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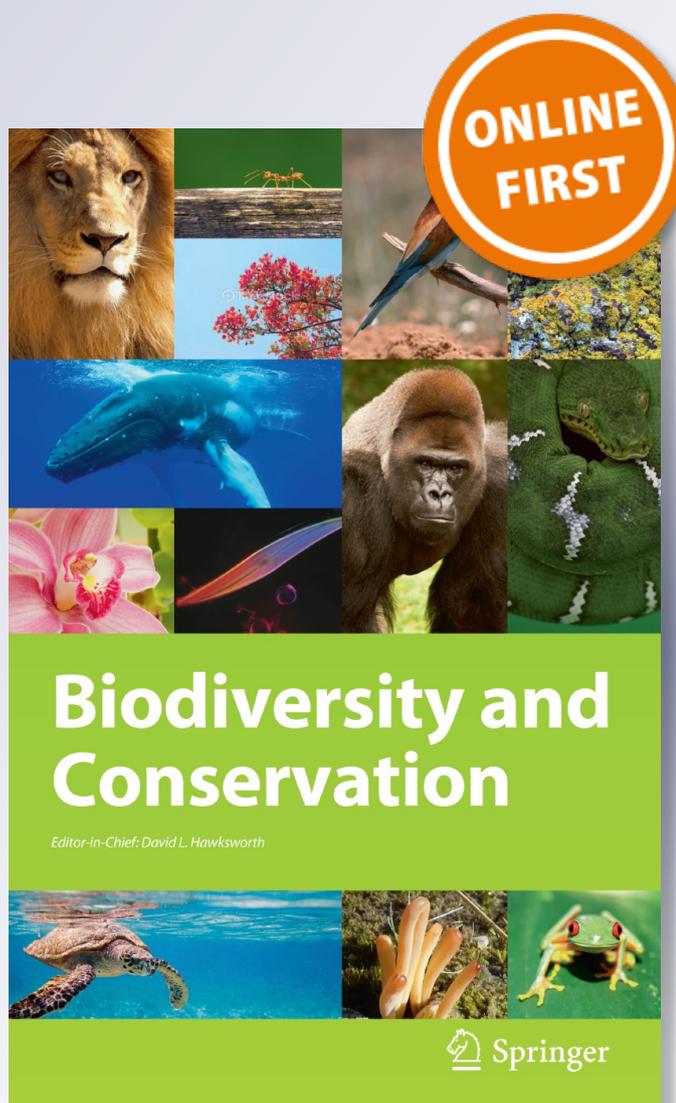
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The social, economic, and environmental contributions of Pan African Sanctuary Alliance primate sanctuaries in Africa

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Abstract Over the last few decades, primate sanctuaries have become more numerous, particularly in Africa. Sanctuaries play an obvious and vital role in the battle against the illegal trade in wildlife and provide opportunities for local people to learn about the importance of protecting habitat and laws governing wildlife trade. Given the multi-disciplinary role of sanctuaries, the Pan African Sanctuary Alliance provides mechanisms to exchange best practices and establishes links to other conservation partners. In April 2011, the managers of the 22 Pan African Sanctuary Alliance members were surveyed in order to collect detailed information on the conservation activities of each sanctuary. The majority of the 22 sanctuaries conducted both on- and off-site education activities, engaging more than 429,000 people in education activities per year. Sanctuaries reported that they provided employment for over 550 local community members across Africa, as well as resources for community education and infrastructure, with an economic impact over \$3 million per year. Sanctuaries were also involved in activities that promote law enforcement and believed that the activities they supported have led to better protection of primate habitats. The results of the survey demonstrate that sanctuaries have moved towards supporting and implementing community development activities aimed at poverty reduction, while conducting conservation activities. While Pan African Sanctuary Alliance sanctuaries were initially established to provide care and housing for orphaned, confiscated and displaced primates, this paper demonstrates how sanctuaries have combined ex-situ

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with in-situ initiatives to support social, economic, and environmental progress in primate range countries in Africa.

Keywords Africa · Community · Education · Primates · Sanctuaries

Introduction

Over recent decades, primate sanctuaries have become numerous across the globe, particularly in Africa (Cox et al. 2000; Schoene and Brend 2002; Trayford and Farmer 2013). Reasons for the increasing need for primate sanctuaries include expansion of human populations and human-related activities into wild primate habitats, displacement of wild primates resulting from the continuing destruction and degradation of primate habitat, poaching of forest-dwelling mammals, especially for the bushmeat trade, and the commercial live animal and pet trade (Amman 1997; Schoene and Brend 2002; Trayford and Farmer 2013; Stiles et al. 2013). Primates accepted by sanctuaries represent confiscations by wildlife officials, pets surrendered by their owners, and individuals injured, displaced and rescued as a result of human-wildlife conflict (Cox et al. 2000; Farmer 2002; Schoene and Brend 2002; Trayford and Farmer 2013). Sanctuaries serve the immediate need of rescuing, rehabilitating, providing life-long care, and in some cases, releasing healthy primates back to natural habitat (Teleki 2001; Goossens et al. 2005; Beck 2010; Humle et al. 2010; Faust et al. 2011; King et al. 2012; Trayford and Farmer 2013). While sanctuaries are primarily focused on the daily health, welfare, and care of the primates (and non-primates) in their charge, the role of sanctuaries has evolved to include a broader mission of impacting the root causes of the influx of primates into sanctuaries. Sanctuaries increasingly find themselves implementing a range of activities supporting conservation and community development (Farmer 2002; André et al. 2006; Farmer et al. 2006; King 2008; Humle et al. 2010; Faust et al. 2011), conservation education (Farmer et al. 2006; Beck et al. 2007; André et al. 2008; Kuhar et al. 2012), noninvasive research (Goossens et al. 2002; Farmer et al. 2006; Lankester et al. 2008; Ruperti et al. 2008; Marty et al. 2009; Hare and Kwetuenda 2010; Jones et al. 2010; Reamer et al. 2010; Wobber and Hare 2011; Lopresti-Goodman et al. 2013; Ongman et al. 2013), capacity building, and law enforcement (Teleki 2001; Farmer 2002; André et al. 2008; Trayford and Farmer 2013; Stiles et al. 2013).

Sanctuaries play a vital role in the battle against the illegal wildlife trade. Where there are no sanctuaries, there is little incentive for wildlife officials to seize illegally held and traded live animals and consequently few to no confiscations take place (Teleki 2001; André et al. 2008). The high rates at which great apes continue to arrive at sanctuaries indicate that the illegal trade continues unabated (Stiles et al. 2013). Confiscated apes have been used as evidence in smuggling cases, and sanctuaries have provided testimony, helping the police, customs, and wildlife authorities pursue the prosecution of poachers and traffickers (Stiles et al. 2013).

Locally, sanctuaries provide opportunities for people living in communities near sanctuaries to learn about primates, the importance of protecting habitat and laws governing wildlife trade. The importance of education in shaping perceptions of nature and biodiversity is widely accepted (Boulton and Knight 1996; Kellert 1996; Kidd and Kidd 1996; Wallis 1997; Jacobson and McDuff 1998; McDuff 2000; Thompson and Mintzes 2002). It is believed that within communities, effective wildlife conservation education programs help foster sustainable behavior, improve public support for conservation, reduce

vandalism and poaching in protected areas, improve compliance with conservation regulations, and influence policies and decisions that impact the environment (Jacobson 2010). Positive encounters with wildlife can help facilitate a connection between humans and wildlife (Tardona 2001; Clayton and Myers 2009) and foster positive beliefs and actions towards that species (Rabb and Saunders 2005; Skibins et al. 2013). Professionally managed sanctuaries are ideally placed to raise public awareness about primates with the goal of nurturing respect in the local communities for animals and their environment (Farmer 2002). In developing countries where few formal environmental education programs exist, informal conservation education may be a valuable alternative (Boulton and Knight 1996; Jacobson and McDuff 1998; McDuff 2000).

In some areas sanctuary visitation may provide opportunities for tourism, attracting international visitors potentially supporting the local economy, and providing funding to the sanctuary. While there are mixed views regarding how much tourism truly benefits local communities, some studies have shown that tourism can provide employment opportunities for and increase the income of local people, as well as raise public awareness of conservation issues at the local and national level, and partially finance the protection of important ecosystems (see Blom 2000; Macfie and Williamson 2010). Even small additions of revenue to the economy may be important in sustaining local human communities (Edwards and Thompson 2010). While tourism can provide some benefits to those communities around primate sanctuaries, the reach of these benefits may be limited to those who are employed in tourism related activities.

Sanctuaries implementing release also offer the potential to make positive contributions to primate conservation (Baker 2002). When an existing wild population is severely threatened, reintroduction or re-establishment of populations may improve the long-term conservation potential of the taxon as a whole or of a population, through increasing numbers (particularly females of breeding age) and genetic diversity (e.g. Dietz et al. 1994; Britt et al. 2003). Releasing primates can make a strong political and educational statement concerning the fate of animals and may serve to promote conservation values. It can positively affect the conservation of all the fauna and flora within the release area due to increased public awareness, presence of project personnel, improved law enforcement, and integration and support of local communities (e.g. Tooze and Baker 2008; King et al. 2009; Farmer et al. 2010; Humle et al. 2010). The process requires surveys and on-going monitoring, which can provide important ecological data for conservation (Beck et al. 2007). The International Union for Conservation of Nature (IUCN) guidelines state that post-release monitoring is one of the most important components of reintroduction providing essential and ongoing evaluation (Beck et al. 2007). To standardize reintroduction practice, sanctuaries, often in conjunction with research institutions, are increasingly developing scientific methods and publishing post-release monitoring data to better demonstrate results and communicate lessons learned (Farmer and Courage 2008; King and Courage 2008; Farmer et al. 2010; Humle et al. 2010).

Given the multi-disciplinary role of sanctuaries, the Pan African Sanctuary Alliance (PASA), a membership-based organization designed to support and represent Africa primate sanctuaries, builds capacity of its members by providing forums for the exchange of best practices, delivering training, and establishing links to conservation (and other) partners within Africa and beyond (Cox et al. 2000; Farmer 2002; Schoene and Brend 2002; Smith 2006; Cress 2010). While primate sanctuaries have long been known to play a role in animal welfare, a survey of PASA member sanctuaries was conducted to highlight, and for the first time quantify, the range of conservation-related activities taking place across Africa to support primate conservation.

Methods

In April 2011, surveys were emailed to the managers of the 22 PASA member sanctuaries to collect detailed information on the conservation activities of each sanctuary (see Table 1 for sanctuary information). The 35-question survey, which was offered in English or French, consisted of dichotomous (yes/no), multiple choice, and open-ended questions. Sanctuary managers were asked to email the completed survey back to the PASA representative. Completed surveys from the 22 sanctuaries were translated into English if necessary and compiled. Where a range of data was given by respondents, the mid-point value was used.

PASA uses the term 'sanctuary' to include short- and long-term stay and facilities that provide rehabilitation and release of animals back to the natural environment reflecting the broad mandate of its members. While elsewhere the terms sanctuary, rescue center, and rehabilitation center are often interpreted differently, for ease of reporting, the term sanctuary in our definition is all encompassing.

Results

The survey results indicate that the majority (86.4 %) of the 22 PASA sanctuaries engaged in on-site (i.e. at the sanctuary) education activities and reached an average of 15,750 people (range 0–120,000 people, median 2,750 people) per sanctuary each year (Table 2). Sanctuaries reported using multiple types of on-site education programs including guided tours (89.5 %), information boards (73.7 %), school groups (68.4 %), newsletters (52.6 %) and nature clubs (47.4 %). Of those sanctuaries, just over half (52.6 %) conducted daily programs and over a quarter (26.2 %) conducted programs weekly or multiple times per week. Most sanctuaries offer education programs in English (79.0 %); however programs in French (57.9 %), Swahili (21.1 %) and the local language of the region (57.9 %) are common as well.

Most of the sanctuaries (81.8 %) also engaged in off-site education activities and reached an average of 3,980 people (range 0–25,000 people, median 1,450 people) per sanctuary per year (Table 2). The off-site programs consisted of visits to local schools (77.8 % of sanctuaries), community meetings (55.6 %) organized conservation activities (e.g. tree planting; 66.7 %), nature clubs (61.1 %), and meetings with local hunting associations (11.1 %). Of those sanctuaries participating in off-site education activities, 38.9 % conducted programs multiple times per week, 38.9 % conducted programs less than once per month, 11.1 % conducted programs monthly, while 5.6 % delivered programs weekly and 5.6 % did so daily.

Sanctuaries reported that they used multiple media to communicate their conservation messages including local newspapers (40.9 % of sanctuaries), national newspapers (50.0 %), international media (63.6 %), poster/billboards (59.1 %), and local or national radio (50.0 %). The most common conservation messages delivered by sanctuaries were related to wildlife laws and regulations (50.0 % of sanctuaries), biodiversity and the importance of a balanced ecosystem (45.5 %), and pride of endemic species (31.8 %). Sanctuaries reported advocating conservation at the level of the village (50.0 % of sanctuaries) and at the state (72.7 %), country (77.3 %), and internationally (45.5 %).

PASA sanctuaries employ over 550 local people, with an average of 26 people per sanctuary (range 3–73 people, median 23 people); with each sanctuary paying an average of \$62,225 (range \$3,200–\$340,000, median \$40,543) in salaries each year (Table 2).

Table 1 PASA member sanctuaries that participated in the survey

Sanctuary	Year founded	Location	Primary species ^a
Ape Action Africa	1996	Cameroon	Chimpanzees, gorillas, guenons
Centre de Conservation pour Chimpanzees	1997	Guinea	Chimpanzees
CERCOPAN	1995	Nigeria	Guenons, mangabeys
Chimfunshi Wildlife Orphanage Trust	1983	Zambia	Chimpanzees
Chimpanzee Rehabilitation Project	1974	The Gambia	Chimpanzees
Colobus Conservation Ltd.	1996	Kenya	Colobus monkeys
Drill Ranch	1991	Nigeria	Drill monkeys
Fernan Vaz Gorilla Project	2006	Gabon	Gorillas
HELP Congo	1989	Congo Brazzaville	Chimpanzees
JACK	2006	DR Congo	Chimpanzees
JGI Chimpanzee Eden	2006	South Africa	Chimpanzees
Limbe Wildlife Center	1993	Cameroon	Chimpanzees, gorillas, drills
Lwiro Primate Rehabilitation Centre	2002	DR Congo	Chimpanzees, guenons
Lola ya Bonobo	1994	DR Congo	Bonobos
Ngamba Island Chimpanzee Sanctuary	1998	Uganda	Chimpanzees
Project Protection des Gorilles (PPG)-Congo	1987	Congo Brazzaville	Gorillas
Project Protection des Gorilles (PPG)-Gabon	1998	Gabon	Gorillas
Sanaga-Yong Chimpanzee Rescue Center	1999	Cameroon	Chimpanzees
Sweetwaters Chimpanzee Sanctuary	1993	Kenya	Chimpanzees
Tacugama Chimpanzee Sanctuary	1995	Sierra Leone	Chimpanzees
Tchimpougna Chimpanzee Rehabilitation Centre	1992	Congo Brazzaville	Chimpanzees
Vervet Monkey Foundation	1993	South Africa	Vervet monkeys

^a This denotes the main species numerically cared for at each facility but some members care for a range of primate and non-primate species

Table 2 Extent of social and economic activities by the sanctuary community

Number or amount per year	# PASA sanctuaries reported	# PASA sanctuaries participating in activity	Total for all sanctuaries	Average per sanctuary	Standard error	Range	Median
No. of people reached through on-site education programs	22	19	346,470	15,748.64	±6,860.05	0–120,000	2,750
No. of people reached through off-site education programs	22	17	83,492	3,795.09	±1,328.03	0–25,000	1,450
No. of local people employed	22	22	569	25.84	±4.03	3–73	23
Amount paid in salaries	21 ^a	21	\$1,306,724	\$62,225	±16,297.11	\$3,200–\$340,000	\$40, 543
Amount spent on local produce	22	22	\$805,301	\$36,605	±10,750.62	\$0–\$236,000	\$20, 384
Amount spent on other items	20 ^a	20	\$827,169	\$41,358	±13,735.67	\$0–\$240,000	\$16,722
No. of local visitors to sanctuary	22	20	305,821	13,901	±6,238.74	0–120,000	1,256
No. of international tourists to sanctuary	20 ^a	19	31,219	1,561	±495.13	0–8,000	280

^a Denotes question where some sanctuaries did not give a response

Sanctuaries also reported offering numerous opportunities for continuing professional development of staff including on-site training and mentoring (86.4 % of sanctuaries), support to attend PASA workshops (72.7 %), exchange with overseas zoos and sanctuaries (31.8 %), support to attend vocational courses (31.8 %), opportunities to take online courses (18.9 %) and exchange with other African sanctuaries (18.2 %).

Sanctuaries reported that they support the local communities by providing resources for community education and infrastructure (Fig. 1). Sanctuaries also contribute to the local economy by spending an average of \$36,600 per year (range \$0–\$236,000, median \$20,384) on local produce and an average of \$41,360 per year (range \$0–\$240,000, median \$16,722) on other items (Table 2).

The sanctuaries host a number of local visitors and international tourists (Table 2). Supporting both social and economic needs, the majority of sanctuaries (68.2 %) have built or assisted with the construction of community facilities such as schools (73.3 %), clinics (26.7 %), community centers (26.7 %), and other education centers (13.3 %). Some sanctuaries (45.5 %) are also involved in creating community infrastructure such as roads, boreholes and bridges.

Sanctuaries participated in numerous activities to protect the environment and primate populations. Almost three-quarters of sanctuaries (72.7 %) participated in anti-poaching patrols, and of these 62.5 % conducted daily patrols of the forest. Sanctuaries also participate in censuses (63.6 %), regular monitoring (45.5 %), tree planting (59.1 %), and anti-logging patrols (13.6 %). Anti-poaching activities are mainly focused on chimpanzees (*Pan troglodytes*) and bonobos (*P. paniscus*); although to a lesser extent on gorillas (*Gorilla* spp), monkeys (species within *Cercopithecidae*), prosimians (species within *Galagidae* and *Lorisidae*), and non-primate species (Fig. 2). Over 50 % of sanctuaries

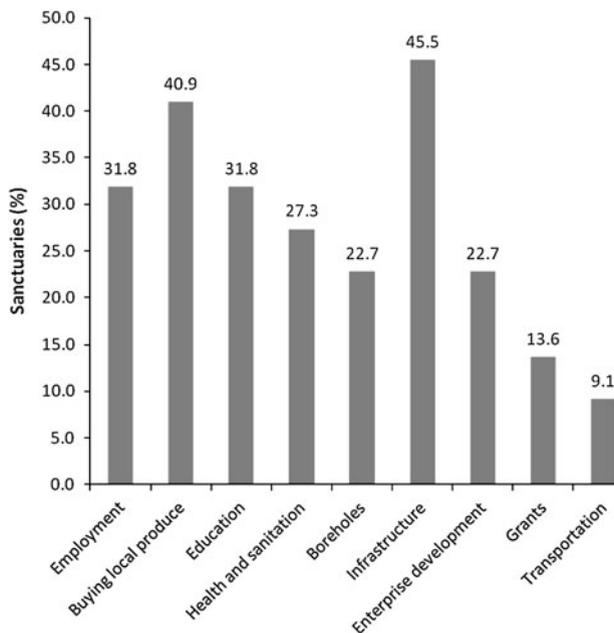
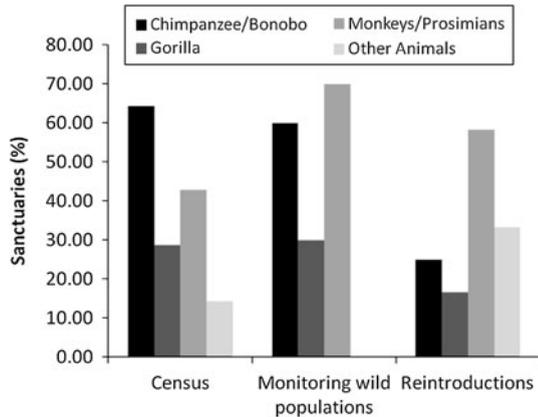


Fig. 1 Sanctuary participation in community development activities

Fig. 2 Sanctuary participation in census/nest counts, monitoring of wild populations, and primate reintroduction



have participated in primate reintroductions, and three-quarters (77.3 %) have long-term plans to reintroduce rehabilitated primates back into their natural habitat.

Sanctuaries received animals from both government confiscations and voluntary surrenders (Table 3). Sanctuaries are also involved in other activities that promote local law enforcement such as anti-logging campaigns (13.6 %), general media (9.1 %) and advocacy campaigns (9.1 %), as well as and other activities such as training, financial support, and collaborating with other national ministries.

The majority of sanctuaries (81.8 %) perceive that the activities they support have led to better protection of primate habitats (Fig. 3). Over three-quarters of sanctuaries (77.3 %) reported that they believed that of the activities in which they engage, education and awareness had the greatest positive impact on wildlife and the environment. Sanctuaries also perceive that community development and relations (40.9 %), support of law enforcement (31.2 %), and rehabilitation and reintroduction efforts (9.1 %) have positively impacted conservation.

Finally, most sanctuaries (20 of 22) reported that they actively participate in scientific research. This includes research focused on social behavior (45.5 % sanctuaries), cognition (31.8 %), ecology (54.5 %), captive management (40.9 %), enrichment (27.3 %), welfare (18.2 %), submitting biological samples (63.6 %), education (45.5 %), genetics (68.2 %), habitat protection and effects of protected areas (45.5 %) and other research, which may include reintroduction (9.1 %).

Discussion

Sanctuaries make a long-term commitment to the primates and the countries where they are located. With the longest established sanctuary nearing its 40th anniversary, collectively sanctuaries represent over 400 ($n = 403$) years of presence and expertise in Africa. While many in-situ programs are dictated by short donor cycles, sanctuaries must by necessity continue. In many countries, sanctuaries have endured years of war and civil unrest. The relationships and partnerships that have been established with local communities, and regional and national governments, have proven to be critical to the longevity of sanctuaries.

Most sanctuaries surveyed participated in a range of educational and awareness-raising activities (using different forms of communication media and target audiences) and over

Table 3 Origins and frequency of primates coming into sanctuaries

	Annual (%)	Infrequently (%)	Monthly (%)	Weekly	Multiple times per week	Daily	Never (%)
Government confiscations	40.91	27.27	9.09	0	0	0	13.63
Voluntary surrender	22.73	27.27	13.64	0	0	0	18.18

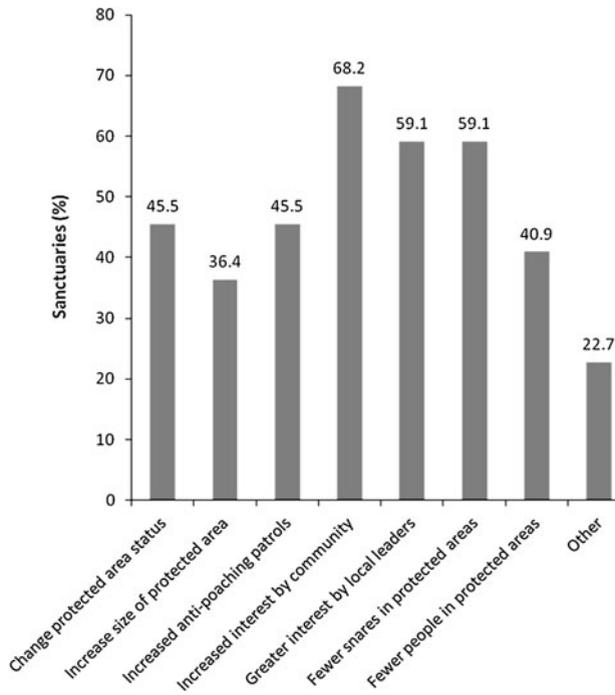


Fig. 3 Sanctuary activities and perception of impact; increased protection of the environment and wild primates. *Note* Other includes observing behavior change in adults and youth and taking a direct role in habitat protection

three-quarters believed that this was where they have had the biggest impact. In 2010, across all sanctuaries, approximately 430,000 people participated in the educational programs. Sanctuaries conducted guided tours with school and other community groups, established nature clubs, published newsletters, visited schools, and held community meetings, and organized conservation activities as part of their programs. PASA has emphasized these awareness-raising activities by providing annual staff training workshops for its members focusing on such areas as education, including content on program development, interpretation, and evaluation techniques (Kuhar et al. 2007; Kuhar et al. 2012). Reduction in arrival rates of gorillas to the Project Protection des Gorilles (PPG)-Congo sanctuary over several years was attributed as much to awareness-raising campaigns amongst the general Congolese public, as to increasing law enforcement (King et al. 2009); PPG Congo has been active in the Republic of Congo for 25 years.

Results of the survey demonstrate that sanctuaries, like other conservation organizations, have moved towards supporting and implementing local community development activities aimed at poverty reduction while at the same time conducting conservation activities. As has been previously shown, biodiversity and poverty coincide geographically (Fisher and Christopher 2009; Hernandez-Morcillo et al. 2010) and that “preserving biodiversity is inseparable from the fight against poverty” (UN General Assembly 2010). Great ape ranges coincide with some of the poorest countries of the world; their habitats are often protected and restrictions on resource use can have negative impacts on livelihoods (Sandbrook and Roe 2010). Poverty reduction has the potential to help primate

conservation in a variety of ways. A number of sanctuaries have supported the development of alternative livelihoods projects such as keeping livestock (e.g. poultry) to reduce demand for bushmeat, and income generating activities including tree nurseries, bee keeping, soap making and handicrafts (*pers. comm.*, PASA sanctuaries, 2013). Sanctuaries provide direct employment (in some areas they may be the main employer) and make regular purchases of fresh produce, supporting local purchasing power and income. Tourism can support other income generating activities. Even a small amount of revenue per person can be enough to change attitudes (Caldecott 2005). If income is regular and sustained, future earnings can be factored into decision making, such as whether or not to set a snare in a particular location (Caldecott 2005). Nearly half the PASA sanctuaries either directly executed or provided support for a range of infrastructure projects including bore hole drilling for wells, road maintenance, and building schools, health and community centers, and provide resources for these facilities. It is important, however, to make explicit linkages between poverty-reduction mechanisms and conservation (Blomley et al. 2010). This applies whether the strategy is an agricultural program or investment in social infrastructure.

Sanctuary activities focus on multiple environmental dimensions. Nearly half the PASA sanctuaries perceive that their presence contributed to an area being legally classified as protected (e.g., Plateaux Batéké National Park in Gabon, Conkouati-Douli National Park in the Republic of Congo), and over a third believed they helped increase the size of a protected area. Research at Batéké Plateaux led to the discovery of new species in Gabon (e.g. Bouchia clawed frog *Xenopus pygmaeus*, Zimkus and Larson 2012) and in the National Park (e.g. servals *Leptailurus serval*, *pers. comm.*, N Bout, former PPG Gabon Director, May 2013). PASA members are also increasingly combining animal welfare and wildlife conservation. For example, the national chimpanzee census in Sierra Leone was vital to support conservation planning (Brncic et al. 2010) and the Limbe WildLab in Cameroon is linking emerging infectious disease and forensic capabilities for wildlife law enforcement (*pers. comm.*, A. Idoiaga, Manager, LWC, March 2013).

Research also extends to captive populations including animal cognition (e.g. Hare and Kwetuenda 2010), behavioral-ecology (e.g. Farmer et al. 2006; Marty et al. 2009; Ongman et al. 2013), animal welfare (e.g. Reamer et al. 2010; Wobber and Hare 2011; Lopresti-Goodman et al. 2013), genetics (e.g. Goossens et al. 2002) and veterinary medicine (e.g. Lankester et al. 2008; Jones et al. 2010). Research on captive and released primates can provide invaluable data to help support and guide both animal welfare and conservation strategies (e.g. Ghobrial et al. 2010; Faust et al. 2011).

By their very existence, sanctuaries and rescue centers represent a visible gap in wildlife law enforcement. Almost a third of sanctuaries believed they had a significant impact through supporting law enforcement; indeed any sanctuary that has received a confiscated animal has supported national law enforcement. In this respect alone, sanctuaries play a critical role in the law enforcement chain. For law enforcement policy to have a deterrent effect, an individual or organization must believe that there is a high probability of being caught, that the response to violations will be swift and certain, and punishment will be severe enough to outweigh the benefits of non-compliance. Arrest, prosecution and prison sentences, and subsequent publicity of the enforcement action, may deter potential violators, facilitate reporting of criminal activity, and ultimately build public understanding that trade and ownership are criminal activities with consequences. Organizations such as The Last Great Ape Organization are working with PASA members to support prosecution of poaching and smuggling cases to ensure that there is no impunity. By tracking confiscations and origins of seizures (or approximate location of extraction from natural

habitat), sanctuaries can identify “hot spots” of poaching, transportation routes and periods of occurrence, which can help strengthen law enforcement and awareness-raising strategies (Ghobrial et al. 2010).

While PASA sanctuaries were initially established to provide much-needed care and housing for orphaned, confiscated and displaced primates, this paper demonstrates how they have diversified their activities to combine ex-situ with in-situ initiatives to stem the very influx that determined their development. The next step for sanctuaries not already doing so is to develop methods to help assess and evaluate the direct impacts that their activities have on primate (and other species) population numbers, on the restoration and protection of habitat for these species, and how they have changed perspectives and behavior through education and community action. Such analyses will support the identification of broader conservation goals, and better demonstrate how sanctuary activities contribute to national and regional conservation strategies.

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