Ecotourism: Counterproductive Conservation

For the past few decades, non-human primates have been deliberately habituated for the purpose of tourism and it has since developed into a profitable industry fueled by a strong market demand. Ecotourism is a controversial tool in terms of its sustainability as an effective conservation solution for primates. Ecotourism is best defined as responsible, low-impact travel to natural areas to observe wildlife and promote conservation. It not only gives people a chance to interact with animals in their natural habitats but also offers local communities employment opportunities and economic development. Despite these seemingly optimistic outcomes, ecotourism also creates a breeding ground for countless consequences such as the threat of pathogen transmission, the negative effects of habituation including physiological stress placed on non-human primates resulting in aggressive behavior as well as changes in basic features of primate life such as their activity budgets. Ecotourism is an ineffective, counterproductive conservation method for such endangered species as it consequently facilitates adverse side effects harming these species' natural resources both physical and biological.

The high risk of disease transmission from humans to gorillas is a major concern of the non-human primate tourism industry. All six great ape species are listed as endangered or critically endangered by the IUCN and studies show decreasing population trends. One of the key threats to these non-human primates is the transmission of pathogens from humans especially as a result of ecotourism. After conducting a literature of pathogen transmission occurrence from humans to great apes, Dunay et al. (2018) found multiple occurrences of probable or confirmed pathogen transmission from humans to great apes. This is important because such effects of ecotourism indicate the need of conservation efforts to concentrate efforts in both the monitoring and addressing of zoonotic pathogen and disease transmission between humans, great ape species etc. to ensure the health of not just humans but also the health of other species within the ecosystems we share.

Ecotourism has proven to have detrimental effects on wildlife conservation when unmonitored or under regulated, especially in the case of non-human primates as our genetic relatedness makes apes greatly susceptible to disease transmission to and from humans (Muehlenbein, 2017). Touching primates is prohibited in many places, and yet many tourists still conduct physical contact with the primates and because of this, these interactions provide plenty of opportunities in which pathogenic organisms can be transferred through animal bites (Muehlenbein, 2017). Habituated gorillas face a risk of disease from tourists, who are possibly hosting foreign illnesses that they are bringing from their own country. These tourists can suffer high rates of illness that can be contributed to the stress of travel and being exposed to air?borne diseases on airplanes. These tourists themselves are also at risk since they potentially lack immunity to local endemic infections (Adams et al., 2001; Muelhenbein and Ancrenaz, 2009).

From trekking for gorillas in Uganda and sightseeing in Central Africa, to visiting sacred Buddhist temples in Asia where monkeys roam free, primate-based tourism remains highly popular among travelers seeking the up-close and personal encounters that such sites provide. Nevertheless, despite their good intentions, ecotourists are very likely creating unnecessary risks of infection transmission to non-human primates. Though pathogen transmission

outbreaks from non-human primates to humans, known as zoonoses, have been extensively studied (e.g. Rabies, tuberculosis, HIV etc.), the transmission of anthroponotic diseases (from humans to non-human primates) goes acknowledged less. Free-living, semi-wild, and captive great ape species, such as chimpanzees and lowland gorillas, have both shown to be affected by human infections including yellow fever, as well as a host of respiratory viruses like human metapneumovirus (hMPV), respiratory syncytial virus (RSV), and influenza B virus, among others (Dunay et al., 2018). Ecotourism programs contribute greatly to the transmission of infectious diseases from humans to apes, as millions of eco-travelers visiting remote, pristine locations inhabited by endangered primates are allowed increased contact, even though they lack proper vaccinations that could easily prevent the transmission of anthroponoses (Shutt et al., 2014). The habituation, or the intentional taming of wildlife at tourist locations often exacerbates this issue.

An additional consequence of the primate ecotourism industry is the spread of antibiotic resistant bacteria transferred from humans to nonhuman primates. Rolland et al. (1985) examined three groups of wild baboons in Amboseli National Park, Kenya, in order to determine the frequency of aerobic antibiotic-resistant fecal bacteria in nonhuman primates with and without contact to human refuse. Through their use of standard isolation and replica plating techniques, they found antibiotic resistance was significantly higher among enteric bacteria from the third group of baboons in daily contact with unprocessed human refuse from living in close proximity to a tourist lodge. The other two baboon groups who had little to no contact with humans and lived undisturbed in their natural habitats had low numbers of enteric anti-biotic resistant bacteria. Analysis of the cell DNA by gel electrophoresis showed that in many cases resistance was plasmid-borne and transferable (Rolland et. al, 1985). The data compiled in this study suggests that wild nonhuman primates in frequent contact with humans and our byproducts exhibit a higher percentage of antibiotic-resistant enteric bacteria than they would otherwise be exposed to if left undisturbed by ecotourism in their natural habitats.

The behavioral stressor of close human contact placed on non-human primates is another crucial factor of ecotourism affecting the health and daily lives, particularly in regards to the regular activity budgets of these primates. Current data on mountain gorilla groups found close observer-gorilla proximity, the gorillas spent an increased amount of time in the monitoring of humans and less time spent feeding when in the presence of tourists (Steklis et al., 2004). Steklis et al. found that as research team size increased, the group-feeding rates of the silverback gorillas decreased. From this we can ascertain that close human distance can negatively influence the feeding behavior of non-human primates. Bai Hokou camp located in the Central African Republic acts as a host to many tourists, film crews, and independent researchers. Hodgkinson and Cipolleta (2009) conducted a longer?term study designed to assess the impact of tourism and human presence on gorilla behavior. In 2006 they conducted a preliminary study with the gorilla group, during the stages of the habitation process, they found that that the presence of tourists and film crews resulted in many significant behavioral alterations which included a decrease in the resting patterns of the silverback gorillas and an increase in the aggressive behavior of the group(Hodgkinson and Cipolletta, 2009). Habituating gorillas to accompany the presence of humans is noticeably a highly stressful process, as it usually involves altering their usual activity budgets, causes regular displays of aggression toward humans, and alters their ranging patterns. The gorillas experienced adverse effects as a result of the ongoing habituation process, displaying an increase in daily path length, and reactions of aggression/antagonistic behavior, fear and vocalization upon contact (Blom et al., 2004).

Within the last 20 years ecotourism operations have increased in Costa Rica which has put humans into close and direct contact with several of their wildlife species including the highly sociable white-faced capuchin (Cebus capucinus). The research of the behavioral changes of two groups of white-faced capuchins at a small, private ecotourist site in Costa Rica showed, over habituating primates could make them hyper-aggressive towards tourists as they lose their fear for humans and experience stress due to close human interaction. As a result of this over-habituation and stress, it prompts bites and scratches that feeds into the pathogen transmission risks discussed earlier as it provides even more opportunities for the exchange of pathogens. (Webb and McCoy, 2014).

Constant exposure to humans as a result of ecotourism subsequently results in the chronic activation of stress responses within primates. Shutt et. al (2014) investigated the effects of habituation, ecotourism and research activities on levels of faecal glucocorticoid metabolites (FGCMs), which served as a proxy for physiological stress, in wild western lowland gorillas located in the Central African Republic. After comparing FGCMs in three human-contacted groups with those in unhabituated gorillas they found that two of the three human-contacted groups had higher levels of FGCMs than those unhabituated gorillas. The group undergoing habituation had the highest FGCMs, which increased up to 21 days following contact and FGCMs in habituated groups were significantly associated with the increased frequency of violation of the 7 m distance rule by humans (Shutt et al. ,2014). By examining the FGCM's it can be determined that non-human primates exposed to human contact as a result of ecotourism are placed under a great deal of stress under habituation. Such responses can produce pathological effects that include impaired cognition, growth, reproduction, and immunity in the primates (Shutt et al., 2014). Such adverse outcomes resulting from ecotourism, demonstrates itself to be a counterproductive method of protecting such endangered species as it poses these serious health risks as a consequence. These species whose conservation heavily relies on being habituated for the purposes of the ecotourism industry are being negatively affected by the very system put in place to ensure their survival.

While ecotourism provides an often safer, friendlier environment that allows ecotourists to experience the wildlife and habits of fascinating nonhuman primates in a more intimate setting, there is a very real consequence to such an invasive system of tourism. According to Matysek and Kriwoken (2003), one of the reasons ecotourism is seen as a beneficial conservation tool is that it focuses on the quality of the natural environment, such as well-preserved or protected natural areas and wildlife habitats. However, an unintended consequence concerning ecotourism includes the environmental ''footprints'' that both long-term researchers and short-term visitors such as ecotourists leave behind including the effects of trails and trail traffic on the surrounding vegetation of which the primates depend on. Trees and other vegetation have to be cleared to make way for new trails for researchers and tourists alike and with the constant use of these trails, soil erosion is occurring in these areas of primate habitation (Strier, 2010).

If concerns such as these and other issues beyond are left unattended and unaddressed, these primates will continue to be fed into a vicious cycle of tourism that breeds a habitat volatile for their survival. There is an urgent and necessary need to minimize pathogen transmissions and disease that is associated with close human contact at primate ecotourism locations in order for primate conservation efforts to be effective. With close human contact and as a result of the habituation of these primates, these species show significant signs of stress including aggressive behaviors and changes in feeding patterns. There are too many risks factors associated with ecotourism for it to be considered an effective way to ensure the conservation

of these endangered species. Guidelines need to be enforced so that these protected areas of primate conservation as well as those at-risk species who call these places their homes don't get put into further endangerment with disease and stress from being the focus of the ecotourism industry. It is important for travel and tourism officials world-wide to engage in conversations to discuss and address the human led consequences of ecotourism in the conservation efforts of these species. Ecotourism seems to be an ideal method of satisfying our human tendencies and desires to learn more about the world through interaction and our love for bonding with other animals. But many of us have a limited knowledge about the risks involved in nature-based tourism and animal habituation which as a consequence, our fellow primates suffer collateral damage and fall victim to the same programs and activities we've created with the intention to safeguard them in the first place.

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