






EDITORIAL

Relational Ontologies and Multispecies Worlds: Transdisciplinary Possibilities for Environmental Education

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Overview

In this Editorial, we provide an overview of the Special Issue on *Relational Ontologies and Multispecies Worlds: Transdisciplinary Possibilities for Environmental Education*. We set out to weave together insights from the sixteen contributions with our considerations, as Guest Editors, and literature that has informed this project. Elaborating on some of the problems that authors seek to address, we then present what we believe to be the purpose and significance of this collection of work. The purpose is a performative attempt to address some of the wicked problems implicating a flourishing planet and empowering modes of (environmental) education that purport social and ecological justice. The significance is the critical and creative approaches to curricular and pedagogical enactments that each author adopts through the combination of rich theoretical and empirical inquiries for (re)configuring different temporal horizons. We then articulate what we mean by relational ontologies and multispecies worlds, and transdisciplinary environmental education. Providing a meta-analysis of each article, we then position author contributions within four interrelated and intersecting clusters: *Wrestling in the ruins: The hope for decolonial environmental education*, *Kinning in the ruins: The hope for creatures, critters and vegetal life*, *Playing in the ruins: The hope for productive technologies*, *Belonging in the ruins: The hope for relational care ethics*. Filled with hope and inspiration from each author's insightful contributions to this Special Issue, we then query what might come next in the quest to imagine and actualise relational and sustainable presents and futurities.

What is the problem?

Widespread climate disruptions and ecological and social destruction, degradation and fragmentation across the planet are intensifying, causing problems for all life on earth. It only takes a cursory glance at the news (or out your window!) to see the latest unprecedented disturbance. The site-specific details of environmental damage can easily be forgotten when they happen at a distance and are talked about at a planetary level. However, as you will read within the pages of this Special Issue, the specific locations some of us live and work are increasingly impacted, with relational and sustainable solidarities between (Western) people and with the Earth needed now more than ever. As such, we have invited authors to highlight both the crux of

some issues they face and actions that have emerged. For example, in this issue, Hilary Whitehouse (2024) acts from an understanding of interspecies justice and care as a form of activism in response to the extinction crisis, concentrating on bats and bat carers in Queensland, Australia. In another article from this issue, Scott Jukes and Kathryn Riley (2024) focus on the combined impacts of climate change and species extinction in both the Australian Alps and the Canadian prairies. Fire, weather extremes, desertification, eradication coupled with perpetuating colonial histories, capitalist growth mindsets and socioecological inequities perform together in specific locations, with unique politics of location. These are just some of the wicked problems, both isolated in place and connected across the globe, which stretch into the pages of this Special Issue.

The problem is not simple. And there is not necessarily one problem, but a multitude of converging and diverging ecological and social crises that are steeped in racist, classist, speciesist and gendered processes of domination and marginalisation (Danowski & Viveiros de Castro, 2017; McKenzie *et al.*, 2023). In response, authors in this Special Issue expose and articulate educational quests that grapple with such crises, understanding that education is (or could be) an ethical project which can strive to move students (and therefore communities) from one way of being to another (Bazzul, 2023). For Abbey MacDonald and Kim Beasy (2024), “As the world increasingly becomes defined by precarity as a consequence of environmental, social and economic crises, we must find ways to support and embrace approaches to and for creating and engaging with the shifting imperatives of education” (p. 316). Thus, contemporary educational landscapes need critical modes of method and thought to problematise inequitable processes. Namely, anthropocentric bounded individualism that position the individual as separate from broader ecologies of the world; and hegemonic power relations that situate inclusion and exclusion and privilege and erasure in dualistic opposition. Within this issue, contributions such as Kay Sidebottom and Lou Mycroft’s (2024) destabilise some of education’s normative conventions by privileging more-than-human teachers to break free of anthropocentric habits. Similarly, Amalie Strange (2024) focuses on the agency of more-than-human others, respecting closeness with others and their capacity to refuse anthropocentric assertions of power. Other examples in this issue move against universally integrated policies that work to homogenise and institutionalise local (Indigenous) and emplaced (situated) practices. In particular, Ranjan Datta (2024), highlights the climate impacts in the Chittagong Hills Tracts in Bangladesh, drawing educational insights from the Laitu Khyeng Indigenous community to affirm local policy, knowledges and practices and disrupt a globalising and universalising, one-size-fits all approach to education.

Such a critical educational project must also disrupt neoliberal governance that affirms staunch self-determined agency that suggests individuals can achieve when they are provided with the right tools for learning. The critical educational project must also break the trends of advanced capitalism that suggests teachers and learners are consumers of education, rather than living education through relationally derived ethics. As Jenny Byman *et al.* (2024) in this Special Issue claim, “as educators and researchers in environmental education we need to notice more and dare to listen to the awkward topics and dimensions that arise from children’s spontaneous willingness to speculate” (p. 168). Finally, the critical education project must speak truth to the ubiquity of colonial land relations that exploit by dispossession and tactics of accumulation (Tuck *et al.*, 2014; Watts, 2013).

Such an educational project, however, is more than just critique. It also requires creative modes of method and thought in creating openings for reconfigurations through an ontological shift that positions the human in an iterative, ongoing and dynamic relationship *with* broader ecologies of the world, not just as individuals in the world. This is the work of this Special Issue. Mapping a multitude of paths between im/possibility, this Special Issue explores contingent, unpredictable and productive environmental educational teaching and learning performances through rich empirical accounts that demonstrate many entryways to becoming undone and becoming otherwise (Martin & Kamberelis, 2013).

What is the purpose and significance of this Special Issue

In redefining progress narratives in education that continue to emphasise doctrines of individualism, achievement and outputs through a single-minded focus on outcomes-focused ideals, the ontological shift amplified in this Special Issue demonstrates agency as distributed across all actors as co-constituted and co-implicated through entangled, yet differentiated, categories and boundaries. Following this, knowing, being, thinking, doing and feeling are not located in an autonomous and discrete individual, but generated in concert with the discursive social structures *and* lively relationships with other species and more-than-human worlds. For instance, Peter Renshaw et al. (2024) in this Special Issue disrupt ecologically destructive human practices that continue to characterise modern societies (and education) through *flickering ontologies* that awaken children to the possibility of kinship relations composing multispecies assemblages. Likewise, Casey Myers and Rachael Kovalchin (2024) contemplate how nonhuman others emerge as curricular protagonists in ways unanticipated; and Jonathan Lynch and Herbert Thomas (2024) show how assembling more-than-human and technology relations could affirmatively shape human-environmental relations. To this end, these authors dismantle human hubris through an unsettling of well-worn educational pathways, to produce less certain but more socially and ecologically attuned, and thus, response-able teachers and learners.

Conversations in environmental education scholarship that seek to reorient the human from anthropocentric bounded individualism to an entangled, yet differentiated, co-composer with worldly becomings are proliferating (as indicated by recent Special Issues and books: for example, Clarke & Mcphie, 2020a, 2020b; Jukes, 2023; Malone et al., 2020; Poelina et al., 2023; Riley, 2023; Rousell & Cutter-Mackenzie-Knowles, 2020). This Special Issue joins these conversations by spurring new connectives and possible reconfigurations in disrupting the status quo that is deeply etched in Western education models. Undoing normalising universals, it opens to new methods and thought to generate different lines of flight in educational inquiry and practice. A decided focus on empiricism in these articles is not to lose sight of the thrill or glory of conceptual work; we acknowledge that theory and thought might offer increased intensities of affect in comparison to narratives of grounded practice. However, through a vast array of author encounters with ideas, people and multispecies relations found in everyday educational doings, this Special Issue still follows the contours of concepts, not of what concepts mean through static representation, but what they can do in producing performances of becoming, sensing, immanence and presence in educational endeavours, as different to interpretive accounts of being, perception, experience and absence (Jackson & Mazzei, 2017). Focusing on what is in the making, rather than what is, we hope the various articles presented will act as a lure to attune to what is not yet through a speculative focus that is responsive to tracings of the past in the embodied, embedded and lived here and now for relational and sustainable futurities of environmental education.

What do we mean by relational ontologies and multispecies worlds?

Scholars advocating for relational ontologies across human and social sciences (e.g., Castree, 2003; Ceder, 2018; Walsh et al., 2021) critique the foundations of humanist concepts, for example, identity, not by doing away with foundations but understanding them as permanently contingent. That is, foundations are not a static, stable, fixed and rigid essence; nor are they an inherent categorical attribute of an individual that is self-evident and pre-existing through naming (Butler, 1993, 2007). Rather, worldmaking is enacted through continual, dynamic, and reiterative doing, becoming, and performing as imbued with discursive (social) and material forces (matter). Relational ontologies, therefore, trouble the idea that the world is a container for the human to act out their lives through pre-given notions of what the world is, or what the world expects us to be, to suggest that things come into being through their relational entanglements. Relational ontologies do not focus on what we can know about an object through understanding objects as

inert and waiting to be interpreted by the human subject, but rather, focus on what an object might do through distributed agency across relational entanglements (Boileau, 2024).

In saying this, however, we, Kathryn, Scott and Pauliina, do not claim to establish an ontology that would be true for all as we are crucially aware of Indigenous and non-Indigenous critiques of relational ontologies as derived from the Eurocentric cannon as just another tool to enact forms of colonialism (e.g., Rosiek *et al.*, 2020; Todd, 2016). What we are trying to do, as Western scholars indoctrinated into globalising, neoliberal, capitalist and colonial ideologies, is relocate the idea of an autonomous and individualised identity through self-critique for the purposes of critically transforming Western, or our own, practices and thinking. We are attempting to disrupt habits of method and thought that reduce and compartmentalise phenomena to isolated parts, while also negating dangerous ‘one-ness’ narratives that do not adequately account for distinctions and differences. Moving us away from inquiry into representations of/about the world as made by the phenomenological subject,¹ relational ontologies focus on the infolding of contexts to suggest humans are *of* the world (Barad, 2007). Initiated through affective intensities that generate an intuitive knowing of Other(s) from one’s grounded, lived, embodied and embedded (micro) politics of location, relational ontologies produce worldmaking through emergences of becoming-with (Jukes *et al.*, 2022; Pacini-Ketchabaw *et al.*, 2016; Rautio, 2017a; Riley & White, 2019). As our individual and independent stories include traces of Other(s), we do not know, or learn, *about* phenomena by standing at a distance; but through the implicit entanglement of knower (one’s self), knowledge (embodied resonance) and known (phenomena), we are becoming-otherwise; we are at the same time becoming a little more and a little bit less ourselves in becoming-with the world.

So called multispecies approaches (e.g., multispecies ethnography, Kirksey & Helmreich, 2010; multispecies justice, Celermajer *et al.*, 2022; multispecies studies, Van Dooren *et al.*, 2016) focus on diverse contexts and situations where many species share lifeworlds (e.g., Hyvärinen, 2019). Rather than being simply about many species then, the term ‘multispecies’ indicates a focus on the relationalities, complexities and uneven vulnerabilities inherent but often overlooked in co-existence between species. Notions of becoming-with has vast implications for multispecies worlds, because it grounds care in relational accountability, response-ability and obligation through attachments within infrastructures of inequity (Liboiron, 2021). That is, care moves from a normative ethical orientation to an active mode of relating and existing set in practice (Daigle, 2023; de la Bellacasa, 2017). In other words, becoming-with moves politicised accounts of performance affinity and activism from the pursuit of democratic citizenship and social and ecological justice grounded in the rights of the oppressed, to a stance of complicity and response-ability from one’s (micro) politics of location. Following this, we are always called-in to good relations, and to stand-with, all Other(s) and to be accountable when these relations are not good (Liboiron, 2021; TallBear, 2014).

What do we mean by transdisciplinary possibilities for environmental education?

Relational ontologies incite and animate the curation of thought that comes out of intra-active engagements *with* the world (Barad, 2007). As bodies are affected in different and diverse ways through these performative acts, bodies, in turn, further intervene and attune with atmospheres, affects and hauntings (Manning, 2016; Massumi, 2015; Seigworth & Gregg, 2010). In this way, the

¹Edmund Husserl proposed that the human conceptual system consists of an intersubjective we, in that there is no objective perception but that every individual will perceive the world in a unique way and have their own unique experiences; we do not perceive a world, but the world is what we perceive (Husserl, 1991). Within the phenomenological school of thought, Maurice Merleau-Ponty argued for the reorienting of ontological dualisms, claiming that we are our bodies and that lived experiences unite mind and body towards a body-subject (Reynolds, 2004). However, while the body-subject is conceived of as enacting dynamic interactions in many directions within the flesh of the world, this idea prioritises human perception within human experiences through a focus on how the human is positioned *in* the world.

affected/affecting relationship collapses binary classifications of ‘either/or’ as rooted in Enlightenment and the idea that individual human actors have complete and autonomous agency to generate worldviews of ‘and...and...and’ through worlds composed of co-constructed multiplicities (Deleuze & Guattari, 1987; Riley, 2023; Strom & Martin, 2017). Crucially, however, because affects are produced through specific constellations of power relations, they also help to locate constraining and disciplining, and empowering and affirmative politics of location (Braidotti, 2011, 2013, 2022; Ringrose, 2011; Strom & Viesca, 2021). Hannah Hogarth and Charlotte Hankin (2024) summarise this point well when they say, “Opening ourselves up to think-with other species, materials, affects, means thinking about different sorts of questions that might be asked and what these questions might make possible” (p. 351).

Thus, the inherent transdisciplinarity of environmental education through relational ontologies means that teaching and learning practices are continually co-inventing and co-composing worldmaking *across* practices of disciplinary boundaries. Which is to say, teaching and learning does not always conform to siloed subject areas, but always already spreads across and beyond scientific and academic disciplines (e.g., philosophy, life sciences, sociology, cultural history) to influence the world in diverse ways. This *doing otherwise* is a political and ethical project that disrupts uncritical and rudimentary forms of education emphasising a homogenised, tidy, fixed, closed, or linear trajectory from ‘not knowing something’ to ‘knowing something’ within disciplinary boundaries. Such linear thinking aptly describes rational humanism as indebted to advancing one universal reality and way of knowing (Strom & Viesca, 2021).

To this end, teaching and learning, *inter alia*, moves from outcomes-focused (instrumentalist) to process focused; from an over-emphasis on actionable goal setting and extrinsic rewards (technicist) to relationally derived ethics; and from reducing and compartmentalising phenomena (mechanist) to planes of immanence, in which everything-is-connected and anything is possible (Braidotti, 2013; Deleuze & Guattari, 1987). For Angela Malloy Murphy (2024), exchanges in teaching and learning can be messy, imperfect and oftentimes playful in “striving for a way of being; an intentional practice—not following a recipe in an anticolonial cookbook” (p. 332). In other words, transdisciplinarity shifts us from what should happen (within confined and predetermined outcomes) to what is emerging in any given pedagogical event, generating a multiplicity of possibilities that are always unfolding (Jukes, 2023).

What are the perspectives, themes and sub-themes in this Special Issue?

Authors combine rigorous theorisation with intensive empirical inquiry in collaboration with more-than-human modes of existence and invent new and different possibilities to study more-than-human communities from their diverse (micro) politics of location. Through forms of inquiry that are speculative, atmospheric, affective and involuntary, authors provide rich accounts of distributed agencies, mutual constitutions and co-productive capacities. These can (re)configure humanist and foundational educational concepts and (re)invigorate different lines of flight in which teachers and learners emerge in relational fields (Hultman & Lenz Taguchi, 2010). They can also pluralise and diversify teaching and learning practices in environmental education, in ways that disrupt anthropocentric individualism and inequitable power relations and generate ethical ways of living and learning in shared worlds.

As such, this Special Issue makes room for new and different ways of messing-with the intersectional systems of oppression that continue to marginalise, exclude, exploit and dispossess, what Rosi Braidotti (2010) called, ‘the others’ - women or sexual minorities, natives and non-Europeans, and earth or animals. We acknowledge that plants, fungi, bacteria (etc.) should be included in the general scope in as much focus as animal species, and not only glossed over by incorporating them into more general terms like ‘landscape,’ ‘earth’ or ‘vegetation’ (Ginn, 2023). Sneha Parmar, Karen Malone and Tracy Young (2024) remind us of the anthropocentric

tendencies to position plants as ‘lesser than,’ suggesting this to be a serious oversight considering that “plants support all life on earth” (p. 245). For David Rousell and Jessica Tran (2024), “while Indigenous knowledges have long recognised forests as sentient and caring societies, western sciences have only acknowledged that trees communicate, learn and care for one another in recent years” (p. 258). Including vegetal life in pedagogies and ethics of immanent care is, therefore, a crucial imperative for environmental education research and practice.

While each article in this Special Issue might appear as discrete, separate and categorised under their own neat headings, they form a simultaneous part and a whole (holonic) of this Special Issue and generate a relational assemblage held together through machineries of text. Through a meta-analysis of each article, four interrelated and intersecting clusters emerged that we, Kathryn, Scott and Pauliina, have identified as: *Wrestling in the ruins: The hope for decolonial environmental education*, *Kinning in the ruins: The hope for creatures, critters and vegetal life*, *Playing in the ruins: The hope for productive technologies*, *Belonging in the ruins: The hope for relational care ethics*. Understanding that we are living amidst the ruination of others, we are reminded of the existential questions posed by Deborah Bird Rose (2011) that ask how we might engage in worldmaking practices across species, in ways that enhance the lives of others, and crucially, how we might do this in these times of extinctions. Following Hannah Arendt (1961), we see the ruins as an opportunity for critical and creative inquiry into what has been laid bare, starting from the grim and unjust realities of social and ecological crises, and grounding ourselves as response-able and complicit within these impoverished social and ecological systems of these Anthropocene times. Wrestling, kinning, playing and belonging in the ruins is a project of hope and action, in, and with, what Anna Tsing (2014) called *blasted landscapes*: the ruins that are now our (degraded) gardens that produce our livelihoods. Dwelling with possibilities of biocultural hope and action (Kirksey *et al.*, 2013), we see our job as making the Anthropocene as short and thin as possible in shifting to stories of hope and action about the kinds and types of futures that are composed, created and cultivated-with multispecies (Haraway, 2016; Stengers, 2017).

Wrestling in the ruins: The hope and action for decolonial environmental education

Wrestling in the ruins is a praxis that seeks to nurture complex entanglements without collapsing important differences and distinctions that matter in the co- shaping of worldings; a praxis that is more than *witnessing the ruins* and beyond politics of recognition, what Kelly Oliver (2001) claimed as only affirming status quo hierarchies to, doing something with the idea in the ethical space (Ermine, 2007, 2011). In the case of relational ontologies and multispecies worlds, *working the ruins* outside of dualistic opposition in building bridges between all forms of knowledge; for example, the Eurocentric cannon of posthumanist and new materialist scholarship and Indigenous Knowledges.

To begin, in *Experiments with a dark pedagogy: Learning from/through temporality, climate change and species extinction (... and ghosts)*, Scott Jukes and Kathryn Riley (2024) confront haunting pasts~presents~futures in environmental education through a form of dark pedagogy enacted in response to two situated contexts and entangled, yet differentiated, socioecological issues involving the escalating impacts of climate change in the Australian Alps and the reordering of human/bison relations through settler colonialism in the Canadian prairies. Exploring the duration of things and considering the relationality of time, dark pedagogy helps Jukes and Riley to (re)member ghosts and ponder practices for fostering anticolonial response-abilities and affirmative human/Earth futurities.

Ranjan Datta (2024) in, *Relationality in Indigenous climate change education research: A learning journey from Indigenous communities in Bangladesh*, then focuses on the experiences and knowledge of Indigenous communities in the Chittagong Hill Tracts of Bangladesh to unravel the intricate web of connections between community members, their environments and the impacts of climate change. The goal of this article is to amplify Indigenous voices in the discourse

surrounding climate change education, in acknowledging the unique ways in which these communities perceive, adapt to and resist environmental changes.

In [*Birdsong*]: *Pedagogies of attunement and surrender with more-than-human teachers*, Kay Sidebottom and Lou Mycroft (2024) adopt a critical posthumanist account to argue for different educational enactments that trouble nature/culture binaries and situate the learner as relationally entangled with the material world. Writing from affective and embodied encounters-with the Yorkshire Dales, Sidebottom and Mycroft disrupt sustainability education-as-usual and propose new modes of transdisciplinary teaching that leans into relational ethics of care to extend learning to something enacted with more-than-human kin for social and ecological justice.

Kinning in the ruins: The hope and action for creatures, critters and vegetable life

Bringing the unit of analysis to discursive *and* material forces comprising the relation between the individual and broader ecologies of the world, means that the story of humans as discrete, separate and autonomously empowered entities changes to stories of worldmaking as co-composed by multispecies. Crucially, as all bodies are enmeshed within a dense network of family relations knit together in a certain time and place, all bodies are kin; woven within and across kinscapes (Macdougall, 2011; Vowell, 2010). In the *Kinning in the ruins* cluster, authors demonstrate human stories as mutually imbricated with critters of many genders and kinds, all from within the particular and specific social and environmental conditions of their situated locales (Bennett, 2010; Haraway, 2016; Rautio, 2017b).

In *Lingering with multispecies kin: Re-turning to encounters between children, invertebrates, and amphibians*, Jenny Byman, Kristiina Kumpulainen and Jenny Renlund (2024) explore multispecies education research and practice within an ethnographic study in a Finnish primary school. Creating new avenues for thinking about multispecies relationalities, Byman and colleagues show how children's lingering encounters with clay, waste materials, photographs and stop-motion animation opened up active silences, slow rhythms and awkward becomings within unfamiliar worlds and temporalities of invertebrates and amphibians.

Casey Myers and Rachael Kovalchin (2024) then take the reader on a journey through a diffractive mapping of movement in early childhood education contexts, in *'How do bugs move us?': Becoming different(ly) with/in the more-than-human movement(s) of the early years classroom*. Exploring more-than-human movements during classroom encounters between young children, animals and plants, Myers and Kovalchin argue that a complex (meta)physics of more-than-human movement affords literal and conceptual turning, enmeshing, decentering, connecting and rupturing; and thus, these authors literally *move* early years teachers (and learners) to relational accountability with multispecies.

Along similar lines of flight that disrupt anthropocentrism, in *Assemblages in flight: Flickering ontologies and wildness in the formation of multispecies assemblages*, Peter Renshaw, Kirsty Jackson and Ron Tooth (2024) adopt research-as-assemblage to foreground the vitality and relational agency of other species as they encounter humans. Illuminating three environmental excursions that encompass multispecies entanglements between the child, the Crow, the Sea Eagle and the Bee, these authors show how rhizomic networks are materially and discursively formed across time and space, while occurring within an affective milieu characterised by sensory attentiveness and attunement to the affective power of 'chanciness' and coincidence. Bringing forth an ontological flickering, Renshaw and colleagues recognise their incomplete becoming-with-others-as-researchers and acknowledge the Crow the Sea Eagle and the Bee as powerful teachers.

Next, Elizabeth Boileau (2024) in *Navigating approaches to 'thinking with': A discussion of the practicalities of posthuman research involving young children*, provides an exploration of posthuman thinking/doing to navigate the planning and conducting of research-with more-than-human worlds. Situated in a multispecies ethnographic study in a forest school programme in

Canada, Boileau traverses methods of non-participant observation, ‘sit spots,’ and the use of wearable cameras to film different perspectives as ways to disrupt the dominant anthropocentric lens in early childhood education for sustainability and beyond.

In, *Solitary but not alone: Materialising boundaries at a distance with a leafcutter bee’s nest*, Amalie Strange (2024) queries the boundary with a leafcutter bee to demonstrate that nature is not a concept embedded within the human experience but is produced through human-and-more-than-human relationality. In this situated example, Strange shows how environmental education is made possible by the productive constraints of respecting more-than-human boundaries and how humans can practice being attentive to the intra-actions of more-than-humans when they are not physically present, are only speculated to be present, or are present through artefacts. As Strange suggests, limited proximity, therefore, is no longer prohibitive but productive in dismantling nature/culture binaries and blurring the boundaries between humans and more-than-humans without violating the agency asserted by more-than-humans.

Finally, in *Planty childhoods: Theorising with a vegetal ontology in environmental education research*, Sneha Parmar, Karen Malone and Tracy Young (2024) focus on human-plant relations through a vegetal ontological approach, as a mode of a relational ontology intersecting through posthumanist, new materialist and Indigenous approaches to environmental education research. Putting this vegetal ontology to work, Parmar and colleagues situate their work within childhood-plant encounters in a botanical garden setting and turn to ancient Indian (Vedic) traditions to help abandon hierarchical comparisons of plants, who are often historically positioned as ‘lesser species,’ mere ‘objects’ and ‘resources.’

Playing in the ruins: The hope and action for productive technologies

In this cluster, ruins act as sites for playful inquiry (Gibbons, 2007) at the margins as authors show how multispecies worlds are co-composed at the intersections of traditional and innovative technologies. For instance, David Rousell and Jessica Tran (2024) in, *Thinking with forests as sentient societies: Toward a pedagogy and ethic of immanent care*, find resonance with Indigenous knowledges which have long recognised trees as intelligent and caring creatures. In this article, Rousell and Tran explore three empirical examples located in Naarm (Melbourne, Australia); namely an immersive theatre production titled *Wood Wide Web*; a data set from *Melbourne Urban Forest*, which is a digital platform that enables urban citizens to map and interact with over 70,000 individual trees across the city; and the *Greenline masterplan*, which aims to revitalise the north bank of the Birrurung (Yarra) River. Troubling Western images of thought, learning, communication, care and familial structures onto nonhuman forms of sociality, the authors speak to the contours of emplaced, relational and pluralist ontologies of Indigenous sciences and Traditional Ecological Knowledge (TEK) systems for rethinking environmental education considering the current convergence of digital and vegetal ecologies.

Next, in *An anthropologist fails to become a fish: Multispecies sensing in the Anthropocene*, Matthew Buttacavoli (2024) provides an autoethnography that describes how he sought to listen to the Great Barrier Reef off the Queensland coast in Australia, through mediating technologies and artistic practices that draw analogies between ethnocentrism/cultural relativism and anthropocentrism/ecocentrism. In creating an experiential relationship with the environment, Buttacavoli does not shy away from methodological failures and roadblocks, but illuminates the messy, contingent and contextualised difficulties in understanding non-human sensory worlds.

Finally, Jonathan Lynch and Herbert Thomas (2024) break down dualisms and human centric thinking and challenge neoliberal and capitalist education that focusses on outcomes and achievements through a (re)conceptualising of digital technology as something learners are entangled with in, *Digital Technology in outdoor and environmental education: Affects, assemblages and curriculum-making*. Rejecting a dualistic positioning of humans and technology,

Lynch and Thomas adopt a new materialist inspired research project to explore video-making and local places and offer a nuanced way of understanding how digital technology could be harnessed in environmental education.

Belonging in the ruins: The hope and action for relational care ethics

Relational ontologies, multispecies worlds and transdisciplinary possibilities for environmental education do not dissociate from, or seek to transcend assumptions, practices and outcomes taken for granted in environmental education. Nor do they seek to reveal the oppressive elements of environmental education by examining how, or what might be silenced, hidden and/or constrained in the field. These examples are set within discursive narratives of what environmental education should and should not look like. Rather, cultivating a rich and fluid dialogue between diverse epistemic, ethical and political worlds, relational ontologies, multispecies worlds and transdisciplinary possibilities for environmental education move from a focus on 'either/or' logics to logics of 'and . . . and . . . and' through accounts imbued with material and discursive forces in worldmaking. Gilles Deleuze and Félix Guattari (1987) referred to this kind of worldmaking practice as an ecosophy of becoming; Isabelle Stengers (2005) referred to it as an ecology of practices; Donna Haraway (2008) referred to it as becoming-with;² and Brian Massumi (2015) referred to it as belonging-together. Importantly, and as authors pay attention to in this cluster, when we say *belonging in the ruins*, we are attentive to *what* systems and structures we are seeking to belong to. As Whitehouse (2022) reminds us, "Attentiveness is an invitation to kinship, and to kinship" (p. 229).

In *A water[shed] moment for articulating a professional practice of education resource creation*, Abbey MacDonald and Kim Beasy (2024) sought different ways of knowing across the water[shed] project from diverse perspectives (of artists, writers, environmental and social change organisations, curators, designers, teachers), environmental ethics, multi-species, culture and place of Lake Pedder in Tasmania. Through the mediating lens of UNESCO's pillars of education, MacDonald and Beasy explicate a process of relational and collaborative meaning making to present a practice and process of education resource creation using multi-modal content that entangles global education and conservation agendas.

Then, Angela Malloy Murphy (2024) in *What world is knocking? Responding to a world in crisis with polyphonic storying*, makes a case for planetary degradation at the hands of White, Western, colonial, positivist, supremacist, anthropocentric thinking. Reconceptualising environmental education as a vehicle to (re)story the value of our earthly relations, Malloy Murphy counters human exceptionalist narratives and acknowledges the entangled nature of our existence to 'keep the way open' more livable worlds for all.

In *Mess-making as a force for resistance: Reimagining environmental educational research and practice for multispecies flourishing*, Hannah Hogarth and Charlotte Hankin (2024) employ 'mess-making' as an act of resistance to narratives of progress, consumption, linearity, categorisation, control and rationality. Through postqualitative approaches to environmental education research, Hogarth and Hankin rethink the neat and tidy relations that have caused

²We do not intend to conflate these various iterations of becoming as one and the same. For example, Haraway (2008) strongly argues that her "dance of 'becoming-with' has no truck with the fantasy wolf-pack version of 'becoming-animal' figured in Deleuze and Guattari's famous section of *A Thousand Plateaus*, '1730: Becoming-Intense, Becoming-Animal, Becoming-Imperceptible' (p. 27)." Although Haraway has similar wants, namely a move beyond the 'Great Divide' between humans and other species, "to find the rich multiplicities and topologies of a heterogeneously and nonteleologically connected world" (p. 27), she sees Deleuze and Guattari as having a lack of curiosity for the ordinary or everyday connections to actual animals. Which is to say, Haraway argues that Deleuze and Guattari's philosophy of becoming is missing a serious grounded earthy attachment to actual non-human animals. These nuanced arguments aside, we (Kathryn, Scott and Paulina), as well as some of the authors in this Special Issue, have found Haraway, Deleuze and Guattari, and many more philosophers and philosophies of becoming generative to think with.

damage in more-than-human relations. They conceptualise how ‘we’ as ecosystems of thriving life forms are constantly living, learning and dying together and illuminate the potential for educational futures that support multispecies flourishing.

Finally, in *Caring enough to counter extinction: The work of volunteer bat carers and educators in tropical Queensland, Australia*, Hilary Whitehouse (2024) adopts a document case study approach to narrate aspects of the kinship work of a network of carers and educators of flying foxes. Conceptualising “kinship as a form of caring for other-than-human kin” (p. 363), Whitehouse suggests that volunteering to care and educate for Australian flying mammals is a form of activism for interspecies justice in a nation with a mammalian extinction crisis.

What do we do from here?

Kathryn, Scott and Pauliina, as Guest Editors of this Special Issue, duly acknowledge that we need to fight for ecological and social justice. As activists for change, we need to take a stand and rage and rally against what appears to be a very unjust and unbalanced world. In these moments of what Braidotti (2010) called negative bonding with ‘Other(s),’ we plunge into antihumanist protest to help dismantle ecological and social forces, tearing down the structures that oppress ‘Other(s).’ Yet in identifying all the things we stand for and all the things we stand against, we reify dualistically positioned allies and enemies. Thus, binary classifications remain. On the other end of the spectrum, we are often bowled over by the relentless and ongoing devastations to our planet and these feelings tend to prompt the disembodied fantasy of transhumanist escape. In these moments, we seek to become more animal than (capitalist) machine, denying all evidence that we too are complicit in the impoverished systems of a commercialised and exploited Earth. Placing social and ecological crises as a threat somewhere out in the future, on another part of the planet (usually away from Western audiences) (Berkman *et al.*, 2022), there is a tendency to become dislocated and distanced from difficult and uncomfortable realities of the world. Thus, binary classifications remain.

Relational and sustainability solidarities between people and with the Earth, however, does not mean standing *apart from* what it is we are seeking to understand, or heal, but understanding we are *a part of* the very relational tissue that hold us together within a finite and shared planet – albeit differently (Akómoláfé, 2023). Transforming ecological and social crises narratives into a more liveable planet for all is a posthumanist project that does not ‘rage against the machine’ through the same logics of control, exploitation, extraction and domination producing ecological and social precarity, injustices and threats in the first place. Rather, the posthuman project troubles the status quo *and* (re)invigorates affirmative patterns of becoming and belonging from within and beyond impoverished systems (Haraway, 2016). We are not attempting to eradicate old stories through an inevitable backward drag to habits of thought rooted in linear thinking, but to take up new and different lines of flight with, and alongside, these stories in an entangled assemblage of and...and...and...We also appreciate ethical and political tensions in celebrating the ‘not yet,’ understanding that some people might have more to lose amidst ongoing and escalating social and ecological crises than others.

As you engage with this Special Issue, we invite you to critically and creatively consider your own lures and sensings, all the while urging you to continually bring into question the difference between bodily sensings that act-with the world, and observations of bodily sensings that tend to entrap and enclose a humancentric self back into introspective and reflective states. Attuning to inwards and outwards affective flows that entangle the body with broader ecologies of the world, we invite you to critically and creatively consider the ongoing implications of your grounded stories and how they might reach out and affect the world, as the world is simultaneously reaching in and affecting you. Malloy Murphy (2024) eloquently illustrated Plumwood’s (2002) plight that, “our problem lies not in silence but in a certain kind of deafness” (p. 22); a call that is clearly understood by Buttacavoli (2024) through his exploration to find ways to listen to the Great

Barrier Reef off the Queensland coast in Australia. Following Buttacavoli, we need to learn to hear; and to enact bumptious, or agitating, kinds of responses to this worldly affected/affecting relationship through non-linear ruptures into possibility that refuse anthropocentric bounded individualism, while wrestling, kinning, playing and belonging in the ruins to invent new pathways in becoming something different. We end this Editorial with an opening, asking whose knowledges, experiences and worlds are inadvertently, or on purpose, prioritised in environmental education (Todd, 2015)? Bringing into question the asymmetrical flows that shape the relational space, we ask whose worlds are we attempting to make more livable and whose temporal horizons are our futures composed of?

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Ethical standard. Nothing to note.

References

- Akómoláfé, B. (2023). Closing keynote by Báyo Akómoláfé: Reflections on democracy and belonging [Video]. YouTube. <https://www.youtube.com/watch?v=ZuScRIYENJc>.
- Arendt, H. (1961). *Between past and future: Six exercises in political thought*. Faber & Faber.
- Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.
- Bazzul, J. (2023). *An intense calling: How ethics is essential to education*. University of Toronto Press.
- Bennett, J. (2010). *Vibrant matter: A political ecology of things*. Duke University Press.
- Berkman, P.A., Vylegzhanin, A.N., Young, O.R., Balton, D., & Øvretveit, O.E. (2022). *Building common interests in the Arctic Ocean with global inclusion*. Springer.
- Boileau, E. (2024). Navigating approaches to “thinking with”: A discussion of the practicalities of posthuman research involving young children. *Australian Journal of Environmental Education*, 40(2), 216–230.
- Braidotti, R. (2010). Nomadism: Against methodological nationalism. *Policy Futures in Education*, 8(3-4), 408–418. DOI: 10.2304/pfie.2010.8.3.408.
- Braidotti, R. (2011). *Nomadic theory: The portable Rosi Braidotti*. Colombia University Press.
- Braidotti, R. (2013). *The posthuman*. Polity.
- Braidotti, R. (2022). *Posthuman feminism*. Polity.
- Butler, J. (1993). Critically queer. *GLQ: A Journal of Lesbian and Gay Studies*, 1(1), 17–32. DOI: 10.1215/10642684-1-1-17.
- Butler, J. (2007). *Gender trouble: Feminism and the subversion of identity*. Routledge.
- Buttacavoli, M. (2024). An anthropologist fails to become a fish: Multispecies sensing in the Anthropocene. *Australian Journal of Environmental Education*, 40(2), 276–287.
- Byman, J., Kumpulainen, K., & Renlund, J. (2024). Lingering with multispecies kin: Re-turning to encounters between children, invertebrates, and amphibians. *Australian Journal of Environmental Education*, 40(2), 157–171.
- Castree, N. (2003). Environmental issues: Relational ontologies and hybrid politics. *Progress in Human Geography*, 27(2), 203–211.
- Ceder, S. (2018). *Towards a posthuman theory of educational relationality*. Routledge.
- Celermajer, D., Schlosberg, D., Rickards, L., Stewart-Harawira, M., Thaler, M., Tschakert, P., & Winter, C. (2022). Multispecies justice: theories, challenges, and a research agenda for environmental politics. *Trajectories in Environmental Politics*, 116–137.
- Clarke, D.A.G., & Mcphie, J. (2020a). Tensions, knots, and lines of flight: Themes and directions of travel for new materialisms and environmental education. *Environmental Education Research*, 26(9-10), 1231–1254. DOI: 10.1080/13504622.2020.1825631.
- Clarke, D.A.G., & Mcphie, J. (2020b). New materialisms and environmental education: Editorial. *Environmental Education Research*, 26(9-10), 255–1265. DOI: 10.1080/13504622.2020.
- Daigle, C. (2023). *Posthumanist vulnerability: An affirmative ethics*. Bloomsbury Publishing.
- Danowski, D., & Viveiros de Castro, E. (2017). *The ends of the world*. John Wiley & Sons.
- Datta, R. (2024). Relationality in Indigenous climate change education research: A learning journey from Indigenous communities in Bangladesh. *Australian Journal of Environmental Education*, 40(2), 128–142.
- de La Bellacasa, M.P. (2017). *Matters of care: Speculative ethics in more than human worlds*, vol. 41. U of Minnesota Press.

- Deleuze, G., & Guattari, F.** (1987). *A thousand plateaus: Capitalism and schizophrenia* (B. Massumi, Trans.). University of Minnesota Press.
- Ermine, W.** (2007). The ethical space of engagement. *Indigenous Law Journal*, 6(1), 194–201.
- Ermine, W.** (2011). Willie Ermine: What is ethical space? [YouTube Video]. *Different knowings*. <https://www.youtube.com/watch?v>. Accessed August 12, 2023.
- Gibbons, A.** (2007). Playing the ruins: The philosophy of care in early childhood education. *Contemporary Issues in Early Childhood*, 8(2), 123–132. <https://journals.sagepub.com/doi/pdf/10.2304/ciec.2007.8.2.123>
- Ginn, F.** (2023). Plants for a cold cosmos: Planetary vegetal thresholds. *GeoHumanities*, 9(2), 569–583. DOI: [10.1080/2373566X.2023.2256824](https://doi.org/10.1080/2373566X.2023.2256824).
- Haraway, D.** (2008). *When species meet*. University of Minnesota Press.
- Haraway, D.** (2016). *Staying with the trouble: Making kin in the Chthulucene*. Duke University Press.
- Hogarth, H., & Hankin, C.** (2024). Mess-making as a force for resistance: Reimagining environmental educational research and practice for multispecies flourishing. *Australian Journal of Environmental Education*, 40(2), 340–358.
- Hultman, K., & Lenz Taguchi, H.** (2010). Challenging anthropocentric analysis of visual data: A relational materialist methodological approach to educational research. *International Journal of Qualitative Studies in Education*, 23(5), 525–542. DOI: [10.1080/09518398.2010.500628](https://doi.org/10.1080/09518398.2010.500628).
- Husserl, E.** (1991). *Cartesian meditations: An introduction to phenomenology*. Springer.
- Hyvärinen, P.** (2019). Beekeeping expertise as situated knowing in precarious multispecies livelihoods. *Sociologia*, 56(4), 365–381.
- Jackson, A.Y. & Mazzei, L. A.** (2017). Thinking with theory: A new analytic for qualitative inquiry, *The SAGE handbook of qualitative research*. 5th edition, Sage Publications, Two Regimes of Madness: Texts and Interviews.
- Jukes, S.** (2023). *Learning to confront ecological precarity: Engaging with more-than-human worlds*. Springer.
- Jukes, S., Clarke, D., & Mcphie, J.** (2022). The wisp of an outline ≈ Storying ontology as environmental inquiry↔education. *Australian Journal of Environmental Education*, 38(3-4), 328–344. DOI: [10.1017/ae.2021.31](https://doi.org/10.1017/ae.2021.31).
- Jukes, S., & Riley, K.** (2024). Experiments with a dark pedagogy: Learning from/through temporality, climate change, and species extinction (. . . and ghosts). *Australian Journal of Environmental Education*, 40(2), 108–127.
- Kirksey, S.E., & Helmreich, S.** (2010). The emergence of multispecies ethnography. *Cultural Anthropology*, 25(4), 545–576.
- Kirksey, S.E., Shapiro, N., & Brodine, M.** (2013). Hope in blasted landscapes. *Social Science Information*, 52(2), 228–256. https://multispecies-salon.org/publications/Kirksey-et-al_Hope-in-Blasted-Landscapes.pdf.
- Liboiron, M.** (2021). *Pollution is colonialism*. Duke University Press.
- Lynch, J., & Thomas, H.** (2024). Digital Technology in outdoor and environmental education: Affects, assemblages and curriculum-making. *Australian Journal of Environmental Education*, 40(2), 288–304.
- MacDonald, A., & Beasy, K.** (2024). A water[shed] moment for articulating a professional practice of education resource creation. *Australian Journal of Environmental Education*, 40(2), 305–321.
- Macdougall, B.** (2011). *One of the family: Metis culture in nineteenth-century northwestern Saskatchewan*. UBC Press.
- Malloy Murphy, A.** (2024). What world is knocking? Responding to a world in crisis with polyphonic storying. *Australian Journal of Environmental Education*, 40(2), 322–339.
- Malone, K., Tesar, M., & Arndt, S.** (2020). *Theorising posthuman childhood studies*. Springer Nature. DOI: [10.1007/978-981-15-8175-5](https://doi.org/10.1007/978-981-15-8175-5).
- Manning, E.** (2016). *The minor gesture*. Duke University Press. DOI: [10.1215/9780822374411](https://doi.org/10.1215/9780822374411).
- Martin, A.D., & Kamberelis, G.** (2013). Mapping not tracing: Qualitative educational research with political teeth. *International Journal of Qualitative Studies in Education*, 26(6), 668–679. DOI: [10.1080/09518398.2013.788756](https://doi.org/10.1080/09518398.2013.788756).
- Massumi, B.** (2015). *Politics of affect*. Polity Press.
- McKenzie, M., Henderson, J., & Nxumalo, F.** (2023). Climate change and educational research: Mapping resistances and futurities. *Research in Education*, 0(0), 1–8. DOI: [10.1177/0034523723120307](https://doi.org/10.1177/0034523723120307).
- Myers, C., & Kovalchin, R.** (2024). “How do bugs move us?”: Becoming different(ly) with/in the more-than-human movement(s) of the early years classroom. *Australian Journal of Environmental Education*, 40(2), 172–199.
- Oliver, K.** (2001). *Witnessing: Beyond recognition*. U of Minnesota Press.
- Pacini-Ketchabaw, V., Taylor, A., & Blaise, M.** (2016). Decentring the human in multispecies ethnographies. In *Posthuman research practices in education* (pp. 149–167). Palgrave Macmillan UK.
- Parmar, S., Malone, K., & Young, T.** (2024). Plantly childhoods: Theorising with a vegetal ontology in environmental education research. *Australian Journal of Environmental Education*, 40(2), 243–257.
- Plumwood, V.** (2002). Decolonisation relationships with nature. *PAN: Philosophy Activism Nature*, 2, 7–30.
- Poelina, A., Paradies, Y., Woollorton, S., Guimond, L., Jackson-Barrett, L., & Blaise, M.** (2023). Indigenous philosophy in environmental education. *Australian Journal of Environmental Education*, 39(3), 269–278.
- Rautio, P.** (2017a). A super wild story: Shared human-pigeon lives and the questions they beg. *Qualitative Inquiry*, 23(9), 722–731. DOI: [10.1177/1077800417725353](https://doi.org/10.1177/1077800417725353).
- Rautio, P.** (2017b). Thinking about life and species lines with Pietari and Otto (and garlic breath). <https://oulurepo.oulu.fi/bitstream/handle/10024/23630/nbnfi-fe201903128644.pdf?sequence=1>.

- Renshaw, P., Jackson, K., & Tooth, R.** (2024). Assemblages in flight: Flickering ontologies and wildness in the formation of multispecies assemblages. *Australian Journal of Environmental Education*, 40(2), 200–215.
- Reynolds, J.** (2004). *Merleau-Ponty and Derrida: Intertwining embodiment and alterity*. Ohio University Press.
- Riley, K.** (2023). *(Re) storytelling human/earth relationships in environmental education: Becoming (partially) posthumanist*. Springer Nature.
- Riley, K., & White, P.** (2019). 'Attuning-with,' affect, and assemblages of relations in a transdisciplinary environmental education. *Australian Journal of Environmental Education*, 35(3), 262–272. DOI: [10.1017/ae.2019.30](https://doi.org/10.1017/ae.2019.30).
- Ringrose, J.** (2011). Beyond discourse? Using Deleuze and Guattari's schizoanalysis to explore affective assemblages, heterosexually striated space, and lines of flight online and at school. *Educational Philosophy & Theory*, 43(6), 598–618. DOI: [10.1111/j.1469-5812.2009.00601.x](https://doi.org/10.1111/j.1469-5812.2009.00601.x).
- Rose, D.B.** (2011). *Wild dog dreaming: Love and extinction*. University of Virginia Press.
- Rosiek, J.L., Snyder, J., & Pratt, S.L.** (2020). The new materialisms and Indigenous theories of non-human agency: Making the case for respectful anti-colonial engagement. *Qualitative Inquiry*, 26(3-4), 331–346.
- Rousell, D., & Cutter-Mackenzie-Knowles, A.** (2020). Uncommon worlds: Toward an ecological aesthetics of childhood in the Anthropocene. In *Research handbook on childhoodnature: Assemblages of childhood and nature research* (pp. 1657–1679). Springer.
- Rousell, D., & Tran, J.** (2024). Thinking with forests as sentient societies: Toward a pedagogy and ethic of immanent care. *Australian Journal of Environmental Education*, 40(2), 258–275.
- Seigworth, G.J., & Gregg, M.** (2010). An inventory of shimmers. In M. Gregg & G.J. Seigworth (Eds.), *The affect theory reader*. Duke University Press.
- Sidebottom, K., & Mycroft, L.** (2024). [Birdsong]: Pedagogies of attunement and surrender with more-than-human teachers. *Australian Journal of Environmental Education*, 40(2), 143–156.
- Stengers, I.** (2005). Introductory notes on an ecology of practices. *Cultural Studies Review*, 11(1), 183–196.
- Stengers, I.** (2017). Autonomy and the intrusion of Gaia. *The South Atlantic Quarterly*, 116(2), 381–400.
- Strange, A.** (2024). Solitary but not alone: Materialising boundaries at a distance with a leafcutter bee's nest. *Australian Journal of Environmental Education*, 40(2), 231–242.
- Strom, K.J., & Martin, A.D.** (2017). *Becoming-teacher: A rhizomatic look at first year teaching*. Springer.
- Strom, K.J., & Viesca, K.M.** (2021). Towards a complex framework of teacher learning-practice. *Professional Development in Education*, 47(2-3), 209–224. <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1449&context=teachlearnfacpub>.
- TallBear, K.** (2014). Standing with and speaking as faith: A feminist-indigenous approach to inquiry. *Journal of Research Practice*, 10(2), 1–7. <http://jrp.icaap.org/index.php/jrp/article/view/405/371>.
- Todd, Z.** (2015). Indigenizing the Anthropocene. *Art in the Anthropocene: Encounters among Aesthetics, Politics, Environments and Epistemologies*, 241, 254.
- Todd, Z.** (2016). An Indigenous feminist's take on the ontological turn: 'Ontology' is just another word for colonialism. *Journal of Historical Sociology*, 29(1), 4–22.
- Tsing, A.L.** (2014). Blasted landscapes (and the gentle arts of mushroom picking). In E. Kirksey (Ed.), *The multispecies salon* (pp. 87–109).
- Tuck, E., McCoy, K., & McKenzie, M.** (2014). Land education: Indigenous, post-colonial, and decolonizing perspectives on place and environmental education research. *Environmental Education Research*, 20(1), 1–23. DOI: [10.1080/13504622.2013.877708](https://doi.org/10.1080/13504622.2013.877708).
- Van Dooren, T., Kirksey, E., & Münster, U.** (2016). Multispecies studies: Cultivating arts of attentiveness. *Environmental Humanities*, 8(1), 1–23. DOI: [10.1215/22011919-3527695](https://doi.org/10.1215/22011919-3527695).
- Vowel, C.** (2022). *Buffalo is the new buffalo*. Arsenal Pulp Press.
- Walsh, Z., Böhme, J., & Wamsler, C.** (2021). Towards a relational paradigm in sustainability research, practice, and education. *Ambio*, 50(1), 74–84.
- Watts, V.** (2013). Indigenous place-thought and agency amongst humans and nonhumans (First Woman and Sky Woman go on a European world tour!). *Decolonization: Indigeneity, Education & Society*, 2(1), 20–34.
- Whitehouse, H.** (2022). The extinction crisis. In K. Sims, N. Banks, S. Engel, P. Hodge, J. Makuwira, N. Nakamura, J. Rigg, A. Salamanca & P. Yeophantong (Eds.), *The Routledge handbook of global development*. Routledge. <https://doi-org.uml.idm.oclc.org/10.4324/9781003017653>.
- Whitehouse, H.** (2024). Caring enough to counter extinction: The work of volunteer bat carers and educators in tropical Queensland, Australia. *Australian Journal of Environmental Education*, 40(2), 359–370.

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