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The Geographies of extinction: Exploring the spatio-temporal relations of species death

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Abstract

This is a paper about extinction, geography, and the geographies of extinction. The emerging field of extinction studies has brought a vibrant corpus of interdisciplinary scholarship that destabilises static notions of 'species'; traces the spatiality of death and violence in conservation contexts; and raises important political and ethical questions regarding what and how forms of life are lost, saved and valued. Such work offers an unsettling counter to the biopolitical tendencies of contemporary conservation discourse and understandings of extinction in terms of final, singular death. Instead, extinction studies emphasises the contingent and situated character of life's forms, and the processes by which these are, often slowly, severed and detached from place. Political ecology and geography bring an attention to the politics of extinction by proposing that we reckon head on with the destructive outcomes and processes, which have played out over the world history of capitalism, and seem to have reached a crisis point in what Jason Moore has termed 'the Capitalocene'. In this paper, the authors draw upon research in diverse contexts – concerning the conservation of ospreys on Speyside, Scotland, and trans-border marine conservation in Mozambique –as a lens through which to demonstrate the multiple ways in which extinctions are 'placed'. These are: firstly, an attention to geographical contingency of 'wildlife' under threat from extinction; secondly, the multiple, overlapping and discordant political and economic geographies of violence, death and attempted (necessarily partial) protections through which extinction unfolds; and thirdly, the geographies produced as a result of extinction, be they blasted, spectral or sites for life amidst ruins.

Keywords

Extinction studies, more-than-human geographies, place, political ecology, conservation.

Introduction

In 1959, a breeding of a pair of migratory, fish-eating raptors settled on a Scots pine near Loch Garten, on Speyside in Scotland, UK. These ospreys (*Pandion haliaetus*) marked the definitive 'return' of their species from a national breeding extinction[1] declared in 1916. Once a familiar sight at many highland lochs during the late-eighteenth and early-nineteenth centuries, the accounts of travellers, writers and artists portray their presence as animating of a wilder, picturesque scene.[2] However, with increasing human persecution at nest site, and to and from their west African wintering grounds, the osprey became one of Britain's 'rarest breeding birds' by the mid-1800s.[3] Unable to raise young, maintain an eyrie[4], or find a mate, the spectral presence of a few lonely birds haunted former Scottish breeding locations in the closing decades of the nineteenth-century before their eventual disappearance from the list recorded British breeding birds.

When the species began to recolonise the forests of Speyside in the 1950s, the Royal Society for the Protection of Birds (RSPB) made a concerted effort to locate and guard any nest sites against possible human disturbance. Their eventual success at Loch Garten via what became known as 'Operation Osprey', saw the site open to accommodate a viewing public. The society's efforts – exemplary of the militarised 'save the species' missions that saw many ex-servicemen apply their skills to, and find recuperation in, conservation activities and objectives[5] – are widely celebrated as a triumph of modern, organized species protection.[6] Tourists and birders alike would flock to view the ospreys at Loch

[1] The osprey was declared extinct as a breeding bird in the UK, however migrants en route to and from their breeding grounds in Norway would occasionally be sighted.
[2] Beattie, *Scotland Illustrated*
[3] Gray, *The Birds of West of Scotland*
[4] A term for the nests of large raptors, typically situated on a tree, cliff or rocky precipice.
[5] See in particular Adams, *Against Extinction*; Davis, 'Militarised natural history'.
[6] Lambert, Contested Mountains.

Garten, cultivating a level of enthusiasm for their plight whilst allowing other returning pairs to nest in (relative) peace.

Fast-forward five decades, traverse some 6,000 miles. In 2009, the Ponta do Ouro Partial Marine Reserve (PPMR) was created in Mozambique by the Peace Parks Foundation and the national government to protect marine habitats and lives off the southern Mozambican coast. A 265km^2 reserve, it comprises part of the larger Lubombo trans-frontier conservation area (TFCA), linking five land and marine national parks across Mozambique, South Africa and Zambia. TFCAs are controversial models in which multiple parks are linked across national boundaries to create vast conservation areas, and they represent competing conservation paradigms that draw on historical and contemporary ideas of how nature should be 'saved'. The ostensible goals of a TFCA are three-fold: to create rich bioregions and reunite populations of charismatic megafauna; to boost regional development through tourism and investment in tourist infrastructure; and, to promote international political relationships and reunite borders artificially drawn by colonialism. They are ecologically and politically ambitious, and have been critiqued as neoliberal policy experiments in environmental governance.[7] TFCAs are funded and managed by non-state philanthropy organisations funded by private investment, making them democratically unaccountable, hearking back to old 'fences and fines' conservation models of the 1950s and 1960s but updating this for a neoliberal era.[8] The creation and management of the PPMR has a neoliberal logic whereby conservation is conducted in reference to a marketised and spectacular nature.[9] Under this logic, scarcity is good for the business of conservation, while simultaneously, successful conservation depends on promoting markets for protected natures.[10] However, they also include commitments to community development, as seen in natural reseource management approaches of the 1980s and 1990s.

[7] Büscher, *Transforming the Frontier*
[8] Duffy, The potential and pitfalls of global environmental governance
[9] Igoe, Neves & Brockington, A spectacular eco-tour around the historic bloc
[10] Büscher *et al.*, Towards a synthesized critique of neoliberal biodiversity conservation

As well as repackaging old ideas about conservation into a neoliberal model, TFCAs are also about managing particular spaces to meet conventional conservation goals, articulated in terms of levels of biodiversity and population numbers. The PPMR is home to a great variety of charismatic marine animals, including newly-discovered nudibranchs (small, colourful sea slugs), nesting leatherback turtles, and resident schools of hammerhead sharks, which – alongside other passing ocean-dwellers like the tiger shark, great white shark and humpback whale – hover over the submerged peaks of the Pinnacles, some 40 meters below the surface. The reserve also features rare endemic plants, holding together some of the largest vegetated sand dunes in the world. Tracing how species, individually and as ecosystems at multiple scales figure in the conservation discourses of the reserve reveals how the notion of extinction, its prevention, or its inevitability, looms large in practices of conservation management. Considerable resources and efforts are invested in the PPMR (and elsewhere) in relation to the measured viability of different populations of creatures. In the biopolitical calculations shaping marine protected areas in Mozambique, strategic decisions are made over which habitats and lives to protect, or sacrifice, in the face of advancing development and to manage the demands placed on particular charismatic and spectacular 'natures' by the neoliberal conservation model.

Though these examples evoke markedly different spatio-temporal and political contexts, together they illustrate our shared concerns with the actual (or potential) cessation of particular, locatable ways of life; the geographies through which losses occur, or are resisted; how such ecologies are co-produced by capitalist processes; and those 'natures' and landscapes that result. Each story, therefore, narrates and evokes the spectre of *extinction* – the terminus of an intergenerational assemblage of being, situated amidst a particular spatial, cultural and environmental context[11] – and the attempts (human or otherwise) to mitigate and respond to this process, *in place*. Knotted together within each example are questions

[11] van Dooren, *Flight Ways.*

about the specific nature(s) of animal lives and their lived, relational ecologies in place: emergent, contingent and unruly in both capacities and forms. The trailing threads of extensive social, economic and political structures of inequality and dominance are in play too, serving to marginalise and degrade both humans and other beings alike across a diverse range of scales, places and times.[12]

This paper reflects our desire to hold onto *both* the intensive and extensive character of ecologies; encounters with, and wider structures of, violence; specific communities of ospreys and the nebulous constituents assembled in and overflowing the boundaries of a marine reserve. Therefore, building on and continuing the contributions of other geographers to the conversations of the environmental humanities, we seek to do two things here.

Firstly we foreground and advocate for a sense of the *explicitly geographical* within scholarly discussion around the topic of extinction, amidst and beyond the environmental humanities. We, emphasise the *place-specific nature of extinction* across multiple levels by elaborating three (among doubtless many) registers for *placing extinction*. These we characterise, in turn, as: *extinct* geographies; *extinction's* geographies; and geographies *after extinction*. Each offers a lens, foreground different elements of interest within a broader concern with what we tentatively characterize as 'geographies of extinction'.[13] We draw upon existing scholarship in interdisciplinary geography and environmental studies to demonstrate how an attention to place provides a deeper understanding of extinction. This is, therefore, to advocate for an explicit political ecology of extinctions-in-place, recognising the material and spatial alongside the political, economic, cultural and social in world making, and, conversely, in world-breaking.

[12] Haraway, 'Anthropocene, Capitalocene, Plantationocene, Chthulucene'.
[13] Garlick, 'Cultural geographies of extinction'.

The character of what counts as 'geographical' scholarship is a subject of much debate. Scholarship within the discipline, inflected by the praxis of science studies, continues to wrangle with this question. Necessarily, one's definition of geography must include certain approaches, lineages and scholars, whilst excluding others, and this is not the place to re-hash these lengthy discussions. Here, therefore, we take a fairly catholic view of geography that begins from two key conceptual starting points. Firstly, we embrace the field's contemporary emphasis of the relational constitution of space/place as a fundamental register of existence; affecting of, and affected by, the interplay of more-than-human actors, agencies, forces and processes, including, but not limited to, the ways in which capitalism co-produces spaces and natures.[14] Secondly, and relatedly, our understanding of geographical praxis builds from Deleuze and Guattari's assertion that geography seeks to 'wrest history from the cult of necessity in order to stress the irreducibly of contingency'.[15] In other words, a geographical perspective emphasises that *where* things happen matters fundamentally for making sense of *how*, *when* and *why* they happen. Thus, our approach to extinction necessitiates putting the specificities of extinctions in their place.

The second, broader aim of this paper is to capitalise upon the promise of the environmental humanities as a site for interdisciplinary conversation and exchange, to which geographers are active contributors.[16] Bringing our own research interests together, we add to ongoing conversations concerned with how the ambitions of political ecology might be usefully combined or held in productive tension with the conceptual contributions of relational (or 'posthumanist') scholarship.[17] We interweave these approaches, and demonstrate their creative application and overlap, by way of selected empirical

[14] See in particular Massey, *For Space*; Whatmore, *Hybrid Geographies*; Smith, *Uneven Development*
[15] Deleuze and Guattari, *What is Philosophy?*, 96.
[16] Rose *et al*, 'Thinking through the environment'; Castree, 'The Anthropocene and the Environmental Humanities'.
[17] See in particular the work of Margulies and Bersaglio, 'Furthering post-human political ecologies'; Menon and Karthick, 'Beyond human exceptionalism'; and Srinivasan and Kasturirgan, 'Political ecology, development and human exceptionalism.

examples drawn from our individual work into the history of Scottish osprey conservation and the management of the Lubombo Transfrontier Conservation Area in southern Africa, respectively.[18]

In recent years, the interdisciplinary milieu of the environmental humanities has provided a home for the array of scholarship emerging around the subject of extinction. This is perhaps unsurprising given the field emerged, in part, out of increasing engagement on the part of humanities scholars *in general* with the nebulous debates surrounding 'the Anthropocene'.[19] If there is a central thread running through the environmental humanities it is a consistent attempt to address, in some form, 'the fundamental questions of meaning, value, responsibility and purpose' that arise in relation to living on a planet undergoing profound transformations by (some) human hands.[20] Most crucially, advocates argue, to properly grapple with the challenges we now face, environmental research requires both 'a more extensive conceptual vocabulary', and to rethink the exceptionalism of the human.[21]

Simultaneously, and with some overlap, political ecologists deploying eco-Marxist theory have highlighted extinction as central to the uneven, lurching expansion of capitalism across time and space, arguing that at the core of different 'capitalisms' remains the ongoing transformation of socionatures for profit.[22] Capitalism is driven by the appropriation and transformation of untapped resources into value, with periodic crises forcing expansion and the exploitation of novel frontiers. The global economy (in its many historic permutations) is understood as an engine of biodiversity loss, folding human and non-human lives into colonial, imperialist and globalising economic structures[23].

[18] With regards the former, research into the historical geographies of the Scottish osprey has been largely archive based, involving visits to access collections and resources held variously by the RSPB, National Museums of Scotland, and National Library of Scotland. In addition, many contemporary published accounts were available online (via archive.org or GoogleBooks). Finally, visits to key sites on Speyside, including Loch an Eilein and Loch Garten, also comprised part of this 'archival fieldwork'.[18] The latter research project, into marine conservation in southern Africa, is largely informed by participant observation and interviews with key stakeholders carried out *in situ,* within Mozambique, between October 2013 and May 2014.
[19] See Castree, 'The Anthropocene and the environmental humanities'.
[20] Rose *et al*, 'Thinking through the environment', 1.
[21] Ibid, 2.
[22] Peluso, 'What's nature got to do with it?'
[23] Moore, 'Transcending the metabolic rift'

Extinctions (conceived, in line with extinction studies, as non-linear lurching extinctions of ways of life) of humans, nonhumans and, moreover, the life-generating capacities of the biosphere become the near-inevitable outcome of capitalism's fundamental drive to exploit new frontiers.[24] At the same time, such crises themselves become opportunities for neoliberal environmental governance experimentation and the creation of new markets based on ecological scarcity.[25] As geographers demonstrate, then, the historical geographies of extinction shadow those of capitalism in its past and present permutations; from colonial (more-than-)human exterminations, to the contemporary and historic production of new 'cheap natures'.[26] In placing extinction, we hope to keep hold of these complexities by way of an attention to extinctions' 'politics of location',[27] attentive to the plural 'we' experiencing, and causing, the threats of destruction.

Ultimately, in writing about animals on the edge of extinction, we are making claims about what matters, where the violence occurs, and how we might respond to it. We suggest that such claims are inherently about places. In recent years, Donna Haraway, Audra Mitchell and Bruce Erickson have argued that such statements about the future shape which stories we tell about the world and what we conceive to be possible in terms of response.[28] Equally, we assert that it matters which *places* serve as the basis for such stories. We advocate attending to environmental loss by way of situated 'extinction stories'[29]; both as a 'way into [the] complexity' of ecological crisis on the ground, and as a means to question what kinds of narratives come to underwrite broader conceptions of the human-ecology relationship.[30] Crucially, we do so in a way that foregrounds geographical contingency, liveliness, and politics.

[24] McBrien 'Accumulating extinction'
[25] Smith, 'Nature as accumulation strategy'
[26] Moore, *Capitalism in the Web of Life*
[27] Braidotti, *The Posthuman*, 88
[28] Erickson, 'Athropocene futures'; Haraway, *Staying with the trouble*; Mitchell, 'Revitalizing laws, (re)-making treaties'.
[29] van Dooren, *Flight ways*, 8.
[30] Heise, 'The environmental humanities', 29.

Over the following sections, we elaborate each of our three registers for 'placing extinction' in turn: extinct geographies, extinction's geographies, and geographies after extinction, illustrating each with reference to the case studies introduced above. Finally, in concluding, we emphasise the specific contributions that such a commitment to 'placing extinction' offers the burgeoning field of 'extinction studies'.[31]

Extinct Geographies

What is it that conservationists want to save? What do we stand to lose when a form of life ends? As Charis Thompson argues through her work examining the ontological politics of elephant conservation in Amboseli National Park, Kenya, and we hope we also illustrate in case studies, such questions are often much harder to answer in practice.[32] Multiple ontologies of nature, and complex human-nonhuman relations, inevitably enter the fray. There is a fraught politics to the questions of *what* stands to go extinct; what kinds of 'natures' matters in the face of extinction; and the onto-epistemology of *absence.* Depending on how these matters are resolved, the manner in which conservationists, politicians, scientists, members of the public and others act to 'save' certain forms of life, in certain places, and judging them to be 'at risk' (or not), differ greatly.[33] After all, 'endangerment' reflects the outcome of biopolitical logics. It is enacted through a whole range of ethical, political, economic and cultural practices of 'triage'.[34]

[31] For an overview of this field see: Rose, van Dooren and Chrulew, *Extinction studies.*
[32] Thompson, 'When elephants stand for competing philosophies of nature'
[33] For a sense of recent geographers' writing on this issue see: Beirmann and Mansfield, 'Biodiversity, purity and death'; Braverman, *Wild Life*; Hennessey, 'The molecular turn in conservation'.
[34] Pooley, 'Endangerment'.

Many working within the field of 'extinction studies' argue that biopolitical conservation discourse, organised around the bounded entity of 'species', often "fails absolutely" to grasp the full extent of *what* is lost, both by humans and others.[35] Within such a conceptual framework, attention shifts towards the relational constitution of life over assumed essential properties. Thus, any notion of autonomous species is rendered "unavailable to think with".[36] The species, as Haraway argues, is "neither singular nor plural".[37] Rather, a multiplicity of different forms of contingent beings, it cannot be understood outside of situated relations with others (including humans). Extinction, from this relational standpoint, then, captures a particular kind of reverberating death: the loss of *a way of life*, understood as a cross-generational, cross-being assemblage. Extinction entails a suite of *collateral losses*: the affordance of forms of perception, the availability of creatures to 'think with' in symbolic terms, the foreclosure of potential, future ecologies or communities to name but a few.[38] Whether the extinction in question concerns a particular kind of animal, form of language, or cultural practice, there is a sense that some means of making sense of the world, and making a home within it, has been lost.[39]

To begin, therefore, we argue the need for specifity and attention to what we term '*extinct geographies'* when seeking to understand the geographies of extinction. By this term we mean, the place-specific ecological relations, assemblages and/or entities that are conceived to be at risk, as well as those which are actually lost. We do so by way of two empirical vignettes, concerning transfrontier marine conservation in Mozambique; and osprey conservation in Scotland, respectively.

[35] Van Dooren, 'The Pain of Extinction', 272.
[36] Haraway, *Staying with the Trouble*
[37] Haraway, *When species Meet*
[38] Smith, 'The extinction of community'; Yusoff, 'The Aesthetics of Loss'
[39] K David Harrison examines the extinction of language as the loss of a means of making sense of worldy phenomena, and argues that such 'cultural extinctions' equally entail the loss of a particular form of life (Harrison, *When Languages Die*).

Threatened Geographies

The unravelling of marine life along the southern Mozambican coasts is deeply complex. In conservation policy circles, it is commonly attributed to subsistence livelihoods, particularly the use of certain types of fishing gear, overuse of coastal resources, and the historic poaching of turtles (along with coastal construction for hotels, private homes and businesses).[40] However, information about the impact of coastal livelihoods on marine life is rather patchy, and other issues such as industrial fishing, illicit shark finning, industrial pollution, marine gas extraction and climate change, and legacies of the independence conflict in which fighters based themselves in national parks, are all contributing to the alarming depletion and contamination of ocean resources in Mozambique (interview with MICOA official, 14 May 2014). In order to facilitate development interventions, the complexity, multi-scale and multi-temporal unravelling of life must be parsed into solveable 'problems' with achievable 'solutions': enter the 'win-win' discourse of the TFCA, and its focus on managing conservation through biopolitics. [41]

As Srinivasan observes, conservation relies on mitigating and managing trade-offs, for both humans and animals, within a biopolitical "bandwith of the acceptable", sometimes permitting harmful interventions in the name of a greater good.[42] Multiple examples of permissible harm and care were recorded during participant observations within the reserve. For example, the potential harms to resident dolphins from tourism are managed by permitting only a limited number of licensed operators, abiding to a code of conduct. However, harm and discomfort still result from such interactions, despite the efforts of the majority of humans involved. The price paid by individual dolphins, harmed or distressed by boats, or else pushed out of preferred shallows, is justified since the ecology to be saved is understood

[40] Ponta do Ouro Partial Marine Reserve Management Plan, 2011.
[41] Büscher, *Remaking the Frontier*
[42] Srinivasan, 'Caring for the collective', 507.

to span the reserve *as a whole.* Thus, rationalised in terms of securing a particular assemblage of 'biodiversity', the welfare of individual dolphins or their social groupings, are sacrificed within calculations of 'allowable harm'. These calculations underpin the spatial arrangement of the reserve, wherein specific reefs are likewise rendered 'sacrificial' in order that the damage caused by careless scuba divers is contained within specified areas.

Humans, too, are excluded and marginalised by the same spatial logics of violent care that are inflected through the particular geographies and places *where* life will be secured. The lived geographies of protected elephants, lions and other creatures, do not neatly correspond to national boundaries.[43] The reserve has driven the planned relocation of several communities, enabling the removal of fences between South Africa and Mozambique and to facilitate reqilding and game restock programs. The goals of these programs are to reunite artificially separated communities of animals, but also to produce a more appealing tourist experience by way of increased numbers of charismatic animals that range across larger areas of 'wild' land. This is about both harm and care. Undoubtedly, economic and structural considerations of development (particularly a shift in the economy of the area towards eco-tourism) are driving the human evictions, the marketization of certain natures, and the shift towards animal reunification through corridors and rewilding projects. Considerations over what is to be saved from harm in turn drive the rearrangement of particular more-than-human places. The political and moral implications of this are unclear. This shift to considering the autonomy and wellbeing of specific (in this case, charismatic and lucrative) animals and ecologies in place, necessitates a reckoning with the harm caused by such interactions with human populations.

[43] The geographer Lulka ('Stabilizing the herd') deploys a Deluezian conception of life as immanent and open-ended to emphasise the shift towards conservation protocols that instil the need for 'migration corridors' and accommodate the mobile lives, such as those expressed by American bison. Likewise, Timothy Hodgetts has emphasised the importance of the concept of connectivity within contemporary ecological management in this journal ('Connectivity'), and in collaboration with Jamie Lorimer in a consideration of 'Animals' mobilities'.

This brief example from Mozambique highlights the potential conflict between animal and human well-being around claims to place, and the competing geographical ambitions of conservation. In taking animal autonomy and individual well-being seriously, at the same time as we abandon human exceptionalism, we must also reckon with the dilemmas and contradictory claims that arise.[44] Whose autonomy and life-in-place matters more when marginal human and non-human communities come into conflict?

Given the impetus within relational, posthumanist and political ecology literatures around the need to specify the *nature of that which is lost* through processes of extinction driven by the expansion of capitalism , an attention to extinct geographies might also emphasise the particular kinds of place-ecologies at stake in terms of their more beastly, lived, affective dimensions. That is, that the place attachments and 'cultural' behaviours of animals are themselves worthy of ethical attention[45], especially regarding why – and how – particular nonhuman lives come to matter (or not) in socio-cultural and political contexts. Recent work within more-than-human geographies (and beyond) has done much to emphasise the spatial dimension of ecological difference. The refrains of migration are one example whereby particular communities of animals (often birds) share and maintain a lived fly-way across a combination of roosting, wintering and feeding haunts, animating sites and facing varied degrees of vulnerability *en route* depending on the season. The consequences of violence in one place reverberate through the migratory assemblage, generating absences elsewhere.[46] Equally, specific places become key locations amidst animals' unfolding biographies, maintaining social, or intergenerational,

[44] Srinivasan and Kasturirangan, 'Political ecology, development, and human exceptionalism'
[45] This kind of attention has been notably paid within van Dooren and Rose's problematising of the concept of 'habitat', in favour of more convivial 'inhabitancies' ('Storied places'); the work of Lorimer, Hodgetts and Barua in elaborating a theoretical understanding of 'animals' atmospheres' ('Animals' atmospheres'); and in Garlick's elaboration of 'animal cultures', which in part informs this paper ('Cultural geographies of extinction').
[46] See for example Reinert, 'The landscape concept as rupture'; Whitehouse, 'Loudly sing cuckoo'.

connections with particular areas.[47] A second example from our research explores the value of paying this kind of attention to place when telling extinction stories.

Avian Places

It can be argued that in the nineteenth-century Scotland's community of ospreys, nesting around numerous northern lochs in the north and west highlands, shared a distinct *cultural geography*. That is, a locatable 'way of life', characterised by a common adherence to specific nesting 'traditions' that saw them occupy sites with the specific features of being prominent, rocky outcrops or ruins, often near water.[48] In turn, their particular existence during this period knotted them into particular configurations – of violence and care – with a variety of human agents. Recognising such extinct geographies becomes important, not merely to afford expressions of such animal difference with ethical significance, but because of what they can reveal about how particular species meetings are made more or less possible under particular historical and geographical conditions.[49]

As a species demonstrating a strong tendency for 'natal philopatry' or site fidelity, as male birds often return to breed amongst their natal haunts upon reaching maturity, ospreys are palpably charmed by place. In addition, the birds appear demonstrably to prefer those nesting sites echoing the characteristics of the eyries from which they fledged. Numerous ornithologists and ecologists remark on this capacity of ospreys to become 'imprinted to area,' allowing particular 'nesting traditions' to cohere amongst distinct regional communities of birds. Older individuals tend to return annually to maintain their nests

[47] van Dooren's work on the penguins of Sydney harbour notes the importance of recognising animal ties to place, and the violence that occurs through such ties being ignored or not included within conservation and planning considerations (*Flight ways*); see also the work of van Patter and Hovorka, on the feline geographies of Ontario and the ways in which cats make and invest significance in place ('Of place', or 'of people'')
[48] Garlick, 'Cultural geographies of extinction'.
[49] Hinchliffe, 'Where species meet'.

and reunite with a mate, until they are eventually usurped and their sites colonised by subsequent generations. As one of us has argued elsewhere,[50] we might characterise the form of osprey life particular to Scotland in the nineteenth century by virtue of the birds' geographical 'orientation', in Sara Ahmed's phrasing. That is, a communally shared affective recognition and attachment towards particular kinds of 'sticky' nesting environments[51]: specifically, rocky outcrops or ruined human structures, chosen at times, it seems, in preference to other suitable tree sites of the kind utilised most commonly today. This orientation, shared across a particular community of birds, characterises an avian 'cultural geography', and becomes most profoundly legible when one considers its present day *absence* across Scotland. Indeed, as will be discussed below, today these former rock and ruin haunts sit empty, apparently unrecognisable to a contemporary, recolonised osprey community that shapes and inherits a different set of geographical affinities.

Thus, in recognising such (former) lived geographies one can better grapple with *what is actually lost*, as well as problematising the biological essentialism of concepts like 'extirpation'. The notion of extirpation – differentiated from 'extinction proper' as being loss of species *from a specified area* – is problematic. It renders life fungible and exchangeable across its dynamic spatio-temporalities by arguing that a loss is only permanent (an extinction) if the species *as a whole* is eradicated across its geography in entirety. In such a narrative, place is a mere background, reduced to interchangeable habitat. By contrast, recognising the cultural geographies *of animals*, their situated ways of living, and the particular kinds of human-nonhuman formations that they enable to persist, allows us to resist the 'species thinking' and inherent human exceptionalism of biopolitical logics. We should, therefore, make space for the vibrant, lively differences that assert 'a nonhuman is not a nonhuman, is not a nonhuman'.[52] As of the debates within cetacean conservation research demonstrate, there is scope to incorporate such thinking into existing biopolitical frameworks. Thus, the shared orientations, like those

[50] Garlick, 'Cultural geographies of extinction'.
[51] Ahmed, 'Happy objects'.
[52] Lulka, 'The residual humanism of hybridity', 382.

that characterise a distinct pod of orca whales, become a recognisable facet of their 'species being', worthy of consideration amidst conservation calculations.[53] However, despite allowing us to stay with some of the complexity, such a move does little to challenge discourses of fungible natures.

What's more, an ever-growing posthumanist literature problematises any notion that there exists singular nonhuman or *human* natures. Therefore, in recovering 'extinct geographies' we also recognise that particular humans are part of such geographies, and, indeed, such geographies actualise forms of humanity, subjectivity, and experience.[54] At Loch an Eilein, in Rothiemurchus estate on Speyside, a pair of ospreys was to be found nesting atop the ruins of a castle in the water. The birds are first recorded in the diaries of Elizabeth Grant, of the Grants that owned the estate within which the loch sat. In 1808, she recalls the experience of paddling in the shallows, observing the adults tending to their young on the nest.[55] In the decades that followed, Scottish artist William Beattie, arriving here in the 1830s to sketch the ruins amidst their picturesque surrounds, commented upon the birds' capacity to enchant the landscape, evoke all manner of emotional and romantic associations with gothic fiction in the onlooker.[56] Later, in the 1870s, another commentator would visit the ospreys at Loch an Eilein and note with much excitement how close the onlooker could get to these birds, which appeared as though they were specimens in a museum.[57] Soon the ospreys became a regular feature for tourists to the region andvisitors were writing to the estate owners, praying they act to secure the birds' presence in the face of falling numbers across Britain.[58]

[53] The incorporation of cultural behaviours amongst pods of orcas off the US west coast in recent years has seen particular communal practices of whales included within the delineation of the 'evolutionary significant units', the value of which determines whether they are to be protected, or sacrificed. See Whitehead and Rendel, *The Cultural Lives of Whales and Dolphins.*
[54] Braidotti, *The Posthuman*
[55] Grant, *Memoirs of a Highland Lady*
[56] Beattie, *Scotland Illustrated*, 75
[57] 'Loch-an-Eilan and its ospreys'
[58] A good summary of these events are provided by Lambert, *Contested Mountains.*

This site, it's combination of particular, contingent relations, is notable for the overall effect of the assemblage it comprised. The osprey nest sat on a castle ruin, set amidst a forested scene of water and mountains fulfilling many of the aesthetic landscape conventions of the day; the proximity of the castle to the shore, enabling onlookers to observe the birds at close quarters; and the capacity of these birds *in particular* to endure (within limits) the sight and sounds of human presence nearby. Such a combination of human, avian, and wider material conditions culviated a particular kind of 'contact zone'[59] in this place: a space in which human *and* bird subjectivities were (re)made, opening onto potentially more convivial and response-able forms of community. The humans, observing the birds here, came to care about the plight of them and their kin. Their celebrity status even earned Laird Peter Grant the silver medal from the London Zoological Society, in 1895, for his attempts to save them, as well as pressure on the part of societies like that for the Protection of Birds, to lobby local councils to extend additional legal protection. As photographer Richard Kearton wrote of such public encounters with wild birds in the nineteenth century, they enabled onlookers to come to value them, and galvanised support in their name.[60] Meanwhile, for a time, a particular instance of bird life was sustained in a particular place: one with a preference for castle roosts, and a limited tolerance for human presence. This site, usefully conceptualised as an 'interspecies embassy', generated vital conditions at which human and nonhuman could come together, witness each other, and learn to live more convivially.[61] Ultimately, it's power was limited, and could not stem the eradication of the Scottish ospreys across their wider migration routes, and their ultimate absence by the early twentieth century. Such a geographical arrangement would disappear with them. We now turn to trace more explicitly the geographies across which such loss occurs and is resisted.

Extinction's geographies

[59] Haraway, *When Species Meet.*
[60] Kearton, Our Rarer British Breeding Birds.
[61] Taylor and Carter, 'The Agency of Dolphins'.

The relational thinking that underlies much environmental humanities scholarship on extinction proposes an ontology of species as cross-generational, assembled 'flight way' of interwoven entanglement.[62] It thus follows that extinction itself be understood in terms of a much broader, often *slower,* process of detachment and severance of the relations that tie contingent ecologies together. Such a process is less spectacular and sudden (the idea of extinction that pervades our cultural imaginary, epitomised by the meteorite that killed the dinosaurs[63]) than gradual and relentless. Absence emerges with the accretionary, slow violence of capitalist 'business as usual', and degradation arising out of everyday consumption.[64]

For scholars seeking to narrate, understand and respond to the process of extinction, and the means by which the conditions affording a way of life are gradually eroded, becoming increasingly precarious to the point of the 'functional extinction' that often precedes any 'final death'[65], there is a need to extend our interests beyond the catastrophic or violent at hand. Present-day vulnerability, or erasure, is often the *end-point* of longer historical geographies, betraying far messier politics, temporalities and spatialities of violence that trail across, and knit together, a multitude of places and times.[66] Both the material conditions of the lives in question, and the forces acting to smother their continuance, are often constituted through relations extending towards sites distant from where their effects are most acutely felt. Just as geographers have argued for the need to couple an appreciation of the situated companionship between humans and animals with an appreciation for the wider topographies and

[62] van Dooren, Flight ways; Haraway, When species meet, 25.
[63] See Heise, Imagining Extinction.
[64] For a useful conceptualisation of this process of slow, everyday violence, see Nixon, *Slow violence*, and Yusoff, 'Aesthetics of Loss'.
[65] Rose, 'Multispecies knots of ethical time'.
[66] Collard, 'Disaster capitalism and the quick, quick, slow unravelling of animal life'

topologies of power that affect them[67], so too must extinction stories reckon fully with the geographies through which they are produced and conservation responses are (more or less effectively) marshalled.

Human geographers direct vital attention to the importance of place and scale for understanding environmental change. The geographies producing extinction are both contextual, rooted in the specific politics and cultures of a place, and extensive, encompassing global environmental discourses, international geopolitics, and political-economic structures. To this, we add the specific affordances of the more-than-human lives and deaths that intersect with and co-produce these processes. Thus, concern with extinction's geographies requires mapping the spatio-temporal relations and assemblages that affect violence upon particular ecologies, as well the attempts by communities, conservationists and others to respond to or resist such violence. As vital as it is to understand the contingency of natures to be safeguarded, we must also elaborate the precise nature, in time and space, of the political economies which bring about extinctions. We do so below though further discussion of Mozambique's PPMR.

Mapping the threats to marine turtles

As we have discussed when highlighting the neoliberal logics producing trans-frontier conservation, the PPMR is shaped by highly contradictory forces and competing models of conservation. To illustrate this, we examine the conservation of loggerhead and leatherback turtles. A central conservation aim of the PPMR reserve is to protect these turtle species, which nest on the beaches of southern Mozambique and South Africa from October to January each year. Leatherback turtles navigate the oceans and return to the same locations annually, making these places significant within ongoing turtle life histories. Failing to comprehend lived turtle temporalities, and the disjoints between 'turtle time' and the temporal

[67] See Srinivasan, 'Towards a political animal geography?'

logics of extractive capitalism, produces conditions of violence and precarity.[68] As Collard discusses in relation to sea otters, animal lives in particular places have, at different times and in different ways, found their existences re-oriented by capitalist social relations. As they are drawn into the tangle of particular capitalist systems at particular historical moments, this serves to both slowly weaken, and quickly engulf, conditions for survival.[69]

The longer-term story of Mozambique's sea turtles illustrates how they are subject to structural political and economic factors in this lurching and "quick-quick-slow"[70] way, including colonial and post-colonial conflict, neoliberal conservation regimes, and capitalist expansion. Turtle lives are co-produced by capitalist social relations, even when not *directly* commodified. Turtles and their eggs have historically been consumed for food in southern Mozambique. While this practice is undoubtedly foregrounded by conservation management discourses, targeting easily mitigated threats in the form of so-called local poachers, it is notable that this practice is also recognised by many as a long-standing issue that has systematically weakening the ability of these animals to reproduce.[71] In comparison, the impacts from such low-level consumption are overshadowed by the taking of turtles and other species for food during the 31-year Mozambican independence conflict (between Mozambican independence forces and former colonial authority Portugal); and during the civil war (in which the Mozambican independent state battled against the South African apartheid government and the internal right-wing agitators it sponsored). Many combatants relocated to national parks, in some cases turning to local wildlife for food.[72] The dynamics of post-colonial independence and Cold War geopolitics that drove these conflicts were intensely materialized on the southern Mozambican coast. Many relocated here from the capital, Maputo, for safety. Combatants based themselves in the Maputo Special Reserve, to

[68] Bastian, 'Encountering leatherbacks'.
[69] Collard, 'Disaster capitalism'.
[70] Collard, 'Disaster capitalism', 910
[71] Ponta do Ouro Partial Marine Reserve, *Management Plan*.
[72] Soto, 'Protected areas in Mozambique'.

both be within strategic proximity to the South African border and claim hunting rights. Local game and turtle populations were reduced to almost nothing as a consequence.

One of the main intentions of the PPMR was to create a safe habitat for turtles to enable their recovery from these events. Following its designation in 2009, staff within the reserve introduced a monitoring and protection regime, incorporating ranger patrols, turtle tagging, the prohibition of driving on the beach, and reductions in beach lighting from coastal hotels. The turtles have also been enrolled in eco-tourism initiatives, such as guided turtle walks, enhancing local and national political 'buy-in' for the reserve through funding development activities. This program is seen as a key success story for the PPMR, credited with reviving the fortunes of Mozambique's turtles.[73] However, these animals remain vulnerable to the dynamics of neoliberal conservation and population biopolitics, each entailing sacrificial logics and violent forms of care, for example through too-close tourism encounters, through invasive tagging, and through coastal construction projects which light the beaches and confuse nesting turtles.[74] In short, at the same time as the PPMR patrols against turtle poaching and aims to create safe spaces to nest, it encourages coastal contruction. Moreover, it is largely unable to do anything about wider threats of entanglement in fishing nets and drastic ocean changes brought about by global heating and climate breakdown.

The conditions of life (or otherwise) for sea turtles are thus shaped amidst wider geographies of conflict, predation, conservation biopolitics, and neoliberal human development. Each entails particular sets of practices and places through which harm and care are exercised. It is vital that the extinction threats faced by particular turtle populations be situated within this wider geographical assemblage if they are to be effectively mitigated against. A further threat in the form of extractive capitalism looms: the PPMR may become the site of a new deep-water coal port. The debates around the proposal have been

[73] Videira, Pereira and Louro, 'Monitoring, Tagging and Conservation of Marine Turtles in Mozambique'
[74] Srinivasan, 'Caring for the collective'.

fierce and oftentimes inconclusive, entangled in regional geopolitics and the multiple, competing agendas variously advancing different strategies for accumulation and human development within Mozambique.[75] What *is* clear, should the port does go ahead, is that the conditions for sea turtle life would (again) change dramatically. The lives of these animals, and their position at the edge of extinction, would become further and differently entrained into the shifting geographical relations of extractive capitalism as they materialise in such places.

Rather than entering an Anthropocene, stories such that that of the PPMR give weight to the alternative labelling of *Capitalocene.*[76] This is an epoch marked by capitalism: both as a way of (re)imagining environments in accordance with Humanist categories, concepts and institutions (like development, class, markets, colonies and commodities); and, as the process of producing and organizing non-human natures in support of economic outcomes. Far more than an isolated event suffered by non-human species, "accumulation by extinction" has been a central pivot of capitalist expansion across its multiple incarnations.[77] Such histories, as the experience of Mozambique's turtles demonstrates, unfold unevenly in different places. As Collard observes, the precarious state of particular non-human lives is felt at varying paces and scales, as animals are by turns commodified, weakened through ecological disasters, and subjected to harmful care regimes in response to their impending extinction. Like human subjects of modernisation and development plans, non-human lives are also subject to varied attempts to commodify, to control and manage, alongside efforts to save and protect.[78] Political ecologists, and geographers, with an attention to place, connect the specific extinction stories and lives at hand to those broader economic, social and political structures of inequality and power that weave together the near and far. Such stories make legible how extinction is thus less a straight trajectory of decline, than a

[75] Symons, 'The tangled politics of conservation'.
[76] Ibid
[77] Ibid p. 116
[78] Prudham, 'Sustaining sustained yield'

process of unravelling and remaking life as economic and political conditions structure the possibilities for existence.[79]

Geographies after extinction

Over the previous two sections we have considered the geographical contingency of those forms of life that we stand to lose through extinction; as well as the complex, spatio-temporal relations of violence and care that variously affect if we will or not. In this final section, we expand a third register of concern, crucial to questions of how to politically and ethically respond to those absences *already rendered.* We designate this the study of '*geographies after extinction'*. Such work involves appreciating and mapping something of the haunted geographies of absence that extinctions affect in place,[80] challenging conventional spatial accounts of extinction and offering a route towards political, ethical and ecological futures *after extinction*.

Absence can be characterized as 'the predominant phenomenological feature of extinction'.[81] Whilst certainly implying a disappearance, absence, for Mitchell, also necessitates the *proliferation* of subjects: spectral figures, ghostly entities and haunting traces. Thus, geographies after extinction are *haunted* geographies, contingent upon cultivating the particular sensibilities necessary to detect and respond to such hauntings, as well as offering up a challenge to geographers and others to reckon with the differential *matterings* of ghosts.[82] The notion of the ghost as a social figure prompting 'transformative

[79] Collard, 'Disaster capitalism'.
[80] The term 'geographies of absence' is drawn principally from the work of geographer John Wylie ('Landscape, absence') who has argued for the need to theorise experiences of landscape in terms of their uncanny, unsettled, and excessive nature, conceived of in part through their hauntings and absences, as much as their presences. See also Jones, 'What's the matter with ghost stories?'.
[81] Mitchell, 'Beyond biodiversity and species', 31.
[82] Jones, 'What's The Matter With Ghost Stories?'

recognition' has become an increasingly productive conceptual tool within and beyond geographies of loss, bereavement and landscape.[83] Likewise questions concerning that which lingers, spectrally, in the wake of Anthropocene environmental destruction prompts a turn towards those times, places and ecologies 'out of joint'.[84] Encounters with extinction necessitate a consideration of the ethics of environmental dealings. Indeed, as Smith argues, 'we might go so far as to say that [any] sense of ecological community could only arise after the recognition that species could indeed go extinct, and that human beings could be responsible'.[85]

Therefore, encounters with places in the wake of extinction necessarily requires consideration of their potential to mobilise or propose new or expanded stories, political alliances, and challenges to the orthodoxy of environmental management and governance. Sarah Whatmore has argued that encounters with environmental disturbances have a capacity to 'force thought', challenging the ontological and epistemological assumptions of publics. Though she is writing in the context of flood-risk management, we echo her sentiments here to argue that encounters with the grim realities and yawning absences of extinction in the landscape, as a profound experience of environmental rupture, have the potential to 'occasion new political associations and opportunities'[86]. As Judith Butler has argued, the question of who has moral status might be answered in relation to that of when (or which) life/lives is/are 'greivable', with an end conducive of mourning. Considering such questions in relation to the 'War on Terror', Butler's concerns have also been extended to the environment via those who argue that 'mournful' encounters are necessary for responding to Anthropocene catastrophe.[87]

[83] In particular, this notion of the transformative encounter with ghosts comes from the seminal work of sociologist Avery Gordon (*Ghostly Matters*).
[84] Derrida proposes a notion of the spectre being signalled by an experience of 'time out of joint', and his hauntology alongside his writing on mourning has served as an inspiration for recent writing on the ethical impact of environmental loss (Cunsolo-Willox, 'Climate change as the work of mourning'). Moreover, work by Barlow (*Ghosts of evolution*) and Haraway (*Staying with the trouble*) – the latter through her SF figuration of 'speakers for the dead' – attests to the stranded ecologies and once-symbiotic organisms that remain in the wake of a partnering species' extinction, existing as monuments to this absence.
[85] Smith, 'The extinction of community', 29.
[86] Whatmore, 'Earthly powers', 29.
[87] Cunsolo-Willox, 'Climate change as the work of mourning'.

As such, expanding our notion of geographies after extinction explores how particular places, sites or landscapes bear traces of absence in the wake of ecological destruction. We believe this generates vital ethical and political resources for challenging notions of fungible, neoliberal natures evoked by technocratic or 'eco-modernist' responses to the Anthropocene. To illustrate such an approach, we return to the story of Loch an Eilein's ospreys.

The Empty Castle

The nineteenth century had seen Britain's ospreys, primarily confined to Scotland, face multiple pressures. Naturalists seeking eggs and adult specimens, shot the birds found brooding around northern lochs and took any clutches they found. Whilst such collecting activities likely contributed to the collapse of osprey nesting in the northern Highlands, where the use of rock precipices for eyrie construction was most common, it was the killing of birds on migration south from the 1820s that ultimately unravelled this community. The continuance of the Scottish ospreys, and their 'nesting culture', required returning adults to breed, raise young and maintain nests. Also required were subsequent generations of matured, younger birds to continue these place traditions. Despite local protections at some sites, like Loch an Eilein, the patchwork of wild bird protection law (only introduced beyond seabirds and game in UK in the 1870s) meshed awkwardly with the migration routes of living ospreys. Running 'a gauntlet of innumerable shot-guns'[88] *en route* south for winter, supplies of new (and old) blood were depleted. The birds would remain largely absent from their declared extinction, in 1916, until their triumphant return to Britain under the protection of the RSPB, in 1959.

[88] Kearton, Our Rarer British Breeding Birds, 61.

A visit to present-day Speyside is, for many tourists, incomplete without a visit to the Loch Garten osprey centre. From the public hide one can observe the birds on the eyrie through a variety of binoculars and telescopes. There is a live HD feed from within the nest. Volunteer wardens, on hand, offer interpretations of avian behaviour, giving a sense of the species' tumultuous, ultimately triumphant history. Palpably, the site is an important locus for human-bird meetings, under carefully managed, asymmetric conditions of proximity and visibility. This encounter facilitates human-osprey enchantment: the recognition of a significant other demanding ethical involvement in ensuring its future survival.[89] The visitor leaves, knowing the species is 'doing well'. All is not (yet) lost.

The osprey's twentieth century story in Britain, shuttling to-and-fro across the line of presence/absence, palpably endows it with a certain 'frisson': the sense of 'now you see it now you don't', that likewise, forKathryn Yusoff, animates the atmospherics of encounter with other threatened species, such as the polar bear.[90] Unlike these bears, however, ospreys are *flourishing*:of 'least concern' according to the IUCN.[91] But the osprey's dalliance with site-specific species-death, *does* imbue it with a haunting affect. Ospreys nesting in Scotland today carry an amount of spectral baggage. They express, through their contemporary ecology, an avian geography 'out of joint'. A mere 15km (as osprey's fly) from Loch Garten sit the castle ruins of Loch an Eilein. Once the site of an intergenerational osprey residency, maintenance and inheritance, this place, like other former rock and ruin sites once tenanted in the north, no longer figures as a viable (or recognisable) nesting location.[92]

One can visit Loch an Eilean, managed by the Rothiemurchus estate, *en route* to the RSPB observation post at Loch Garten. The visitor might call into the nearby Inverdruie fisheries, where many Speyside

[89] Haraway, When Species Meet.
[90] Yusoff, 'Biopolitical Economies', 89.
[91] REF for IUCN
[92] Garlick, 'Cultural geographies of extinction'.

ospreys catch their prey (permitted for the sake of tourist revenue).[93] When one of us visited the empty castle in July, 2014, the atmosphere could not have felt *less* mournful. The sun was out, families lounged and bathed in the waters of the loch. Some swam out to, and clambered over, the castle. In a nearby gift shop, hidden behind shelves of souvenirs, were the remaining panels of an information display concerning the castle's history. Regarding the ospreys once found there, the panels lamented their loss, but celebrated the fact that the species once again bred on Speyside. There was little sense, though, that anything had been *lost*. Yet, figuring the osprey as a particular and situated flight-way, woven across time, space and relations, proposes something else. This kind of relational ontology contests both the framing of 'species' and place as interchangeable. Geographies after extinction map places populated with absences; niches left unfilled or closed, ghosted by former ways of living. To see such ghosts at Loch an Eilean, demands a different way of seeing, a different kind of ecology, and a political awakening.to the fact that such losses endure.

Conclusion

Geographers have been active contributors to the environmental humanities project. Here, we have sought to continue in this vein by emphasising the value of cultivating a place-specific attention to the unfolding of extinction, and the landscapes this leaves behind. Over the course of this paper we have, with the aid of empirical examples, advocated a tripartite attention to the *geographies* of extinction. We articulate extinction stories with a material, political and conceptual firmness, worked through their underlying and emergent political and more-than-human geographies. We have also sought to demonstrate how such a geographical approach to extinction necessitates both a political attention to

[93] Lambert, 'In Search of Wilderness', 43.

the larger, structuring forces affecting environmental crises, alongside appreciation for the vibrant, excessive difference and agency of nonhumans within ecologies.

We believe that such an approach sharpens our accounts of extinction. To ignore political context, and the ways in which distant decisions, actions and agendas texture the occasion of species meetings (and *where* they meet) reifies the encounter, disabling the possibility for critique to reach beyond the immediate.[94] At the same time, ignoring the disruptive effects and agential roles nonhumans when considering how ecologies are used, abused, produced, managed and governed in line with the logics of extractive capital and 'cheap nature' assumes an exceptional position for the human. One remains blind to the fulsome nature of the agents involved, and re-instates up a problematic nature-culture dichotomy via such omission.[95]

What we hope to have achieved here is to demonstrate how an attention to *where* extinctions happen is fundamental to understanding *why* they happen, *how* they might be responded to, and for *critiquing* the fundamental assumptions about the interchangeable nature of nonhuman life that sit, violently, at the core of contemporary conservation logics. Extinction is a deeply geographical phenomenon: there is no singular extinction, only a multiplicity of sited *extinctions.* That is not to deny such events are connected, interwoven, or co-constitutive of each other. Many environmental catastrophes share similar causes. Yet one should recognise that the story of extinction in one locale cannot necessarily be understood with recourse to blanket theoretical frameworks developed elsewhere. This is not least, as we have argued, because the nature of that which stands to go extinct is itself *geographically contingent.* The forces at play, driving or resisting that extinction, only become legible *amidst the situation of their specific entanglement.* The outcomes of an extinction, and the kinds of lives, landscapes and political-

[94] Srinivasan, 'Towards a Political Animal Geography?'.
[95] Margulies and Bersaglio, 'Furthering post-human political ecologies'.

ethical frameworks left behind, can only be apprehended *on the ground*, amidst particular ecologies 'incessantly ghosted by elsewhere and elsewhen'.[96]

As for concrete steps for a praxis which acknowledges extinction-in-place, we conclude by draw attention to emerging agendas which foreground the uneven production of conservation space and the role of global class inequalities. These include an approach to conservation which is not centred around the consumption of reified and spectacular nature, but which asks us to recognise the every-day natures which are closer to home, rethinking the political-economic relationships which fund technocratic and neoliberal conservation 'solutions' (such as private philanthropists and corporations), and agitate for radical changes to the global economy, including supporting decarbonisation, degrowth and redistributive agendas for wealth and land.[97]

In sum, if we are to respond to, and resist, the 'ecocide' that Felix Guattari argues to be intrinsic to our era then we must promote the conditions for vibrant difference and heterogeneity across multiple registers of thought and action.[98] We must resist the homogenising forces of capital. We must encourage the growth of new political and social relations fostering connections across, through and between communities often considered disparate or antagonistic. We must recalibrate our conceptual apparatus, rejecting stale, arborescent modes of thinking about the environment, in favour of those which grasp vibrant differences and the relations of contagion, involution and intermingling occurring between never-pure entities. As Haraway argues, 'it matters what thoughts think thoughts'[99]. A place-attentive approach, stressing 'the irreducibility of contingency'[100], is the route we choose to cultivate an such an

[96] Wylie and Webster, 'Eye-opener'.
[97] Büscher and Fletcher, 'Towards Convivial Conservation'
[98] Guattari, *The Three Ecologies*.
[99] Haraway, *Staying with the Trouble*, 35.
[100] Deleuze and Guattari, *What is Philosophy*, 96.

approach that is both relational and just, capable of responding, conceptually and politically, to the challenges of the Anthropocene.

Biography

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