

causing multifaceted loss to a human community. It is particularly important to show empathy and understanding in situations where human communities are translocated from their homes, lose crops, or lose the use of land that had in the past been culturally and economically important to them. Unfortunately, there is no one solution when it comes to dealing with conflicts within the realm of human livelihoods and primate conservation. Crop-raiding mitigation and ecotourism can help provide local people with effective strategies to obtain income; however, each situation will likely evolve its own problems which will have to be dealt with individually. The role of conservationists is not clear when it comes to securing human livelihoods when primate conservation is the goal; however, if the end goal is to preserve primates, a positive relationship must be a priority between the conservation initiative and local communities. This positive relationship should also extend to local and national governments, typically in an economic and political sense. The future of conservation depends on the cooperation of human parties because of human population growth and habitat loss overall. A deeper understanding of both human and nonhuman primate behavior, conflict, and needs can be one approach to begin to understand each situation individually.

SEE ALSO: Anthropogenic Landscapes; Behavioral Flexibility; Crop Raiding; Cultural and Religious Aspects of Primate Conservation; Ecotourism; Hunting and Habitat Degradation; Zoonoses

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Primate Conservation Education

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What Is Conservation Education?

Primate conservation education is a long-held staple of conservation planning. In the original 1978 Global Strategy for Primate Conservation, produced by the IUCN's then newly formed Primate Specialist Group, conservation education was separated from other listed aims alongside habitat conservation as the two measures "absolutely essential" to primate conservation's future (Mittermeier 1978). Its use and practice has only continued to grow.

"Conservation education" appears to be a simple term, but professed conservation education programs may not always provide true "conservation education" content. The American Association of Zoos and Aquariums (AZA 2013) provides an important distinction between "conservation education" and "general education programs" when creating content: conservation education involves garnering knowledge of and action toward conservation problems, while general education covers generalized knowledge (e.g., habitat, behavior of a species). Primate conservation education programs should thus include conservation content to be deemed "conservation education" programs, especially as studies have found weak or no connections between providing generalized knowledge alone and conservation action (Frick, Kaiser, and Wilson 2004; Lo, Chow, and Cheung 2012).

The scope of primate conservation education programs and strategies is near-limitless. Projects range from units carried out in a single classroom to those with mass distribution and appeal, like the IMAX film *Island of Lemurs: Madagascar* which includes supplementary educational

content online (<http://islandoflemurs.imax.com/site.html>). Program methods range from traditional lectures to classroom workbooks (Savage et al. 2010), comic books (Dolins et al. 2010) to nature clubs (Breuer and Mavinga 2010), and increasingly incorporate social media (Pearson et al. 2014) to widen impact and garner support. Many programs are accessible online and through resources such as the Primate Education Network (PEN) (www.primateducationnetwork.org) and the International Directory of Primatology (<http://pin.primate.wisc.edu/idp/>).

Program curricula focus on primate-specific topics (Dolins et al. 2010) or ones more broadly conservation oriented (Savage et al. 2010). An analysis of biodiversity conservation projects in Spain found that the majority of projects focused on natural science concepts rather than addressing the human element of conservation (e.g., climate change) (Jimenez et al. 2015), a trend that may be assumed present among primate conservation education programs due to the relative ease with which practitioners may address strict biology concepts over more nuanced ones. Blumstein and Saylan (2007) suggest a more holistic approach to teaching conservation and environmental education topics and argue that curricula should include discussions of human consumption control: for primate lessons, this may center on minimizing use of logged trees or reducing instances of bushmeat hunting.

Primate conservation education programs overwhelmingly target children (Breuer and Mavinga 2010; Dolins et al. 2010) but also cater to adults (Savage et al. 2010). Programs have been reported extensively across all regions native to primates—Africa, Madagascar, Asia, and the Neotropics (Kling and Hopkins 2015); while no report has determined whether every primate-native country contains primate conservation education programs, it appears safe to assume so. Programs are skewed, however, toward the more charismatic species (e.g., great apes) of an already highly charismatic animal family (Kling and Hopkins 2015). Programs are reported in animal sanctuaries (Kuhar et al. 2012), protected areas (Dolins et al. 2010; Kuhar et al. 2012), zoos (Pearson et al. 2014), and classrooms (Dolins et al. 2010), both *in situ* (Alexander 2002; Dolins

et al. 2010; Savage et al. 2010) and *ex situ* (Pearson et al. 2014). They may informally arise from interactions in the field (Garber, Molina, and Molina 2010), while national (Savage et al. 2010) or even multinational (Kuhar et al. 2012) primate conservation education initiatives persist.

Cultural sensitivity and the inclusion of program constituents in decision-making processes is of immense importance to running a respectful conservation education program, particularly *in situ*. It has been shown to strengthen participant connection to the project (Dahl 1997; Evely et al. 2011) and allow for valuable feedback (Breuer and Mavinga 2010; Padua 2010). Conservation education projects are often components of larger, overarching conservation efforts that can include economic incentives for program involvement, ranging from creating job opportunities through ecotourism (Alexander 2002) to providing cost-efficient and environmentally friendly technologies (Savage et al. 2010). When projects incorporate community development elements in addition to conservation work, like Proyecto Tití (Savage et al. 2010) and the Community Baboon Sanctuary (Alexander 2002; Horwich and Lyons 1998), they are termed “integrated conservation development projects” (ICDPs). Despite the obvious appeal of such projects, careful consideration should be paid to ensure that economic incentives are appropriately planned and carefully monitored (Espinosa and Jacobson 2012; Savage et al. 2010; Wallis and Lonsdorf 2010). Distribution of any funds or economic opportunities should be done fairly to avoid any societal conflicts (Horwich and Lyons 1998), and economic structures should be both scalable and self-sustaining to ensure that benefits do not collapse were outside funding resources to stop (Ferraro and Kiss 2002; Peters 1998). Ultimately, conservation education projects have the opportunity to enrich the lives of their participants, both educationally and by addressing needs, but such endeavors must be cautious of not causing any disappointment.

Why Utilize Conservation Education?

Threats to the viability of primate populations worldwide are readily apparent. The IUCN

Red List confirms that over 50 percent of primate species are threatened with extinction (IUCN 2015). Despite conflicting results (Oates et al. 2000; Roberts and Kitchener 2006), Miss Waldron’s monkey (*Procolobus badius waldroni*) of West Africa may have already been the first primate species post-nineteenth century to go extinct, heralding cascading cases of extinctions to come if current trends are not halted or slowed. Broadly, threats to primate populations range from habitat loss (Johns and Skorupa 1987) to bushmeat and live animal trade (Golden 2009; Nijman et al. 2011), disease (Caillaud et al. 2006), urbanization, and infrastructure expansion (Wilkie et al. 2013), as well as loss due to pest control (Naughton-Treves et al. 1998). As these threats are of anthropogenic origin, the aim of primate conservation education is to alter or slow the cause: human behavior.

The oft-professed strength of conservation education is in its influence on KAB: the Knowledge, Attitude, and Behaviors of conservation education program participants. Ideally, increased knowledge on conservation topics, paired with positive attitudes toward a given primate species or its conservation, will lead to increased conservation behaviors, thus resolving in a reduction of primate threats. A brief assessment follows which addresses each KAB component individually.

Knowledge

A number of primate conservation education programs have quantified proof of increased knowledge of primate species or conservation topics relevant to their content (Dietz, Dietz, and Nagagata 1994; Kuhar et al. 2012). This conclusion, while seemingly intuitive, should not be assumed for any conservation education program, however. Miscommunicated or even false information may translate into little or incorrect knowledge change among program participants (Elbers 2004), a potentially dangerous by-product in terms of conservation aims. A carefully constructed conservation education program should thus incorporate evaluation methods to ensure that content is being appropriately received and understood.

Attitudes

Extant attitudes toward primates can significantly influence human behavior toward primate species and thus have important conservation implications. In certain regions of the Indian subcontinent, Hanuman langurs (*Semnopithecus* spp.) are tolerated and granted respect due to a religious and spiritual association (Hill 2002). Aye-ayes (*Daubentonia madagascariensis*), however, are hunted in many regions of Madagascar as a bad omen (Simons and Meyers 2001), serving as an unfortunate counter-example. Attitudes toward primates can also extend beyond cultural views: crop-raiding species, such as red-tail monkeys (*Cercopithecus ascanius*) (Naughton-Treves et al. 1998), are regarded as pests and may be injured or killed as a result. Apathy toward primates is perhaps an equally formidable force counter to conservation aims. A marine conservation education program reported greatest positive change in the attitudes of those participants initially neutral toward the conservation process, indicating the enormous potential conservation education has for tackling the “apathetic contingent” and thus building conservation support firsthand (Leisher et al. 2012).

Attitudes toward conservation action may additionally be influenced by demographic factors of participants: a study of conservation attitudes in South Africa found that positive attitudes were skewed toward those with greater wealth and higher education levels or those who benefited from conservation activity (e.g., through employment) (Infield 1988). A global survey of primate conservation education programs additionally found a significant correlation between an increase in positive attitudes toward primates and the inclusion of economic incentives for program participation (Kling and Hopkins 2015), demonstrating the role personal circumstance plays in engaging in conservation actions.

In practice, it is important to remember that attitudes toward primates do not always dictate actions toward them: even when primates are respected, they are not exempt from being exploited or even inadvertently harmed by human action (Hill 2002). Thus primate conservation education’s third and arguably most important step lies in its ability to change participant behavior.

Behaviors

In addition to being a necessary component of conservation education program outcomes, changing behaviors is often an elusive result to track. Once the ideas behind behavior change are accepted, it takes time both to implement new behaviors and, most importantly, to see a related reduction of threats or increase in primate viability (Wallis and Lonsdorf 2010). However, primate conservation education programs have reported positive, observable behavior changes necessary for conservation aims. Conservation education clubs linked with Centre ValBio (CVB) in Madagascar, for example, noticed a high demand for new seedlings among participants of a replanting project (Dolins et al. 2010). A conservation education campaign targeting coastal waste and littering in Australia found an increased use of bins following program awareness (Pearson et al. 2014). Importantly, a study evaluating commitment to pro-tiger conservation activities in Russia found a post-program increase in pro-conservation activities, but only temporarily (Mukhacheva et al. 2015), pointing to the importance of continual participant involvement in programs for maximum impact. Further research of primate conservation education programs and their long-term impact on behavior is frequently requested (Bettinger et al. 2010; Espinosa and Jacobson 2012; Kling and Hopkins 2015).

Express consideration also should be paid to any unanticipated behavior changes resulting from program presence. A conservation initiative in Nigeria unintentionally increased deforestation behaviors due to the more widespread access the program brought to the forest (Oates 1995). Careful consideration and evaluation of program impact would have helped prevent this problem.

Relevance to Primatology

It has been argued that primate researchers have the responsibility to protect the primate populations they study through conservation efforts and specifically through conservation education (Sherrow 2010). If conservation education programs are implemented successfully, they may protect not only the specific field site the education program targets, but also primate species as a whole. Conservation education

therefore is of enormous importance to the field of primatology, most narrowly in the sense that its intention is to ensure the field has subjects to study for future generations.

Case Studies of Primate Conservation Education Programs

As stated, primate conservation education programs operate under unique local and cultural contexts. Here case studies are provided of primate conservation education programs from each of the major primate range areas: Africa, Madagascar, Asia, and the Neotropics.

Case Study: Kibale Forest Coalition for Conservation Education (KFCCE), Kibale National Park, Uganda

Jessica Rothman, Professor, Hunter College of the City University of New York, NYCEP

Kibale National Park, Uganda, a stronghold for primate research, has a long history of conservation education: there are currently 16 organizations involved in conservation education that jointly form the Kibale Forest Coalition for Conservation Education (KFCCE).

Most prominently, the Kasiisi Project (www.kasiisiproject.org), established in 1997 by Elizabeth Ross, is linked with the research-based Kibale Chimpanzee Project and focuses on conservation and health education, literacy training, and the special needs of female students. Their efforts are concentrated in 14 schools and support over 10,000 primary school children. Their far-reaching methods include field trips to the neighboring national park and to the Uganda Wildlife Education Center and lessons and discussions about fuel-efficient technologies. The project boasts tremendous impact: anecdotal evidence details how there is now competition locally among parents for children to attend schools with these programs.

In another initiative, the New Nature Foundation (www.newnaturefoundation.org) operates science centers around the national park in nearby villages. These centers include books, animal artifacts, natural history museums, and presentations about the natural world. The

science centers have several hundred visitors per month, and outreach films are viewed by thousands of people each year.

A different type of conservation education focuses on the training of park wardens, a program spearheaded by Dr. Jessica Rothman who has been working in Uganda since 1997. She developed a memorandum of understanding with the University of Western Australia (UWA) whereby compulsory research fees would be used toward the tuition of park wardens to enroll in a conservation-related master's degree program. In this unique agreement, the wardens are granted paid study leave from the UWA and work closely with Rothman and her team to conduct research related to primate ecology and conservation. This capacity-building effort for senior park staff to obtain higher education is the first of its kind in Uganda.

Case Study: Centre ValBio Conservation Education Program, Ranomafana National Park, Madagascar

Patricia Wright, Professor, Stony Brook University/Founder of CVB

Florent Ravoavy, CVB Head of Conservation Education, Ranomafana

Madagascar is one of the world's top priorities for primate conservation. With over 90 percent of its forest destroyed and 91 percent of its primates in danger of extinction, what happens in these next few human generations will determine if lemurs will survive into the next century. Ranomafana National Park contains 13 species of lemurs and has been a target of conservation efforts since 1990. The main threat to the lemurs in this region is slash and burn agriculture and gold mining. CVB research station established in 2003 employs over 85 local people in biodiversity studies and conservation. A dedicated mobile conservation education team annually visits 50 village schools (over 6,000 students alongside parent organizations) with conservation education materials including films, posters, and games. The remoteness of some of these schools is challenging, and the conservation team can walk nine hours to reach the farthest schools. Over 6,000 trees a year are nurtured at school tree nurseries and planted on

the parents' farms by the children. Participation and inquiry-based learning make valuing the wildlife and rainforest real to the children. Class field trips to the national park add appreciation of nature to the children's lives.

In addition, CVB leads 25 Conservation Clubs (CCs) for members ranging from 8 to 18. CCs raise money for school visits to the rainforest and initiate recycling and waste pickup projects and reforestation efforts. CCs organize booths at local fairs to encourage local people to value their rainforest and biodiversity. CCs annually sponsor local festivals with theater, humorous skits, music, and dances about forest conservation and the value of lemurs, as well as sports events. The CVB CCs have a major focus on reforestation and forest visits.

Reaching as many children as possible over a broad and inaccessible region is a challenge. CVB piloted a UNICEF-sponsored as well as an IUCN SOS-sponsored nature show on local radio, expanded upon by our conservation education team to keep conservation awareness in the forefront of the children's priorities. Several children's books with lemur themes add to conservation awareness. T-shirts by Conservation International and Stephen Nash are constant reminders that saving lemurs is important for the children and the world. CVB strongly believes that convincing the next generation to save lemurs is essential, and thus effective conservation education is key.

Case Study: The Little Fireface Project, Cipaganti, West Java, Indonesia

Anna Nekaris, Professor, Oxford Brookes University/Founder of the Little Fireface Project

The Little Fireface Project (LFP), named after the Sundanese word for loris, is the world's longest running loris conservation project, started in 1993, under the auspices of the Nocturnal Primate Research Group of Oxford Brookes University. Its research was highlighted in the award-winning 2012 film *Jungle Gremlins of Java* and has since been featured on more than nine major news networks worldwide, including Animal Planet and BBC UK (Nekaris 2016). The program aims to save lorises from extinction through learning about their ecology and using this information

to educate local people and law enforcement officers, leading to empathy and empowerment. LFP has created a successful storybook campaign for schoolchildren which brings loris-related games, activities, and lesson plans to schools in Indonesia and abroad. Pride days, or village-wide celebrations encouraging support for the lorises, are held in West Java and incorporate carnival games, sporting events, and presentations to generate a culture around lorises and conservation. Educational films and local discussions are also held in villages surrounding LFP's base of Cipaganti, West Java, to address any community concerns and questions about LFP's practices and research. LFP focuses on evaluation and data collection to continually monitor its efforts. Between July 2013 and February 2015, 12 local schools and 1,209 children between the ages of 9 and 11 were reached through LFP's storybook program. Children were asked to draw pictures of lorises prior to their first lesson with the program and were tasked with the same prior to follow-up sessions six months after initial contact: a 57 percent increase in accuracy of loris drawings was reached, a significant achievement and only one of many (Nekaris 2016).

LFP education programs do not stop in range countries, but also reach out to potential purchasers of loris pets: extensive social media and marketing campaigns increase LFP's influence on global audiences. LFP and loris-related merchandise have been created for worldwide markets and online purchase which help raise awareness and resources for the project. LFP's website (www.nocturama.org), Twitter, and Instagram are excellent means of connecting with LFP's education and research projects in real-time: its Facebook page reaches over 11,000 followers and videos on its YouTube channel have been watched 155,161 times as of July 2016 (Nekaris 2016). The project's open push toward modern media and novel methods of conservation awareness place it on the cutting edge of conservation efforts.

Case Study: Proyecto Tití, Colombia

Katie Feilen, Conservation Team, Disney's Animal Kingdom

Anne Savage, Conservation Director, Disney's Animal Kingdom/ Founder of Proyecto Tití

Proyecto Tití is a multidisciplinary conservation program established in 1985 to protect

critically endangered cotton-top tamarins in Colombia (Savage and Guillen 2012). The program started with a strong scientific focus, but expanded its scope to include environmental education, community development, and protection and restoration of tropical dry forest to address conservation threats and support the Colombian National Conservation Program for Cotton-top Tamarins. Proyecto Tití uses a variety of platforms for its educational programs, including nonformal events such as the Day of the Cotton-top Tamarin, and education programs designed to be implemented in elementary and middle schools (CARTITILLA and TITÍ KIDS), teacher training programs, conservation clubs, and leadership programs (TITÍ CLUB and TITÍ LÍDERES).

Proyecto Tití has designed two programs that are implemented in various schools in northern Colombia: CARTITILLA and TITÍ KIDS. TITÍ KIDS is designed for the third to fifth grade level and uses puppets, activities, and stories to teach children the difference between domestic and wild animals. CARTITILLA is a semester-long program designed for students in seventh to ninth grade to increase knowledge of cotton-top tamarins and their habitat, as well as their threats. As part of the CARTITILLA program, students are given the opportunity to meet cotton-top tamarins in the wild in forest areas that surround their villages. Since the start of the CARTITILLA program in 2010, over 2,000 students have participated in the program in more than ten rural communities located in close proximity to cotton-top tamarin forests.

Around 80 students per year participate in TITÍ CLUB and spend 13 weeks learning to develop solutions to environmental problems for which they will design and implement projects. Forty high-school students that have demonstrated leadership potential in TITÍ CLUB are invited to participate in TITÍ LÍDERES each year. Students in TITÍ LÍDERES learn project planning, fundraising, implementation, and evaluation, as well as leadership skills that they use to design and implement a program to solve an environmental problem in their own community during a six-month period. Students have planned and implemented community recycling programs, distributed eco-stoves, and planted trees in their communities as part of the TITÍ LÍDERES

program. In order to increase the sustainability of conservation efforts in Colombia, Proyecto Tití has created the Blue Sky Education Fund Scholarship. This program provides an opportunity for TITÍ LÍDERES students to attend schools and courses to learn professional and technical skills to practice conservation as a profession.

Each of Proyecto Tití's formal education programs is evaluated. Although evaluation format differs across programs (for example, TITÍ KIDS is administered orally, while students in the CARTITILLA program take a written test), they all assess learning and attitudes prior to and after the implementation of these programs. Over the course of Proyecto Tití's education programs, students have significantly increased their ability to classify domestic versus wild animals, understand why wild animals should not be kept as pets, understand the natural history of cotton-top tamarins, and have increased their attitudes to help their local environment and conserve cotton-top tamarins.

Challenges to Primate Conservation Education

Challenges to primate conservation education programs are just as varied and site-specific as primate conservation programs themselves, and it is therefore ineffective, or even limiting, to cite definitive overarching challenges to the field. Notable trends, however, are apparent and are briefly considered below.

Funding

Difficulty in obtaining funding is not a challenge unique to conservation education programs; nevertheless, it is a common one, cited in a global survey of primate conservation education programs as the top challenge faced by over two-thirds of all programs surveyed (Kling and Hopkins 2015). Funding challenges influence all aspects of conservation education program output, from materials purchased to staff hired and program length, all of which directly influence program quality and ultimately efficacy. To maintain or gain funding, programs are implicitly urged to over-report program success: this may

include proposing education projects which are larger or more resource-heavy than is reasonable to accomplish (Wallis and Lonsdorf 2010). Conversely, conservation is an attractive component of any grant proposal and may often be listed as a grant aim and then not implemented, an action that Oates (2013) deems as "motivated by self-interest." Blumstein and Saylan (2007) recommend that education programs implement extensive evaluation methods to ensure that money is being properly spent. A study of recycling programs in Ontario, Canada, noticed no change in recycling rates across varying funding allowances toward promotion and education (Lakhan 2014): were this a primate conservation education program, the program approach would need to change to increase conservation outputs, or funding would need to make a greater conservation impact elsewhere.

Lack of Commitment to Education

Primate conservation education, perhaps ironically, has been criticized for not incorporating education expertise enough (Sherrow 2010). There may often be a gap between what program implementers know about primates and conservation and their knowledge of how to effectively share that expertise in an educational setting. Collaboration across disciplines, and especially among professional educators, is highly recommended for a program to be maximally effective (Sherrow 2010; Wallis and Lonsdorf 2010) and is a useful means of introducing new skillsets and perspectives to an education team (Jacobson 2010). Educator training is a meaningful avenue to ensure that concepts are being taught impactfully (Kuhar et al. 2012). It is insufficient to simply introduce material to a program participant; rather, it needs to be done so in an appropriate educational context and to confirm that that content is being appropriately absorbed and acted upon.

Lack of Evaluation and Results

Lack of evaluation may be the most commonly cited challenge to primate conservation education projects (Bettinger et al. 2010; Espinosa and Jacobson 2012; Kuhar et al. 2012). A positive, but

effectually damaging, stereotype of conservation education programs is the misguided idea that education is beneficial no matter what. This leads many conservation educators to forgo evaluation, which may be perceived as costly or time-intensive, with the idea that it is unnecessary, thus discouraging project personnel from finding program best practices (Bettinger et al. 2010). In the absence of evaluation, program results and project impact are not well understood, a striking void when proper evaluation could serve to legitimize a program's success to relevant stakeholders, particularly potential donors (Norris and Jacobson 1998).

Additional cited challenges include confronting local poverty (Savage et al. 2010), complex political situations (Johnson-Pynn and Johnson 2005), expanding efforts to include more primate taxa (Kling and Hopkins 2015), and challenges inherent in addressing large-scale and global threats to primates (Sherrow 2010). Increased transparency and communication among primate conservation education practitioners will certainly help ensure that any problems, however specific, may be addressed. A workshop at the 2014 International Primatological Society (IPS) Congress in Hanoi, Vietnam, connected educators and those interested in the field to collectively address and discuss specific program challenges and to work toward potential solutions (Clanin 2014), a concrete example of commitment to improving the field and to addressing its challenges.

Evaluating Primate Conservation Education Programs

Evaluation is perhaps the most potent tool in a conservation educator's toolkit, but it is a task most often done without (Bettinger et al. 2010; Espinosa and Jacobson 2012; Kuhar et al. 2012). Evaluation involves both participant and program operation assessment, and it is a highly recommended aspect of program design (Carleton-Hug and Hug 2010; Dietz, Brown, and Swaminathan 2010; Espinosa and Jacobson 2012; Keene and Blumstein 2010; Norris and Jacobson 1998). Beyond assessing program KAB outputs,

evaluation can aid in determining best practices, identifying weaknesses in a program, and ensuring effective action toward any expressed grievances. Additionally, it can quantitatively help pinpoint appropriate education strategies: a survey of the impact of comic books distributed near Lac Aloatra, Madagascar, found more significant impact among activities that incorporated peer learning than traditional, teacher-led ones (Richter, Rendigs, and Maminirina 2015). An evaluation using focus group assessments of a conservation project on Andean bears found that bear predation on local cattle was a significant inhibitory factor for program support (Espinosa and Jacobson 2012). These findings would ideally result in a re-evaluation of preferred educational strategies and an increased program focus on human-wildlife interactions, respectively.

Surveys as the Most Common Methodology

When evaluations are conducted, the most common method are surveys, most often focusing on pre- and post-program KAB changes (Kling and Hopkins 2015). Thoughtful consideration within an evaluation team of the survey's purpose and how it may reflect program objectives is important for producing productive, meaningful surveys. Salant and Dillman (1994) have suggestions for survey designs that minimize the use of "leading questions" and encourage honest feedback. Indirect measures, like participant attendance levels, can provide useful information on program impact (Jacobson 1991). Outside consultations, through educators, professionals in survey design, or even among colleagues or friends, can introduce additional expertise and objectivity: a survey designed for a conservation project in France, for example, consulted an expert committee which included educational psychologists before their survey was launched (Ballouard et al. 2012). When conducting surveys, control groups and random sampling are essential for being able to put any KAB gains or other evaluative measures in proper context and to remove bias (Ballouard et al. 2012; Korhonen and Lappalainen 2004; Rakotomamonjy et al. 2015). Additionally, pre-testing of surveys is an ideal precautionary method for catching any

confusing or misleading questions (Leisher et al. 2012). Consultation, pre-testing, and overall careful design obviously are not methods limited to surveys alone and should be included when planning any evaluation protocol. While surveys are often considered a cost- and time-effective method of evaluation, consideration of other, more in-depth methods, such as focus groups and behavioral studies, should be considered. An extensive evaluation system in the Smokey Mountains, United States, as an example, utilized workshops, stakeholder interviews, and pilot testing, among surveys and other methods (Powell, Stern, and Adoin 2006).

A Push for Formative Evaluation

Even when evaluations are conducted, there is a field-wide problem with evaluating within a limited scope. A review of environmental education program evaluation methods found that 90 percent of programs utilized summative rather than formative evaluations (Carleton-Hug and Hug 2010) despite formative evaluations being significantly tied to program success (Norris and Jacobson 1998). Summative evaluations serve as summaries, evaluations that assess programs only at the beginning and final stages. Formative evaluations, however, incorporate assessments throughout program involvement and allow for the formation of adaptive management strategies, a highly beneficial means of allowing programs to grow to their fullest potential. Jacobson's (1991) Planning-Process-Product model of evaluation utilizes a fine-toothed method for evaluating from start to finish. Emphasizing program objectives in the early stages of evaluations can help ensure that programs do not become "off-task," especially when programs are modeled throughout implementation (Flowers 2010; Zorrilla-Pujana and Rossi 2014). Workshops, collaborations across disciplines, and increased conversation to help form standardized, user-friendly evaluation protocols would be a welcome addition to current evaluative practice.

Conclusions

In contrast to the unfortunate and unavoidably dire future of primate conservation itself, the

future of the field of primate conservation education is an optimistic one. Increased collaboration among primate conservation education practitioners and interested others will encourage creative partnerships across disciplines. PEN has been created to serve as an online resource both for downloadable education content and as a networking mechanism for those in the field, in addition to providing in-person training workshops for educators. Similarly, the American Museum of Natural History's Center for Biodiversity and Conservation (AMNH, CBC) has created a Network of Conservation Educators and Practitioners (NCEP) (<http://www.amnh.org/our-research/center-for-biodiversity-conservation/capacity-development/network-of-conservation-educators-and-practitioners-ncep>) which provides training events and multilingual online training resources and courses predominantly geared toward higher education in conservation.

Primate conservation education is a dynamic field and one that is only limited by the enthusiasm of its practitioners and participants. As primate conservation education programs age and grow, it will be important to continually assess their KAB impacts as well as their ultimate impact on primate populations. Because an "end" to the field of primate conservation education would signal an end in interest in and support for primates themselves, this field will continue to support primate populations for many generations to come.

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Primate Conservation Genetics

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Biodiversity is decreasing dramatically due to human activities such as habitat degradation, habitat conversion, and unsustainable use of natural resources. The same is true for the diversity of primates, where habitat loss and hunting for bushmeat, use in traditional medicine, and the pet trade are the main causes of an accelerated risk of extinction for many species. At present, more than half of the approximately 700 primate taxa are threatened by extinction. Urgent conservation actions are therefore required to preserve species. For a number of conservation decisions and conservation management plans, information on the degree of genetic diversity within and among