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# Colombian Hippos and Species Management: Exploring the Legal Case Surrounding the Management and Control of the Colombian Hippos from a Species Justice Perspective

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**Abstract:** Colombian hippopotamus populations are increasing against the backdrop of general species decline. In addition to wider calls for further protection, this pocket population is considered an invasive species and is subject to ongoing legal discussions about how they should be controlled and managed. These proceedings currently consider two options: whether the hippopotamus population needs to experience yearly culls or to use a fertility management program. This article explores whether species justice has a place within the control of non-native species via this case study of the Colombian hippo legal proceedings. When reviewing this case, neither euthanasia nor fertility control are fully in the interests of the species; however, fertility control is more in line with their interests. The conclusion considers whether it is possible to recognise the interests of wildlife within species management and how a shift towards the interests of species and species justice at minimum could provide more dignified and harmless methods of species control as well as find alternative solutions which are more in the interest of the majority of parties.

**Keywords:** green criminology; species justice; hippopotamus; species management; Colombia



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## 1. Introduction

Since the 1970s, evidence shows an average decrease in monitored wildlife populations of 69%. This is the result of an array of threats including species exploitation, climate change, and pollution with one of the largest contributing threats to biodiversity being invasive alien species (WWF 2022). “Invasive alien species (IAS) are animals and plants that are introduced accidentally or deliberately into a natural environment where they are not normally found” (European Commission 2023, p. 1). Sollund (2019) discusses how invasive species generally are perceived as aliens and ‘enemies’ who need to be destroyed. These species are considered a threat for an array of issues, from the harm that stem from the species introduction, the overarching threat to environmental security being considered a key risk to biodiversity loss, in addition to connections to wider criminality such as wildlife trafficking (Wyatt 2013; Wittenberg and Cock 2001). As a result of this risk to biodiversity and the narrative of harm associated with invasive alien species, many of them are dealt with using species management programs which generally fall into four broad approaches; prevention, eradication, containment, and control (Grice 2009). This can be via an array of methods from killing through poisoning or shooting to the movement or fertility control of the species in question. However, contrary to this overarching narrative and punitive approach, the impact of invasive species is not as clear-cut as all cause harm (Schlaepfer 2017). For example, the introduction of Aldabra giant tortoises on the island Ile aux Aigrettes led to the increased seed germination of the critically endangered *Diospyros egrettarum* (Griffiths et al. 2011). Not only does this case provide evidence of invasive species not consistently being threats but also supports Schlaepfer’s (2017) argument that these species need to be assessed on a case-by-case basis to measure their impacts with some species not causing harm and others being considered beneficial, and all of these should be considered regarding species management. One ongoing example regarding

invasive species management involves a growing population of hippos (*Hippopotamus amphibius*) within Colombia in which a legal case is being used to decide how this herd should be controlled.

This paper aims to explore the ongoing discussions surrounding the management of the Colombian hippo population through a green criminological framework to observe whether the interests of invasive species can be considered within species management and related wildlife and conservation law. Regarding the hippos, two species management strategies are currently being explored as part of a legal case; euthanasia and fertility control. Discussions surrounding these two strategies will consider if the interests of the hippos are being taken into account and whether it is possible to do so while also protecting the environment. Finally, the discussions of this case study will be considered regarding wider invasive species management.

## 2. Hippopotamus

Alongside global trends in species decline, hippo populations have not been an exception, although some regional populations are stable there is a general trend of between 7 and 20% and two-thirds of regional hippo populations are predicted to be in decline (Cowdrey and Crudgington 2019). This species reduction is predicted to continue with hippo numbers expected to fall by an additional 30% within the next 30 years (Lewison and Pluháček 2017). The cause behind the decline is linked to an array of threats from droughts, climate change, human–hippo conflict, and military exercises in addition to an increase in the hippo ivory trade, particularly in light of a crackdown on elephant ivory (Lewison and Pluháček 2017; Moneron and Drinkwater 2021; Born Free 2022). These ongoing threats and continued species decline have resulted in calls on an international level to change the protection of this megafauna to prevent further decline (Greenfield 2022).

Current classifications have hippos labelled as a species vulnerable to extinction (Lewison and Pluháček 2017) as well as being listed as an appendix II Cites species since 1995 meaning that trade in the species and their derivatives is to be regulated (CITES 2021). However, with continued decline as well as evidence of clear discrepancies in the trade in hippo ivory point to a growing illegal market (Andersson and Gibson 2017) and the ineffectiveness of current international classifications. As such, there has been a growing movement to have hippos listed as an endangered species as well as a ban on their trade (Move to CITES appendix I) to curb this decline (Neslen 2022). This proposal was brought forward by 10 African nations (Benin, Burkina Faso, Central African Republic, Gabon, Guinea, Liberia, Mali, Niger, Senegal, and Togo); however, at the time of writing in February 2023, this is being opposed by the Council of the European Union suggesting that the megafauna is not in imminent danger of extinction (European Commission 2022). In contrast, although the majority of political and academic discussions centre around the protection of hippos, there is one growing population in which population control is at the centre of much legal debate, the Colombian hippo herd.

## 3. Cocaine Hippos

Colloquially known as “cocaine hippos” this invasive herd has garnered a wide array of media attention due to their relationship to drug lord Pablo Escobar as well as being a charismatic megafauna species resulting in further media coverage (White and Heckenberg 2014; Dembitzer 2018). Dating back to the 1980s, Pablo Escobar acquired several species for his private zoo including four hippos (three female and one male). Upon his death in 1993, the majority of the wildlife in the zoo were relocated; however, due to the difficulties associated with trying to move the species, the hippos were left at Hacienda Napoles, the Escobar estate, which included his private zoo and the area was abandoned (Subalusky et al. 2021). This led to the degradation of the estate where the hippos then escaped to the larger bodies of water nearby (Howard 2016).

By 2006 when the estate had become more of a tourist attraction, it was found that there were 16 hippos residing in the area providing initial evidence of population growth

(Subalusky et al. 2021). Since then, the herd has continued to grow and spread, and although difficult to fully calculate, research suggests that their numbers could have increased to anywhere between 65 and 120 by 2020 (Shurin et al. 2020; Duarte 2021). These estimates were reinforced in early 2022 when the [Ministry of Environment and Sustainable Development \(2022\)](#) announced at least 111 individual hippos had been registered with the possibility of further hippos being unaccounted for. Research into the current reproduction rates suggests that due to the Colombian ecosystem, the hippos' breeding rates are above average. Globally the average reproduction rate is between 7 and 11% per year; however, in Colombia, the hippos are growing at a rate of 14.5% per year with current predictions suggesting the number of hippos could grow to between 400 and 800 by 2050 (Shurin et al. 2020; Castelblanco-Martínez et al. 2021). Furthermore, the hippos have spread from Hacienda Napoles, being spotted residing along the middle of the Magdalena River as well as some towns and areas over 100 km from the private zoo (Subalusky et al. 2021). Further predictions suggest that alongside continued growth the species could spread further to areas placing wider regions at risk of potential harm ([Ministry of Environment and Sustainable Development 2022](#)). Similarly, the unregulated growth of invasive species has been seen as a threat to both biodiversity and economically if control measures are not put in place. For example, in Florida, the increase of invasive rhesus macaques led to a significant loss of bird populations and millions of dollars in crop damage (Engeman et al. 2010; Evans 1989).

In the case of the Colombian hippo although originally believed to be having only minor environmental impacts, as the species has grown it has been observed that there have been harms alongside an increased risk of further harm to the environment. Research into these impacts has found pollution and biodiversity loss linked to the increasing hippo population ([Ministry of Environment and Sustainable Development 2022](#)). Initial evidence suggests a connection between the species and creating anoxic water conditions due to the faecal matter, generating high mortality rates in certain fish and aquatic species in addition to those who rely on the light within the rivers (Shurin et al. 2020). This has the possibility of resulting in changes to ecosystems from loss of species as well as being further exacerbated by increasing hippo numbers. On the contrary, arguments have been made that this is due to South America having very few megafauna species, Dembitzer (2018) argued that there is a possibility that these hippos are filling a gap in the ecosystem and will potentially help with rewilding efforts within Colombia via the introduction and growth of a keystone species. This could result in the introduction of nutrients and wider ecological impacts such as algal blooms (Howard 2016); however, this is a rare occurrence. Arguably, even taking into account the future rewilding potential, there is currently evidence of harm being created by the hippos which could continue to escalate.

Additionally, concerns have been raised regarding social harms and conservation-related issues associated with the hippos. Naturally a territorial and aggressive species in Africa, there have been several human fatalities and injuries associated with hippos throughout history (Eltringham 2010) with the species often being raised as one of the most dangerous on the planet. Although there have been no reported deaths associated with hippos in Colombia, there have been media reports of attacks and injuries from the hippos in addition to property damage and complaints of access to areas of rivers being cut off due to harassment by the hippos (Kaplan 2021; Pachón 2022). Furthermore, with continued population growth, there will be an increased risk to public health as well as property. Alongside the threat to human safety, there have been initial reports of connections between the hippos and wildlife trafficking with traffickers taking advantage of the lack of control measures to sell baby hippos (Pachón 2022). This raises additional concerns if the hippos are being taken to other areas or private zoos in Colombia, as it risks creating a larger invasive species issue (Animal Balance 2021). Evidently, in addition to the associated environmental harms the increasing hippo population creates the opportunity for wider criminality to take place.

In response to this risk to harm the Colombian government initially authorised the culling of a hippo in 2009 with the aid of the military. However, the killing of a high-profile hippo known as “Pepe” as well as pictures of the soldiers posing with the body, was met with large amounts of public outrage from both the Colombian residents as well as the international community (BBC 2009; Kaplan 2021). Within the country, the hippos are seen relatively positively with those around the Escobar estate with businesses utilising the megafauna as a tourist attraction (Subalusky et al. 2021), demonstrating the use of the species as a form of ecotourism. Considering this, the Colombian government stopped the culling in favour of exploring all options. However, due to the wider harms and risks associated with the species in March 2022, the hippos were officially labelled as an invasive species which needs to be managed and controlled to avoid impacts and wider environmental harm by the Colombian Ministry of Environment and sustainable development (Ministry of Environment and Sustainable Development 2022).

#### 4. Theoretical Context

Although an indirect impact and victim of the cocaine trade and the emerging connection to wildlife trafficking, both fall under more traditional interpretations of criminology, the rights, interests, and aforementioned harms associated with Colombian hippos fall outside of these interpretations. Positioned under a strand of critical criminology, this paper’s discussions fall into green criminology exploring environmental crimes (In breach of criminal, civil, and/or regulatory law) in addition to wider harms associated with the environment and nonhuman animals (Nurse 2017). Most interpretations of green criminology consider anything harmful to humans, non-human animals, and the environment to be considered regardless of its legal status (White 2011). This zemiological consideration is taken into account due to the harm of non-human animals and the wider environment not always falling under criminal law with non-human animals generally being perceived as property and many environmental damages being caused by the state or large corporate actors (Stretesky et al. 2013; Biernie 2007). In addition to the wider harms, green criminology considers the further risks of future environmental crimes and harms posed by human actions/inactions (Hall 2015), as well as evidence of the relationship between them and further traditional criminal elements (Nurse and Wyatt 2021), demonstrating a clear relationship with more traditional criminology. These studies of harm and risk within green criminology are particularly pertinent in relation to the Colombian hippo herd. This is concerning the potential harms and risks posed to the hippos themselves by the relevant authorities, in addition to the impacts that a rapidly growing hippo population could pose to the local area as well as emerging links to traditional crimes such as wildlife trafficking (Dembitzer 2018; Subalusky et al. 2021).

Reflecting on the application of green criminology, White (2010) argued that most discussions in this field can be focused on who or what is being victimized, suggesting three broad frameworks for interpreting green crime issues (environmental justice, ecological justice, and species justice). Environmental justice and rights explore greens issues through an anthropocentric perspective lens looking at the rights of the environment as an extension of human rights with the notion of the environment’s value and use to humans being central to this framework (White 2008). Taking a different perspective, ecological justice views humans as just one aspect of the larger biosphere exploring their relationship to wildlife and the rest of the environment being concerned with the overarching health of the environment (Cullinan 2011). Finally, species justice and animal rights consider the rights of non-human animals within the Anthropocene (Benton 1998).

It is this final lens of animal rights and species justice that is at the heart of the legal proceedings surrounding what actions needed to be taken with the invasive hippos with the central argument being about the interests of the herd.

Currently, legal systems, rights, and laws operate from an anthropocentric perspective with the rights of humans being at the heart of these systems. Globally, non-human animals are rarely perceived as the victims of criminality and harm with them generally being seen

as property with very few protections unless they serve the interests of human beings (Nurse 2013). This perspective is rooted in speciesism with the idea that humans are superior to non-human animals and as such have rights and protections from harm where non-human animals do not (Bierne 2007). Sollund (2008), argues that this speciesism approach to harm comes down to a perceived difference and us vs. them perspective between humans and non-humans with physical differences, general separation, and denial of suffering all being factors behind this outlook. These speciesism perspectives inform the protections and rights that are in place and as such are arguably not taking into account the interests of the non-human animals they are arguably created to protect (Nurse and Wyatt 2021).

Species justice views the rights and well-being of wildlife from a different perspective, taking the approach that rights should not be provided based on the notion of the value of a species to human beings but based on the sentience of the species with most being able to demonstrate an array of behaviours (Benton 1998). For example, hippos have been observed to demonstrate clear evidence of sentience with an array of behaviours including communication, distinct relationships between mother and calf, and reactions to death within a herd all being documented (Barklow 2004; Inman and Leggett 2020). A critique of current justice systems is they do not give equal weight to crimes against animals and crimes against human beings, this is in direct contrast to the principles of species justice and ignores the life and sentience of species (Sollund 2008). When considering species justice and animal rights White (2008, p. 15) summarised that species justice is based upon the notion that “Nonhuman animals have rights based upon utilitarian notions (maximising pleasure and minimising pain), inherent value (right to respectful treatment) and an ethic of responsible caring, indicating not only should animals have rights but that humans do not have the right to inflict harm on animals for their benefit. Moreover, species justice argues that the wider rights of animals should be explored from a more anti-speciesism perspective.

As such, wider anti-speciesism perspectives and notions of species justice consider the rights and protections of wildlife from the perspective of the individual wildlife and not from the anthropocentric perspective of how they can benefit human beings (White 2008). However, the difficulty of this perspective is weighing the balance of possible harms to the environment and humans against the notion of what are the interests of the hippos. Discussions regarding what rights species have has been an ongoing academic and legal discussion that has grown significantly since the 1960s (Bierne 2007). Today there is no universal standard for animal rights that are enforced and set in stone. Attempts have been made to create a more standardised approach to species rights, the 1975 universal declaration of animal rights in addition to the 2011 revised declaration and the attempt to pass the universal declaration of animal welfare. All of these declarations proposed non-binding sets of principles for United Nations members to enact which promote animal welfare, recognise that animals are sentient beings, and overall set a standard of well-being for animals (Nurse 2016; World Animal Protection 2014). Even without this standard in place, countries have legislation and regulation in place which offer varying degrees of protection and possibly rights for species (Nurse and Wyatt 2021). For example, Nurse and Ryland (2014) contend that the UK animal welfare act 2006, which considers the individual needs of companion animals whilst still perceiving them as property, is a form of rights. In addition, Colombian Law 1774 of 2016 (Law 1774 2016) which considers the sentience of species.

Discussions regarding the rights of animals generally fall into taking anthro, eco, and biocentric approaches. The more hard-line biocentric approach to animals takes the stance that humans do not have the right to harm or use animals in addition to keeping them as property (Francione 2008). Although this is not the case today it does open discussions for the rights of non-human animals and the overarching enforcement of their rights. The ecocentric more welfarist approach suggests that animals should have the right to better treatment and to reduce the amount of harm that they experience, but at the same time

does not prohibit exploitation, only suggesting that it should be done in the least harmful way possible (Ibrahim 2006). Reinforcing these discussions, Rollin (2006) argued that these rights are not final and can fluctuate depending on the animal and the circumstances at the time. Taking that into account, countries need to codify the rights of animals into law so that critical discussions can be had on a local, national, and global level.

Although complicated by their labelling as an invasive species, the rights of the hippos are dictated by Colombian law. Under Colombian Law, non-human animals are protected under the animal protection statute Law 84 of 1989 (Law 84 1989). This legislation applies to non-human animals with domestic, tamed wild, and feral all being listed and acknowledged that they can feel pain. Furthermore, Article 2 of the national statute of animal protection (1989) classifies that the purpose of this legislation is to prevent the pain and suffering of animals within Colombia. This statute was later amended in 2016 under Law 1774 of 2016 which further changed how non-human animals were perceived under the Colombian legal system declaring that all animals are “sentient beings” subject to protections. Furthermore, Article 3 of the 2016 statute established five principles of animal welfare: freedom from hunger or thirst; freedom from discomfort; freedom from pain, injury, or disease; freedom to express normal behaviour; and freedom from fear and distress by ensuring conditions and treatment which avoid mental suffering. Furthermore, under the updated statute, animal cruelty is considered a criminal offence with harms that impact animals physical and emotional integrity being subject to penalties of up to 36 months imprisonment and fines of up to COP\$ 46,874. The complication over the rights and protections of the hippos is due to their status as an invasive species, and there have been discussions as to whether they have protection under Colombian legislation; however, the legislation states, all animals and including wild animals in addition to the phrasing within Ley 84 concerning “all the animals within the national territory”, and it could be argued that they are protected under law.

## 5. Legal Analysis

Between the emerging harms associated with the hippos, the lack of clarity surrounding the hippos welfare due to them being an invasive species alongside the high profile nature of the species the decision surrounding how to control the population has been subject to an ongoing legal case. The legal case (Case No.: 25000234100020200044400) was brought forward to consider the interests of the hippos when deciding how they should be managed, stipulating that former decisions of euthanasia were not in their interest.

In 2020, to protect the hippos, a case was brought before the Cundinamarca administrative court. The case was raised with this specific administrative court since those responsible for the ongoing hippo situation are the environmental authorities in which this body has jurisdiction, and as such is seeking action surrounding the protection of the invasive species. The popular action was filed by Colombian attorney Luis Domingo Gómez Maldonado on behalf of the hippos as an interested party with precedence already being set surrounding wildlife being recognised as sentient species under Law 1774 of 2016. Taking this into account, this action was brought forward in an attempt to recognise the wider evidence-based options for the management and control of the hippos and to have their interests represented in this decision. Furthermore with this being an ongoing case, part of the initial action was the recommendation that until a verdict can be made as to how to best manage the hippo population, none should be euthanised.

The central argument of this case has two key arguments, euthanasia and fertility control. The official position of the Colombian Ministry of the Environment and Sustainable Development alongside CONARE (The regional autonomous corporation of the Negro and Nare River) is that the focus should be on the removal of the hippos from the ecosystem via euthanasia through yearly culls (Animal Balance 2021). The NGO Animal Balance brought forward the argument of fertility control via the use of the drug PZP (Porcine Zona Pellucida). The drug in question is currently used in zoos to control hippo fertility with it being effective for around 8 months before further doses are needed. In 2022, the case

would begin the evidence-gathering phase regarding these two perspectives (in addition to possible further solutions).

However, on the 15th of October 2021, a case was brought to the United States before the district court for the southern district of Ohio (captioned case: *Community of Hippopotamuses Living in the Magdalena River, Applicant, To Issue Subpoenas For The Taking of Depositions Pursuant to 28 U.S.C. § 1782*. No. 1:21-mc-00023-TSB-KLL. (Sparks and Flint 2021)). This was due to representatives claiming that although evidence has been submitted to the Colombian court (Before 2022), the defendant argued that this has been ignored by the court judge and as such is depriving the hippos of a solution that preserves their lives. The case itself has garnered a wide array of international media attention with headlines such as “Pablo Escobar’s ‘cocaine hippos’ are people too, US court rules’ and “Pablo Escobar’s “cocaine hippos” are legally people, U.S judge rules” (CBS 2021; Associated Press 2021), this was not the reality of the situation. This confusion came from an article produced by the Animal Legal Defence Fund (ALDF) which argued that the court had recognised hippos as legal/interested persons for the first time in a U.S Court (ALDF 2021). The case itself was an application by two lawyers for an order to take the testimony of two U.S. witnesses for the Colombian administrative case to support the application of the hippos for an order pursuant to conduct discovery for use in foreign proceedings. The discovery is to explore the viability of solutions other than euthanasia of the species to be then used via the submission of documents and deposition of experts to be used as evidence in an attempt to persuade the Colombian authorities to explore alternative solutions that both resolve the issue and respect the interest of the hippos.

Evidence provided to the Ohio court is to be submitted within the evidentiary phase of the Cundinamarca administrative court case as evidence to help formulate a decision as to how the growing hippo population will be managed and controlled. The court will take this alongside wider evidence to decide how best to manage the hippo population within Colombia.

## 6. Euthanasia vs. Fertility Control

The central argument of these legal proceedings is that if the herd needs to be managed then their interests at least need to be considered. The decision by the Cundinamarca administrative court arguably will reflect this with evidence regarding the harms, rights, and overall interests of the hippo populations being considered in the case. Already this demonstrates evidence of good practice by considering the species’ interests. Species management rarely considers the interest of the invasive alien species when it comes to control methods reflected by some of the actions committed by some environmental agencies (Inglis 2020). For example, within the UK, grey squirrels are considered a “pest” species and can be legally killed by utilising such methods as poisoning and traps under the wildlife and conservation law in an effort to protect native red squirrel populations (Inglis 2020; Nurse and Wyatt 2021). These harmful practices likely will not kill the animal immediately and lead to suffering in the name of tackling invasive species. From a species justice perspective, the rights and interests of wildlife must be considered, however, if a species such as the hippo has the potential to harm the environment and measures need to be put in place to control them, and, arguably, the option that considers the interests of the herd and is least harmful needs to be considered. Neither euthanasia nor fertility control is fully in the interest of the hippos; however, arguably, fertility control takes their interests more into account, whereas euthanasia goes against them.

Euthanasia of the hippos is seen as the more favourable and current position in Colombia with recommendations of up to 30 hippos killed each year (Animal Balance 2021). The concerns raised via the Ohio case discussed the following:

“A proposal that was developed after it was discussed in the meetings that the hippo population would need to be reduced through “annual controlled killing” as **the only viable solution** to resolve the conflict created by their presence in the region” (Bold added by author).

Brought about by a need for urgency, political pressure as well as the growing concerns surrounding the harms associated with the hippo population, the argument for euthanasia is believed to be a fast solution to the growing population. This method is not an uncommon strategy when responding to invasive species with several national bodies allowing the culling of species for invasive species management to help respond to the environmental harms (Simberloff 2013). Although met with public outcry from the local communities and wider international communities, which initially stopped the culling, it is seen to be the economically viable and immediate resolution (Animal Balance 2021).

This raises a particular concern surrounding the rationale behind euthanasia. Not only does this demonstrate a clear anthropological motive behind the control method by putting economics over the species' interests but also suggests that even if species control through euthanasia was utilized, it places price and convenience over the potentially more painless methods. This was evident in the previous hippo killing which reports suggested involved high-powered rifles which is an inhumane and painful method of killing (Carroll 2009). Furthermore, the killing of Pepe entailed those responsible for posing with the hippos corpse (Kaplan 2021), removing respect and dignity from the animal. When considering this through a species justice lens, the interests of the hippos are not being considered. To begin with, as sentient beings, it is not in the interest of the species to be killed, and doing so would potentially deprive the animal of 40–50 years of life (Eltringham 2010). This herd are victims of the illegal cocaine trade, and although they would likely have had a safer and less controversial life within Africa, they do have an interest in life, are thriving, and are not intentionally causing harm. Similar to other cases of culling, the hippos are not being killed out of mercy or because they are struggling, in short, the option to kill invasive species exists to resolve a potential problem (Sollund 2022) and goes against any overarching arguments of species justice.

The main consideration remains whether the Colombian authority has the luxury of waiting for the population to drop with the fertility treatment program or does the quicker process of euthanasia need to take place. Given the risks and potential harms connected to the population that has already been reported, in addition to the further increased risk of hippo trafficking when considering the rights of the hippos, the rights of other species and the wider biosphere need to be taken into account. As stated, Colombian law amendment Law 1774 of 2016 recognises the sentience of species and offers special protection to wildlife to have freedom from pain and suffering which is either directly or indirectly caused by human beings. However, if the hippo population is causing harm to species such as with the anoxic water conditions already (Shurin et al. 2020) this raises the question of competing interests, the rights of wildlife, and at what stage do the rights of the environment overtake the rights of individual species.

The strategy more in line with the hippos' interests is the fertility management program being considered. As suggested via the paper Fertility management of the Colombian hippo: Achieving long terms success with a low-cost humane strategy, the program looks to initially use PZP to reduce the fertility of the female population every 8 months with the effectiveness of the drug likely to increase in the future (Animal Balance 2021). Similar strategies have been used or developed in an attempt to control other invasive populations in other states. For example, research into the use of contraceptive bates in rodent populations has been found to be an effective method of controlling pest populations (Shuster et al. 2023). Although being pushed as the strategy that takes into account the interests of the hippos, there are considerable challenges associated with the program from both safety and logistical perspectives.

To begin with, the female hippos need to have the PZP administered via dart gun, which means that this likely needs to take place on land and within range of the hippo for the PZP to be administered (Animal Balance 2021). There are challenges associated with this procedure concerning the safety of those administering the treatment with hippos posing a danger due to their territorial nature, in addition to the estimate that for this program to be effective, 70–80% of female hippos would need to have been given PZP



([Animal Balance 2021](#); [Estes 1992](#)). This poses logistical difficulties due to the exact numbers of hippos not being known creating ambiguity. However, the use of PZP is more in the interest and beneficial than other forms of fertility control such as castration of the males. This strategy involves the sedation of the hippo which must be out of water due to the risks associated with drowning in addition to the possibility of having reactions to the castration with hippos being sensitive to hormonal and chemical changes within the body resulting in the hippo's death ([Dembitzer 2018](#)). With the interests of life being a key argument surrounding the case this does raise concerns; however, in comparison to the alternative, this procedure is far more in line with a species justice approach to species management.

The concern surrounding this approach is the wider harm that could develop from the fertility program that does not immediately serve the hippos' interests. With hippos being a dangerous species, by attempting to lower fertility rates there are significant risks to those involved in the procedure to nearby hippos who are notably territorial in water ([Estes 1992](#)). This would continue to put practitioners at continued risk every 8 months to begin with until more effective drugs are produced, although it should be noted at the time of writing no harm has been reported. Furthermore, regarding the dangers of hippos, with the population not decreasing with this strategy, this would not reduce risks to harm to locals. From an anthropocentric perspective, there are still dangers. In addition, this is an expensive procedure, with costs being reported at around \$50,000 ([Duarte 2021](#)) which has the potential to create a large financial burden on the state. On top of all these risks and associated difficulties, this process would not be a rapid solution and could result in further environmental and human harm in the meantime while the population is being treated.

Additionally, Colombia is reported to house nearly 10% of the world's biodiversity containing a wide array of species diversity with large amounts of various distinct ecosystems ([Convention on Biological Diversity 2023](#)). With evidence being presented that the hippos are causing environmental harm and polluting the Magda River, there is a risk that not reducing their numbers presents the possibility of impacting the biodiversity and putting other species at risk and arguably going against other green crime frameworks of ecological and environmental justice ([White 2008](#)). Arguments have been made to the contrary of suggesting the full extent of the population impacts is not known with there being only a limited number of studies so far, with predictions of the impact of the species being difficult to predict ([Animal Balance 2021](#)). There is an array of evidence that looks at the biodiversity threats and damages done by invasive species; however, these need to be considered on an individual basis as the exact impact of inserting non-native species into an ecosystem is difficult to predict ([Nurse and Wyatt 2021](#)).

Both options of euthanasia and fertility control at points do not fall fully in line with species justice perspectives, and each has risks, harms, and abuse with the options generally being discussed from a speciesism lens. The difficulty surrounding this case is that the hippos, although victims, are causing some harm and could potentially cause more with an increased population. As such, although measures need to be put in place if a more species justice approach is taken in managing non-native species, this could be done to reduce suffering and impact the interests of the hippos in the least harmful way possible. The fertility management program does account for this more species justice approach as, although there are risks attached, it validates the argument of the hippos' interests in life as the risks of harm from this procedure are slim. If further research reinforces the need for immediate species reduction at the risk of wider environmental and species harm arguably by taking this approach, this should be done in the least painful and dignified way possible.

## 7. Species Justice and Invasive Species

From a wider invasive species position, there is a further risk of harm and abuse in how these are tackled. When controlling/removing invasive species, several countries have given citizens the freedom to euthanise them via any means necessary ([Simberloff 2013](#)). Concerning how many animals are killed each year, which species, and the methods used globally, there are no accurate figures ([Inglis 2020](#)). The hippo case discussed

could be seen more as an anomaly due to the nature of the species being a charismatic megafauna garnering more national and international attention than most invasive species cases. Arguably, this has directly influenced the decision-making process such as with the initial stopping of the killings after the outcry surrounding Pepe and the ongoing legal proceedings (Kaplan 2021). However, what is less clear is the wider decisions being made surrounding the majority of invasive species which do not receive this level of attention and whether decisions are being made from an anthropocentric sense of convenience or whether the interests of the species are being considered.

Without having some form of international species rights and a sense of species justice within legal frameworks, this opens up invasive species to potential abuse and harms with there being an array of case studies where harm has been performed onto species under the guise of species management and control (Inglis 2020). For example, in the US, invasive species are being euthanised using a range of practices such as the use of sodium cyanide canisters demonstrating wider use of harmful practices where potentially a species justice approach could have been put in place (U.S. Department of Agriculture 2019). Although it must be acknowledged that there are indicative harms associated with many invasive species, taking into account the interests of non-native species regarding their control would mean the least harmful options would be considered when deciding the fate of nonhuman animals. Furthermore, when an invasive species is threatening the environment, non-human animals, as well as humans, it may at points be a necessary evil to euthanise the species, however, in a way that keeps suffering and pain to a minimum. However, due to the difficulties of predicting the impact a species may have on the local environment (Nurse and Wyatt 2021), at points, it may be difficult to determine future harms until the damage has taken place and as such potential. By reflecting on the current species management strategies used globally to tackle non-native species from human actions through a species justice lens, there is the opportunity to reduce unnecessary harm in addition to considering best practices moving forward.

## 8. Conclusions

This article has considered whether species justice has a role to play in decisions regarding responding to invasive species via the case study of the Colombian hippo population. At the time of writing, a decision has not been made regarding how the species will be managed; however, by the representation of their interests within legal proceedings, broader discussions regarding the rights and interests of hippos have been brought to light. Whereas neither species management strategies are fully enshrined in species justice, the consideration of a fertility management plan does demonstrate at least some movement regarding the rights and interests of the hippo population. Consideration of yearly killings, although certainly not in the interests of the species, if necessary to preserve and protect native species, a more dignified and painless method could be considered.

From a larger species control perspective, due to the harm associated with non-native species in addition to the lack of global guidance and enshrined rights for wildlife, current decisions are more likely to take more speciesism and anthropocentric perspectives. However, such as in the case of the Colombian hippos, although likely difficult to fully take into account the interests of all species, the environment, and humans, by considering non-native species cases from a species justice perspective, the interests and rights of the animal are more likely to be taken into account. Particularly while animal rights are currently not enshrined in international law and clearer guidance is provided by reviewing these cases through a species justice and wider green criminological lens, there is a higher chance of harm reduction approaches to be considered that are in the interest of all parties.

To ascertain the treatment and reaction to wider invasive species globally, it is argued that further research into the legal protections, perceptions, and decisions that are being made regarding the management of non-native species. This should be done through a green criminological lens to widen the general understanding of the treatment of invasive

species, and further decisions could be made to reduce the harm and euthanasia taking place under the guise of species control.

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