Introduction: Critical Animal Studies in an Age of Extinction

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> To allow the term 'extinction' to stand for only the death of the last of a kind is to think within an impoverished notion of 'species,' a notion that reduces species to specimens, reified representations of a type in a museum of life, and in so doing ignores the entangled relations that are a particular form of life.
>
> – Thom van Dooren, *Flight Ways: Life and Loss at the Edge of Extinction*, p.58

In what has been deemed the Sixth Extinction, or the sixth mass extinction event in Earth's history, species are currently going extinct at between one and ten thousand times the natural extinction rate (Ceballos, P. R. Ehrlich, et al.; Ceballos, P. Ehrlich, et al.). Every taxon is in trouble: a third of known invertebrates, amphibian and bird species are at risk of extinction, and a quarter of all fish and reptile species are imperilled. The International Union for Conservation of Nature [ICUN] estimates that half the globe's known mammals are declining in population and a fifth are clearly at risk of disappearing forever. Most of our closest relatives are severely endangered; ninety percent of primates are among those mammals slipping the fastest towards extinction. Insects are some of the primary victims of the current extinction event; an estimated forty percent of insects are currently endangered, which is eight times the extinction rate of vertebrates (Sánchez-Bayo & Wyckhuys 2019). The primary causes of insect extinction are habitat loss due to agriculture and the industry's use of pesticides (Sánchez-Bayo & Wyckhuys 2019; Weis 2013, 2018). Since insects are crucial to food chains, plant pollination, and the recycling of nutrients in healthy soil, their projected demise in the coming decades risks widespread ecosystem collapse. Similarly, while many species of oceanic life are driven to extinction by over-fishing and the saturation of the sea with plastics, anthropogenic climate

change is a major factor because the warming oceans result in the deaths of coral reefs on which all oceanic life depends (Davis 2015; Zalasiewicz et al. 2016). Unlike some animals, plants cannot readily move as their habitats are destroyed; a staggering sixty-eight percent of evaluated plant species are threatened. Plants make up the backbone of ecosystems and are at the foundation of every food chain – it is little wonder biologist Paul Ehrlich warns us 'extinction breeds extinction' (Ceballos, Gerardo et al.). In short, whether on land or at sea, the current wave of extinctions is occurring at the foundations throughout the web of life, and the implication of these losses is catastrophic for biological existence as we know it.

Unlike the previous five mass extinction events, this time, an extraordinarily destructive minority of one species, our own, is the cause. Indeed, current rates of biodiversity loss – rather than climate change alone – is the clearest indication that we have entered a new geological epoch, which geologists are naming the Anthropocene. Although some extinctions are due to human over-hunting, and others are due to the intentional and unintentional introductions of invasive species into ecosystems by human beings, the primary cause of these extinctions is habitat loss. Much of this habitat loss is due to human development of land, such as the clearcutting of rain forests to graze cattle for agribusinesses (Weis, *The Ecological Hoofprint*; Weis, 'Ghosts and Things'). That is not to say that anthropogenic climate change is not another major factor in the current extinction crisis, as witnessed in the 2019 wildfires in Australia. While at least a billion animals were killed directly by the wildfires, many more perished after the fires had passed because the habitats that sustained and sheltered these animals had vanished (Katz). Estimates suggest that three billion animals were impacted by this wildfire event alone and, in many cases, there are no alternative habitats for such animals to turn to (BBC). Although this extinction event continues to be marked by catastrophic eliminations in the web of life, and will have dire repercussions for humans, it remains a relatively rare subject of media, political, and ethical discussion. When taken up by the environmental scientists, meaningful consideration of nonhuman animals often remains absent.

The painful erasures of extinction are often understood as the unintended but catastrophic result of humanist, industrial activities. Anthropocene and extinction studies scholars, such as Simon Lewis and Mark Maslin, Heather Davis and Zoe Todd, Jason Moore, and

Ursula Heise, have argued that racial capitalism and settler colonialism have provided the conditions in which the Anthropocene and its extinctions could occur. Not only have settler colonialism and racial capitalism reordered nature, but they have also directed life in service of capital, fundamentally altering ecosystems and our conceptualisations of animality and social relations. As such, the drivers of mass extinction in the Anthropocene cannot separate humans and animals, despite the very real material differences experienced by and within groups of humans and other animals. Yet, our response to extinctions continues to forward a humanist agenda: we have prescribed a systematic management of life forms in order to ensure the survival of species, but our idea of 'conservation' is often undermined by our irresponsible management of resources. A Critical Animal Studies approach focuses our attention on the fact that both conservation and resource management have embodied and enacted the large-scale structures of violence that have given rise to the current extinction emergency.

Our methods of 'managing' the biodiversity crisis are as bankrupt as the language we use to describe the plummeting of nonhuman life. Scientists often respond to extinction by trying to conserve a species by interfering with and/or removing the animals in question from their habitats, isolating and confining them, and then intervening and directing their reproduction and kinship; scientists even attempt to reverse extinction or revive extinct species from the dead vis a vis genetic engineering and the preservation of genetic material in cryo/biobanking (Dawson 2016; Heise 2016; Kolbert 2014; Laidlaw 2014). According to Irus Braverman, regulating human-nonhuman relations in accordance to classifications of 'at risk', 'threatened', 'vulnerable' or 'critically endangered' is yet another means of creating a binary between humans and other beings. Systems that dehumanise and animalise the ordering of life imbues privilege to some while relegating others into classes deemed killable. Our mapping of 'doing conservation' parallels maps of 'doing security'; categorising entire populations as 'combatants', 'terrorists', or 'civilians' helps rationalize which lives are worth protecting and even potentially resurrecting, and which lives are allowed to be destroyed or to disappear.

Hasian and Muller argue that colonial ontologies of race and species continue to inflect the present day conversationism that ultimately shores up a monopoly on violence, namely the categorizing of life and deciding of who gets to kill or be killed and for what purpose.

Conservation narratives continue to posit that killing in the name of science is necessary and often done in an appeal to loving 'nature', whereas the killing of animals for sport or pleasure is equated with its destruction. This dualism is borne out in Claire Jean Kim's work on the killing of Harambe, a western lowland gorilla, at the Cincinnati Zoo in 2016. Kim has analysed the relationship between anti-Black racism, animality, whiteness and conservation to argue that this relationship determines who remains non-criminally killable – primarily nonhuman animals and Black individuals who have been subjugated because of their historical and ongoing association with one another in dominant Western racial and anthropocentric orderings. This racial and specied hierarchisation of life means that even endangered animals can be killed if they are deemed a threat to human interests, with conservationists intervening only minutes after Harambe's death to extract biological material (such as sperm) that will be used to continue the animal's lineage (Kim). The immediate extraction of reproductive capacities, in conservation terms, is then indexed as 'nature loving' in that his lineage, though not his life, will continue. It is apparent that being up- or down-listed, multi-listed, de-listed or en-listed will translate to how much protection and active governance an individual has right to, whether that be a human refugee, western lowland gorilla or honeybee.

Ursula Heise, Thom Van Dooren, Dolly Jørgensen, Anna Tsing and many other scholars urge us to approach extinction as a cultural object, a sign used to define contradictions, reinforce identities and articulate sociopolitical critiques or consequences. Ursula Heise argues that cultural narratives not only exploit the statistical, biological and political concepts of extinction, but also impose the very values that shape scientific or humanitarian inquiry. Perhaps that is why Extinction Studies is an inherently interdisciplinary approach to the accelerating destruction of nonhuman life; 'a diversity of perspectives' team in this new subgenre of ecocriticism and science studies,

> from stories that immerse themselves in the cacophony of human and nonhuman voices involved in local extinction crises, to theorisations of how the Sixth Extinction transforms ethics, aesthetics, and politics; from research on the biopolitics of zoos and wildlife management, to imaginative creation of knowledge and action in a world mass death. (Donahue 923)

As with Extinction Studies generally, this special issue is comprised of scholarship gathered from diverse and wide-ranging experts: sociologists, geographers, educators, historians, artists, political scientists and those working in cultural, media, literary, film, environmental, and social justice studies.

The first three articles in this issue are characterized by the themes of interdependence and ecologies of extinction. Environmental and literature studies scholar Nathaniel Otjen's 'Economies of Extinction: Labour and Loss in the Longleaf Pine Forests of the US South' bridges critical animal studies and critical plant studies to consider an ecosystem that was once one of the most extensive in North America and among the most biologically diverse in the world, and that has today been decimated by extractive industries. Otjen uses the example of the longleaf pine forests of the southern US to echo the arguments of extinction scholars such as Ashley Dawson regarding the entanglements of extinction with imperialism and capitalism. In the case of the longleaf pine forests, animal and plant extinctions were driven by settler colonialism and racial capitalism, which first removed Indigenous peoples from the ecosystem and then exploited racialized human and nonhuman labour to extract products such as rosin, turpentine and timber for the naval stores industry. In this way, the exploitation of the longleaf pine forests played a crucial role in the construction of vessels that transported human slaves and nonhuman species across the Atlantic. Otjen draws on environmental scholars such as Thom van Dooren and Rob Nixon in stressing the slow violence of extinction, the ecological effects of which on multispecies communities are felt well before and continue long after the death of the final member of a species. As Otjen shows, many life forms and ways of life relied on the longleaf pine, and died or were impoverished in the wake of its decimation. Species losses are thus not isolated tragedies but have cumulative effects.

The planetary decline of seventy-five percent or more in insect biomass since the 1970s should alarm everyone and the civil litigation of pesticides has done more harm than good for those being impacted or destroyed amidst an 'insect apocalypse' (Goulson). In 'The Common Law of Landscape Hostility in the Lives and Deaths of Honeybees', political scientist Caleb Goltz looks at civil lawsuits from the US and Canada to illustrate the way common law and its conceptualisation of property enables our toxic destruction of bees and other pollinators.

Pesticide drift necessitates a change in the way we legally interpret borders around property; landscape-level hostility has thus far been legally permitted by makers and users of neonicotinoids to avoid resultant liability. By analysing accusations of negligence made in *Anderson v. State Department of Natural Resources, Donoghue v. Stevenson, Bates v. Dow Agrisciences* and *Sun Parlor Honey Inc. v Bayer Cropscience*, this essay steers towards potentials of redefining our configurations of property and landscape to better protect bees and other insects. The flow of pollinators, plants, pollen, and pesticides cannot be justly governed under current legal frameworks and this essay urges ongoing negotiations between bordering interests that allow relevant stakeholders to find solutions based on local knowledge and their geo-specific duties of care.

In 'Fostering Refugia amid Unfolding Extinctions', environmental sociologist João Aldeia argues for a reimagined way of being and living that facilitates the recognition of refugia for non-human animals. Building on conditions that fostered survival during past extinction events, the author conceptualizes refugia as sites of geological and ecological importance that allow species to continue living and practicing their social and cultural norms, until the conditions of life on the outside are not hostile to their survival. It is not the case that all members will survive, but that they can continue living until it is safe to re-emerge and repopulate. Aldeia is clear that refugia must not be made, for the simple reason that they already exist. Refugia must however be recognized and not encroached upon by capital's practices, including resource extraction, industry, deforestation for animal grazing and monocrop agriculture, commercial fishing and hunting, waste disposal, tourism, and commercial transportation. Aldeia concludes by suggesting a non-Cartesian political ecology that thinks together Tsing's work on Holocene resurgence and refugia and Agamben's call to recenter political philosophy around the figure of the refugee.

The next three articles in this issue explore the end-game politics of extinction. Multispecies justice scholar Darren Chang and sociologist Lauren Corman's contribution, 'Colonialism, Domestication, and Extinction: A Pre-Mortem for Our Ecological Futures', diagnoses the conditions of our current extinction event with a view to correcting and righting our perilous and catastrophic trajectory. The authors do this by interrogating the relationship

between colonialism and animal agriculture, and attend specifically to the notion that current scholarship and popular attention about extinction continue to categorize farmed animals as 'governable waste' rather than those from whom we can and should learn. Their positioning of domesticated animals as teachers is a call to two re-imaginings, 1) for humans to embrace (our) animality; and 2) to undermine the colonial human-animal dualism and the practices driving extinction that it authorizes. As such, their premortem is a call to change how we live and consume in an attempt to preserve biodiversity, non-human others, and, as a consequence, ourselves.

Socio-legal scholar Kelly Struthers Montford's 'Prison Zooing and Conservation: Human and Animal Caging in a Time of Ecological Catastrophe' considers recent conservation and sustainability programs occurring in US prisons. The article examines the Stock Island Prison Zoo in Florida and Sustainability in Prison Programs (SPP) operating in US institutions. Whereas the Stock Island Prison Zoo integrates some zoo and sanctuary practices, SPP programs often run in partnership with zoos and other government agencies. Given the historical and ongoing similarities between the zoo and the prison, Struthers Montford argues that programs such as these could mark the next historical era in zooing in which the prison positions itself as an ecological saviour, while at the same time effacing the prison's role in causing human, animal, and ecological extinctions.

In the 'The Violent Narrowing of Animal Life', political ecologist Tony Weis observes how environmentalists have historically focused on the conservation of large charismatic wild mammals while remaining silent on the welfare and environmental impact of the farmed animals whose numbers have surged in the same decades that biodiversity has plummeted. As Weis notes, this has recently shifted with greater awareness of the role of animal agriculture as a primary driver of climate change and environmental pollution, and of its inefficiency in terms of land, water and energy use. Although this awareness is in some ways invaluable, Weis cautions that it risks contributing to the already extraordinary poultrification of global livestock, as consumers wishing to lessen their carbon and environmental footprint shift not to plant-based diets but to the consumption of chicken rather than beef. As Weis observes, while poultry production may have lesser climate and environmental impacts than beef, dairy and even pork, it

is nonetheless far worse than plant-based diets in these regards and, like all animal agriculture, is a mainspring of the current extinction event. Moreover, Weis underscores, the global poultrification of livestock is disastrous in terms of animal welfare, with ever more sentient animals living in deplorable conditions and experiencing slaughter. Consistently juxtaposing the defaunation of wild animals with the interrelated *commodifaunation* of agricultural animals, Weis urges environmentalists not only to emphasize disparate climate impacts and degrees of efficiency of different agricultural products, but also to make vivid the ways that contemporary poultry production is a source not only of extinction but of constant agony for nearly unthinkable numbers of animals.

The next two contributions to this issue concern the science and technology of de-extinction, also known as species revivalism or resurrection biology. In 'No Going Back: Unfixing the Future of De-extinction', education scholar and artist Jessie Beier observes that, given the tragedy of the current extinction event and human culpability for it, de-extinction may seem to be something that we cannot be against, particularly when it is framed as a way not only of resurrecting lost species but of healing ecosystems and reversing climate change. As Beier asks, does opposing de-extinction mean being *for* extinction? On the contrary, Beier demonstrates that de-extinction is in fact a corporate enterprise intent on patenting life deemed economically valuable and expanding human mastery over nature. Species revivalism is an example of a 'Good Anthropocene' discourse, Beier argues, which sees the current ecological catastrophe as evidence of human exceptionalism and an invitation to exercise further control over the more-than-human world. De-extinction corporations engage in messianic discourses regarding our moral obligations to remake the dead but are heedless of the harms they inflict on experimental animals and would impose on the (unconsulted) Indigenous communities into which they would introduce proxies of species such as thylacines. As Beier writes, de-extinction does not call into question the colonial, capitalist and human supremacist structures of control and consumption that have led to climate change and defaunation, but would rather expand human domination and exploitation of nature further, thus characterizing as a solution what is in

fact the problem. While de-extinction corporations do not entertain the possibility of human extinction, in closing her article Beier considers what resisting de-extinction looks like, including accepting the end of humans.

The informal dialogue on 'Rhetorics of Species Revivalism and Biotechnology' contextualises and explores contemporary practices of nonhuman animal gene-modification in de-extinction projects. Environmental geographers Charlotte Wrigley and Adam Searle, sociologist Richard Twine, and interdisciplinary scholar Eva Kasprzycka illustrate recent developments in biotechnology's role in de-extinction sciences and industries to scrutinise the neoliberal impetus driving 'species revivalism' in the wake of the Capitalocene and mass extinction. Looking at hybridized animals re/produced in projects aimed at restoring extinct animals and ecological niches, these interdisciplinary scholars map some of the necessary restructuring of conservation policies, investments and enterprises that could secure viably sustainable and just futures for nonhuman animals at risk of extinction. The authors question what alternatives are being ignored in the wake of technoscientific responses to the climate emergency and interpret the motivations, tactics and tools that team together in commodifying nonhuman animals down to the cellular level. In examining techno-optimism, rewilding initiatives and species integrity, the authors break down the current politics and praxis that structure forms of life invalidation across taxonomies of extinction. Coupling 'species' with 'extinction' uncritically has led to problematic approaches in de-extinction trajectories – ones that are facilitated and driven by the pursuit of profit, quick fixes and returns on investment. Drawing from her fieldwork at the Pleistocene Park in the Russian Arctic, Wrigley illustrates how the cryopolitical control over death is more closely oriented towards a conservation of time, rather than a conservation of species. Informed by his fieldwork in the Pyrenees where he studied the cloning of the extinct bucardo, Searle's interest in the animation and suspension of genetic material delineates some of the biocultural significances rife in the current extinction crisis. The experience and insights of these two critical geographers help reimagine worlds beyond the hubris of techno-scientific promises to situate extinction not as an ending, but as a becoming. An expert in the politics of nonhuman animals repurposed into biotechnologies, Twine explains how a systemic fight for land rewilding and against corporate expansion can

emerge alongside a greater transition to plant-based diets and as a wiser alternative to resurrection biology. Finally, Kasprzycka delineates how the instrumentalization of nonhuman animals in science carves a path to their instrumentalization in capitalist modes of production in ways that are unique to the 21st century. By acknowledging messier relations that form within endangered ecologies and nonhuman cultures, this dialogue offers alternative and localised strategies for how environmental governance addresses the climate and biodiversity crises today.

The final three contributions to this issue concern the representation of extinction. Film scholar Alex Ventimilla's '"It's about Us": Extinction, Contradiction, and the Mourning of Modernity in *David Attenborough: A Life on Our Planet*' makes a case for the political and cultural significance of eco-documentaries in confronting the current mass extinction event, a genre that has been largely ignored or even dismissed by extinction studies scholars. Given their popularity on streaming services such as Netflix, and their ability to reach and affectively impact wide audiences, Ventimilla compellingly argues that such films demand our critical attention. As a case study, Ventimilla considers what is perhaps the most influential eco-documentary on the Sixth Extinction, *David Attenborough: A Life on Our Planet*, as exemplary of a number of contradictions in popular representations of mass extinction. Although *A Life on Our Planet* is heavy-handed in its use of emotional devices – for instance, melancholic soundtracks and protracted closeups of Attenborough's pained face as he expresses grief for the lost biodiversity of his youth – Ventimilla argues that the film remains invested in a rationalist view of humans as distinct from and masters over nature. Moreover, Ventimilla argues that it is the human masters for whom the film ultimately grieves, or what the loss of nature will mean for us. This 'us', Ventimilla moreover shows, is not all humans, but the technologically advanced culture of the modern West. It is this culture that Attenborough ironically hopes to preserve by fighting biodiversity loss, although it is this culture that is the root cause of the current extinction event.

The second roundtable conversation in this issue, 'Sites of Cultural Production Responding to Mass Extinction', concerns art and art history's capacity for provoking engagement with and action towards species loss. Drawing from her fieldwork in Artic Russia's Pleistocene Park, Canadian artist Tara Nicholson guides this discussion between the influence science has on artmaking, extinction research and its representation, defining nonhuman animal

life and new vocabularies for our kinship with other-than-human life. Environmental humanities scholar Stephanie Turner's expertise in the rhetorics of science and technologies neatly ties visual cultures to meaningful engagement and action towards addressing the catastrophic loss of biodiversity. From an art historical perspective, EvaMarie Lindahl connects museum practice and artistic research to forms of embodied knowledge that promote public awareness surrounding the acceleration of species extinction. Historical naturalist illustrators, the 2010 Deepwater Horizon oil spill, Rosa Bonheur and other artists' works are examined to unsettle dominant historical and political narratives to enrich our understanding of Timothy Morton's 'hyperobjects' as well as Horst Rittel and Melvin Webber's conceptualisation of 'wicked problems'. Our perceptual abilities are inadequate tools in comprehending larger-than-human-life phenomena, such as global warming and mass extinction, and these authors illustrate how such shortcomings have direct bearing on representational practices. Better yet, this discussion provides insights and examples of how art, as a form of storytelling, can overcome these limitations to better spur mobilisation and action against the anthropogenic biodiversity crisis.

Last but not least, in their lucid, entertaining and critical review of Otto Brockway's debut documentary, *Eating Our Way to Extinction*, feminist environmental humanities and critical animal studies scholar Melissa Plisic pays keen and necessary attention to the way straw person arguments against veganism are addressed throughout the film. *Eating Our Way to Extinction* takes on the most common points of contention for those opposed to plant-based living: the sustainability of pescatarian diets, the nutritional deficiencies in vegan diets and soy and/or other plant-based proteins causing deforestation and greenhouse emissions in scales comparable to animal agriculture. Considering their widespread use in omnivorous rhetoric, these rebuttals are obviously worth addressing, but Plisic takes issue with the *way* these fallacies are countered. Lost opportunities and methods of persuasion are closely dissected from a cultural studies perspective to clearly uncover the individualist and anthropocentric motivations upon which *Eating Our Way to Extinction* thrusts its attack on what-about-isms. Taking a meta-analysis of the film's distribution and availability furthers this review's strengths in promoting collective solidarity and movement-building over consumerist and egocentric incentivisation for adopting vegan principles. A vegan themselves, Plisic presents a timely learning opportunity to look closer at how the social justice demands of veganism are more effective in transforming one's relationships with plants, other animals, and the rest of our kin than swapping out items in one's grocery list.

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