 trap nights (Table 1). Of the wild cats photographed, we captured 4 felid species: Jaguar, Puma, Ocelot, and Jaguarundi, and identified 13 individuals. The majority of felid photos were of Jaguarundi (38.1%), followed by Jaguar (28.6%); Ocelot (19%) and Puma (14.3%) were photographed less frequently, and we obtained no photographs of Margays (0%) (Table 1). Trap success varied significantly by species (Pearson's χ^2 goodness-of-fit = 43.505, df = 4, P = 0.0001). Jaguarundi had the highest trap success (8/100 trap nights; Table 1) largely due to a male (black morph) that frequented the same trail and was photographed regularly, but a female (red morph) was also photographed (Table 1). In contrast, we photographed a total of 5 different Jaguar individuals identifiable by distinct coat patterns. We identified 3 Ocelots from spot patterns, and 3 individual Pumas from prominent external parasites and scars (Table 1).

Six of the 14 cameras captured felid activity. Wild cats were photographed across a variety of land uses, with most wild cats photographed beside crop fields (42.9%) and milpas (38%; Table 2). Forested sites produced 3 felid photos and pasture sites yielded a single photo of a Puma (Table 2). The greatest wild-cat activity documented occurred beside a cornfield where we captured 4 of 5 native

Table 1. Camera-trap yield of target-felid species captured in and around the New River area, Belize. Total number of trap nights = 670.

Species	Total # of photographs	Total # of individuals	Trap success (%)
Leopardus pardalis (Ocelot)	4 (19%)	3	0.60
Leopardus weidii (Margay)	0 (0%)	0	0.00
Panthera onca (Jaguar)	6 (29%)	5	0.90
Puma concolor (Puma)	3 (14%)	3	0.45
Puma yagouaroundi (Jaguarundi)	8 (38%)	2	1.19
Grand total	21 (100%)	13	3.14

felid species (6 individuals; Table 2). Wild cats were photographed on trails of all activity levels: low-use trails (50%), medium-use trails (20%), and high-use trails (30%), including one occasion when an animal was captured on the same camera 20 minutes after a hunter was photographed. Felids were captured at sites that ranged from 25–100% cover, but 80% of wild cats were photographed on open trails with ≤25% cover. Cameras placed on wide trails captured more frequent felid activity (70%) relative to narrow (5%) and medium-width (25%) pathways. Distance to the nearest road ranged from 0.2 to 2.3 km, with 70% of the wild-cat activity captured at sites 1.7 to 1.8 km away from the nearest road, and only 10% of felid activity was captured as far as 2.3 km from the nearest road.

A test of the full logistic regression model against a constant-only model was statistically significant, indicating that the predictors used reliably distinguished between sites with and without wild-cat photo capture ($\chi^2 = 19.626$, df = 5, $P = 0.001$). The model explained 72% (Nagelkerke's R^2) of the variance in felid photo-capture success and correctly classified 89.3% of cases. However, the full model did not predict camera-trap success (all $P > 0.05$), but this may have been largely due to small sample size and lack of power. There was a positive association between wild-cat photo capture and land use (Cramer's $V = 0.543$, $P = 0.041$). Results of Spearman's rank correlation analyses indicated that wild-cat photo capture was positively correlated with distance to nearest road ($r_s = 0.443$, $P = 0.018$) and trail width ($r_s = 0.603$, $P = 0.001$). There were no significant correlations between camera-capture success and percent canopy cover or human traffic ($P > 0.05$ for both). The camera station with greatest wild-cat activity was located on the edge of a corn plantation bordering forest with a wide, open trail that divided Indian Creek and Indian Church villages and was heavily trafficked by hunters and farmers on foot and bicycle.

Photographs and signs of recent activity indicated that in 3 cases Jaguars were travelling in pairs (2 adults, an adult and a juvenile, and an adult and a cub). In one of these instances, only the adult was photographed, but a set of smaller Jaguar paw prints was distinguishable alongside those of the adult, suggesting a mother and cub pair. We did not include the cub in our count. Two of 3 Puma photos were on low-use trails, and all Jaguars were photographed on high-use trails. Jaguarundis (2 individuals) were photographed in the diurnal hours, and Ocelots were captured at night. Pumas and Jaguars were photographed relatively equally at dusk and dawn but not in the middle of the day.

Table 2. Camera-trap yield by land use of target-felid species captured at camera stations in the New River area, Belize.

Land use	Species	Total # of photographs	% preference
Forest	Ocelot, Jaguar, Puma	3	14.3
Pasture	Puma	1	4.8
Milpa	Jaguarundi	8	38.0
Crops	Ocelot, Puma, Jaguar, Jaguarundi	9	42.9
Grand Total		21	100.0

Cameras also captured several other mammal species, many of which serve as prey for target felids: *Agouti paca* Brisson (Paca), *Dasyprocta punctata* Illiger (Agouti), *Odocoileus virginianus* Zimmermann (White-tailed Deer), *Urocyon cinereoargenteus* Schreber (Grey Fox), *Nasua narica* L. (Coatimundi), *Procyon lotor* L. (Raccoon), and *Conepatus semistriatus* (Boddaert) (Striped Hog-nosed Skunk); and some large bird species: *Mycteria americana* L. (Wood Stork), *Aramides cajaneus* (Müller) (Grey-necked Wood Rail), *Nothura minor* (Spix) (Lesser Tinamou), and *Cathartes aura* L. (Turkey Vulture). Livestock, particularly cattle, and hunters and farmers with domestic dogs were captured on cameras.

One camera captured 4 felid species and repeat individuals of Ocelot and Jaguar. One camera captured one Jaguarundi with multiple visits (n = 7) and one Ocelot. Two separate cameras captured two different Jaguars travelling together. Foxes were photographed most often (4 individuals, 11 photographs); Coatimundi, Paca, and Skunk were each captured twice; and Raccoon, White-tailed Deer, and Agouti were photographed once. Three of 4 bird species were photographed multiple times (total birds n = 9).

Six of 13 landowners received payouts for photographs of wild cats. A total of $2025 USD was paid out for wild cats (13 individuals, 8 repeat individuals): $675 USD for Jaguars, $550 USD for Jaguarundi, $425 USD for Ocelot, and $375 USD for Puma. Mean payout was $337.50 USD to landowners that captured wild cats (8 landowners received $0 USD for wild cats), with a range of $125 USD to $725 USD per landowner. A total of $90 USD was paid out for prey to 6 landowners (4 landowners had both wild cats and prey, and 2 landowners had prey and birds).

Discussion

Our study demonstrates the utility of using remote cameras to monitor multiple species simultaneously across the landscape mosaic of the New River area. We photographed 4 species of felids, and identified a total of 13 individuals during this camera-trapping period. Despite our relatively short study period, we obtained a 3.14% camera-trap success rate for detecting felids, a value within the range found in several other studies that employed a greater study effort: 6.9% felids (Kelly 2003), 3.13–3.5% for Jaguars (Silver et al. 2004), 3.58% for *Lynx rufus* (Schreber) (Bobcat; Kelly and Holub 2008), 5.34% for Ocelots (Dillon and Kelly 2008), and 6.3% for Jaguars and Pumas (Harmsen et al. 2010). Our camera traps also captured images of 10 other wildlife species—6 mammals and 4 large bird species—many of which are typical prey species of Neotropical felids (Aranda and Sánchez-Cordero 1996, Emmons 1987, Weckel et al. 2006). Results of other studies indicate that a trap-effort equivalent of 1000 trap nights is needed to truly consider a species absent from a site (Carbone et al. 2001). We did not capture Margays during 670 trap nights; however, two weeks later an individual was photographed at a remaining camera station located in a forest patch. Thus, we recorded all 5 native felid species in the New River area.

Steady landscape changes will undoubtedly affect wildlife presence and activity. In this study, land used as pasture had the lowest presence of wild cats. Land for agricultural use yielded a higher number of wild cats, perhaps because the corn crop attracted small and medium-sized mammals also in search of a food source. The current data set provides a foundation to design a research and monitoring program to accurately determine species richness and abundance and to implement occupancy modeling of the landscape mosaic by wild cats. We plan to increase our study area, trap effort, and sample size by deploying more cameras and using double-opposing camera stations to collect both seasonal and annual survey data. This increased effort will allow us to positively identify individuals for density estimates, and address predator–prey overlap in temporal and spatial scales.

Livestock losses prompted the inception of this project, but we opted out of adopting a compensation system that pays for losses, and instead implemented an incentive program that encouraged landowners to value presence of wild cats on their property. Though compensation programs work in some areas, it is not a model that can be applied globally because different sites are impacted by a variety of socio-political issues coupled with economic hardship (Ferraro and Kiss 2002, Treves et al. 2009). Typically, by encouraging compensation programs that pay for losses, there is a sense of blame that is transferred to those willing to pay post-hoc as a means toward conservation (Montag 2003, Treves et al. 2009), and these programs provide no information about whereabouts of wild cats and thus no ecological conclusions can be reached. However, our system of direct payments uses incentives for landowners to essentially manage lands that are capable of supporting wild cats while still producing cash crops such as livestock and vegetables. A vegetable farmer may not incur loss of a calf, or even crop damage, but by participating in this project, not only do we gather information on landscape use by wild cats, but this landowner has an alternative source of income that does not come from a hardship loss. In this incentive-based program, a photograph of a live wild cat is more financially valuable than a dead calf (for which there is no payment for losses). There is added incentive when both prey and wild cats are photographed on private lands, thus there is added benefit to protect and sustainably use land that attracts both wild cats and prey. The project payout sum of $2115 USD is a small price to pay for wild cat conservation. It was sufficient to garner local attention, to stimulate future interest, and warrants further investigation as a conservation approach. Average daily income was $10 USD in Belize (World Minimum Wage Resource 2009–2014) and $15 USD for those working in tourism in the New River/ Lamanai area (R. Arevalo, Lamanai Outpost Lodge, Indian Church, Belize, pers. comm.). There was an opportunity to augment household income substantially by participating in the project. During this project, no Jaguars were killed, and the bounty was lifted; we view this as a success in favor of wild cat conservation. Direct payments, such as those used in this project, are based on the principle that "you get what you pay for" (Ferraro and Kiss 2002) and in this case we paid landowners for images of wild cats and their prey.

Contrary to local belief, results of this camera-trapping study showed that wild cats did not frequent areas with high livestock activity, but instead followed wild prey in areas of lower disturbance (i.e., old milpas) or near corn fields. This information resonated positively with farmers concerned with crop damage from small mammals, because wild cats, as predators, help to control small-mammal numbers. Landowners' perspectives began to shift toward recognizing the benefits of having wild cats in the area. Several additional landowners have offered to have their private lands included in the project, and some landowners have sought suggestions from us regarding how to make their lands attractive to wild cats. Some landowners have made existing seasonal ponds deeper to hold water for greater periods during the dry season (C. Diaz, Landowner, Indian Church, Belize, pers. comm.), have begun to rotate cattle and crops on different parcels (G. Friessen #2, Landownder, Indian Creek, Belize, pers. comm.), and have made the important decision to promote wild-cat presence by refraining from clearing land (G. Friessen #2, pers. comm.). Of course these instances are not necessarily representative of all community members, but this is the first study in Belize particularly geared toward wild cat conservation that involved the active participation of a Mennonite community, in addition to Mestizo and Mayan villages. Mennonites in Belize are usually socially distant from other communities, and economic decisions have traditionally originated from church leaders. Conservation efforts in Belize have been based in protected areas and rarely involve neighboring villages, or active participation by village members. Findings of this project have spurred development of a social research survey as a tool to assess local perceptions and attitudes on living with wild cats among the 3 culturally distinct villages. Our camera-trapping began with 13 landowners. At the end of analyses, 18 landowners were actively involved in the next phase of the project, 8 of whom were new; three of the original landowners withdrew for a variety of reasons (sold property, moved, had no time to check cameras).

Community members have also expressed interest in being involved with activities geared toward wild-cat conservation through ecotourism. As a result, the local tourist resort, Lamanai Outpost Lodge, is developing a guest activity around checking a subset of camera traps as a means of data collection for this project, and simultaneously introducing a healthy cultural exchange between visitors and local landowners. In this way, landowners engage in another income-generating activity in which they serve as naturalists. The potential to create more opportunity for financial gain arises with each positive visitor experience and is measured by visitors' willingness to pay for an activity that ultimately leads to long-term wild-cat conservation.

This study demonstrates how scientific research can be integral to effective conservation efforts. A community conservation-program that involves both local landowners and residents is key to effective conservation practices, and provides a course of action that can be taken to ensure that wild cats are viewed as assets rather than threats. Most areas surrounding New River and New River Lagoon are privately owned and, if wild cats are to survive in this landscape mosaic of forests, agricultural fields, and pastures, conservation measures in this region of Belize, like the efforts in the Pantanal, Brazil (Quigley and Crawshaw 1992), must be joint ventures between landowners and communities who recognize the value of these animals (Rosas-Rosas and Valdez 2010).

There is little information available that indicates the extent to which large felids favor human-influenced landscapes in relation to wilderness, or how anthropogenic factors may influence coexistence of wild cat species (Crooks 2002, Foster et al. 2010). Thus, protecting wild cats in a habitat mosaic alongside human communities not only requires a holistic approach that addresses the felid guild, but also the ever-present potential for human–wildlife interactions. When communities share landscapes with wildlife, associated risks must be assumed and handled effectively for human safety, but also for wildlife protection, and for national and regional biodiversity conservation. In this community-based conservation project, we partnered with local communities living in wildlife-contact zones, and recognized the need to manage natural resources locally and to design strategies that reduce drastic land-use changes. Our work provides a foundation to address a major cat conservation issue in Belize that has not been addressed elsewhere and for which very limited resources are available.

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