causing multifaceted loss to a human community. It is particularly important to show empathy and understanding in situations where human communities are traumatized from events, such as losing 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 prime conservation. Crop-raiding mitigation and eco-tourism can help provide local people with effective strategies to obtain incomes; 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 prime 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 could be one approach to begin to understand each situation individually.

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

REFERENCES


Prime Conservation Education

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What is Conservation Education?

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

“Conservation education” appears to be a simple term, but professional conservation education programs may not always provide true “conservation education” content. The American Association of Zoos and Aquariums (AAZA) (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), prime 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 (Trick, Kaiser, and Wilson 2004; Lo, Chow, and Cheung 2012).

The scope of prime 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 Mavungu 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 Prime Education Network (PEN) (www.primeeducatedationnetwork.org) and the International Directory of Primatolog (http://pin.primate.wisc.edu/idp/).

Program curricula focus on prime-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 prime conservation education programs due to the relative ease with which practitioners may address strict biology concepts over more nuanced ones. Blumstein and Stebbins (2007) suggest a more holistic approach to teaching conservation and environmental education topics that primate curricula should include discussions of human consumption control; for prime lessons, this may center on minimizing use of logged trees or reducing instances of bushmeat hunting.

Prime conservation education programs overwhelmingly target children (Breuer and Mavungu 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 prime 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 (Kharar et al. 2012), protected areas (Dolins et al. 2010; Kharar 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 (Kahar et al. 2012) primate conservation education initiatives persist.

Cultural sensitivity and the inclusion of program components 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 connections to the project (Dahl 1997; Freshy et al. 2011) and allow for valuable feedback (Breuer and Mavinga 2010; P疽gia 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 Tiwi (Savage et al. 2010) and the Community Reboon Sanctuary (Alexander 2002; Horwich and Lyons 1998), they are termed "integrated conservation development projects" (ICDP). Despite the obvious appeal of such projects, careful consideration should be paid to ensure that economic incentives are appropriately planned and carefully monitored (Epipanios and Jacobson 2012; Savage et al. 2010; Walls 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 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; Robert and Kitchener 2006), Miss Waldron’s monkey (Presbytis modrani 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 (Goldman 2009; Nijman et al. 2011), disease (Caillault et al. 2006), urbanization, and infrastructure expansion (Willier 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 these threats.

The oft-professed strength of conservation education is its influence on KAB: the Knowledge, Attitude, and Behavior 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 resulting 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 (Berto, Diets, and Nagagata 1994; Kahar 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 (Elbeh 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 (Ellis 2002). Ayres’ douc (pygathrix nasalis) are hunted in many regions of Madagascar as a bad omen (Simons and Meyers 2011), serving as an unfortunate counter-example. Attitudes toward primates can also extend beyond cultural views; crop-raiding species, such as red-tailed 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 against conservation aims. A survey of a 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 (Leindeer 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) (Imfeld 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 (Ellis and Hopkins 2015), demonstrating the role that economic decision-making 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 (Ellis 2002). Thus primate conservation education programs should consider not only the specific method or policy 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 (Walls and Lonsdorf 2010). However, primate conservation education programs have reported positive, observable behavior changes necessary for conservation aims. Conservation education clubs linked with Centre Vallio (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 (Mukhachev 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; Epipanios 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 education efforts and specifically through conservation education education (Sheerow 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, NYCED.

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 Kasinzi Project (www.kasinzi-project.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 lectures 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, Ramonafana National Park, Madagascar

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

Florent Ranavory, CVB Head of Conservation Education, Ramonafana.

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. Ramonafana 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 added 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 lorises, is the world’s longest running lorises 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 Creations of Java and has since featured on more than nine major news networks worldwide, including Animal Planet and BBC UK (Nekaris 2016). The project 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 lorises-related games, activities, and lessons plans to schools in Indonesia and abroad. Pride days, or village-wide celebrations encouraging support for the loris, 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 2015 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 lorises 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.nocturana.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 Pellen, 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 Guillén 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 Titi 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 (CARTITI LL and TITI KIDS), teacher training programs, conservation clubs, and leadership programs (TITI CLUB and TITI LIDERES).

Proyecto Titi has designed two programs that are implemented in various schools in northern Colombia: CARTITI LL and TITI KIDS. TITI 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. CARTITI LL 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 CARTITI LL 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 CARTITI LL 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 TITI 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 TITI CLUB are invited to participate in TITI LIDERES each year. Students in TITI LIDERES 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 TITI LIDERES program. In order to increase the sustainability of conservation efforts in Colombia, Proyecto Titi created the Blue Sky Education Fund Scholarship. This program provides an opportunity for students to attend schools and courses to learn professional and technical skills to practice conservation as a profession.

Each of Proyecto Titi’s formal education programs is evaluated. Although evaluation format differs across programs (for example, TITI KIDS is administered orally, while students in the CARTITI LL 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 Titi’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 primate conservation 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 often urged to over-report program success; this may effectively damage, stereotype of conservation education programs is the misguided idea that education is beneficial no matter what. This leads many conservation educators to forgo long-term projects in the hopes of creating short-term rewards as a grant aim and then not implemented, an action that Oates (2013) deems as “motivated by self-interest.” Bloomstein and Sylian (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.

Lock 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 primate 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; Walls and Loosdorf 2010) and is a useful means of introducing new skills and perspectives to an education team (Jacobson 2010). Educator training is a meaningful avenue to ensure that concepts are being taught impactfully (Kubal 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 context is being appropriately absorbed and acted upon.

Lock 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; Kubal et al. 2012). A positive, but
The potential for the field of primate conservation education is an optimistic one. Increased collaboration among primate conservation education practitioners and interested others will encourage the development of new partnerships across disciplines. A network 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 (NCERP) (http://www.amnh.org/our-research-center-for-biodiversity-conservation/capability-development/network-of-conservation-educators-and-practitioners-ncerp) which provides training events and multilingual online training resources and courses predominantly geared toward higher education in primate conservation programs. 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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