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More-Than-Human Borderlands and Mobilities

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1. Introduction to the Theme of the Special Issue

This editorial contextualizes the research presented in the special issue on *More-than-Human Borderlands and Mobilities*. The contributions seek to unravel some of the complex more-than-human assemblages that constitute spatial mobilities and territorial bordering processes. The five research articles engage with emerging debates on posthuman border studies through empirical case studies from different regional contexts in Europe and Asia. They signal the productive potentials for scholars to integrate nonhuman entities into the study of borders and cross-border movements.

The special issue explores intersections between critical border studies and more-than-human geographies. Since the early 2000s, posthuman and more-than-human approaches have risen to prominence across different sub-disciplines and thematic strands of human geography. As an early proponent, Whatmore (2002) called for the development of hybrid geographies focusing on the "intimate, sensible and hectic bonds through which people and plants; devices and creatures; documents and elements take and hold their shape in relation to each other in the fabric-ations [sic!] of everyday life" (Whatmore, 2002, p. 3; see also Whatmore, 2017). More-than-human geographies attend to the complex interactions—or "intra-actions" (Barad, 2007)—between humans and a number of nonhumans, such as viruses, animals, plants, material objects, and technologies, while illustrating how the wayward relations between them exert agency in social and spatial processes (Asdal et al., 2016; Braun, 2005; Panelli, 2010; Whatmore, 2006). By doing so, more-than-human approaches point to the unruly potentials of living beings and materials beyond human forms of meaning-making through language and discourse, thus contributing to a recuperation of materiality in human geography (Fregonese, 2015; Müller, 2015; Whatmore, 2006).

The articles in this special issue explore the relevance of these perspectives for mobility and border studies and thereby contribute to the growing yet still underdeveloped field of more-than-human border studies (see, however, Barry, 2024; Boyce, 2016; Chuengsa-

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tiansup & Limsawart, 2019; Fleischmann, forthcoming; Ozguc & Burridge, 2023; Squire, 2014; Sundberg, 2011). A number of scholars have argued against an ongoing anthropocentrism in critical border studies while calling for an integration of nonhumans as relevant actors in de- and re-territorialization processes (Oliveras-González, 2023; Ozguc & Burridge, 2023; Pugliese, 2021). In this spirit, we suggest looking at borders as more-than-human compositions spanning a multitude of human and nonhuman elements. The research discussed here explores how territorial borders filter, channel, or block (non-)human mobilities. The authors raise questions about how unruly border crossings of all kinds of beings and matters co-constitute, challenge, or subvert practices and infrastructures of border control.

The starting point is a shared concern that a sole focus on humans and their mobilities cannot explain the profound re- and de-bordering processes that have gained momentum over the last decade since the so-called European migration crisis in 2015. Against the background of highly selective and securitized border regimes, border enforcement through walls, fences, and other material infrastructures plays an increasing role (Błaszczyk et al., 2024; Koca, 2019). Moreover, the COVID-19 pandemic was met with massive restrictions on mobilities and set in motion profound (re)bordering processes (see Butsch et al., 2024; Cole & Dodds, 2021; Cresswell, 2020; De Genova, 2022; Radil et al., 2020; Shachar, 2020; Wille & Weber, 2020). In parallel, the spreading of other infectious diseases, such as African swine fever (ASF), led to a proliferation of border fences that target potential border crossers of a nonhuman kind; wild boars acting as vectors of the pig virus, which is currently depicted as the most threatening global animal disease (see Broz & Harrisson, 2025; Eilenberg & Harrisson, 2023; Fleischmann, 2025; Svendsen, 2021).

Yet, at the same time, the uninterrupted flows of materials and (lively) commodities continue to be framed as a central priority for food and energy supplies (Cresswell, 2011, 2014, 2020). Cross-border mobilities are also increasingly dependent on material infrastructures of selection, such as digital technologies and logistics (Amoore, 2024; Olwig et al., 2019; Schindel, 2016). Nonetheless, animals, plants, and humans continue to cross borders in unruly ways and thus challenge administrative concerns and jurisdictions (see Boyce, 2016; Hodgetts & Lorimer, 2020). In addition, rivers, the climate, and geological features play a role in the co-constitution of state and administrative borders in both symbolic and material ways (see Pallister-Wilkins, 2022; Thomas, 2021).

In sum, territorial borders are neither exclusively reproduced through human forms of meaning-making nor against the sole background of the cross-border mobilities of humans. Instead, they are also effective for and co-constituted through our manifold relations with a nonhuman world and its mobilities. Acknowledging these aspects helps to pave the way for a more-than-human conception of border studies.

2. Towards More-Than-Human Border Studies

The articles in this special issue engage in discussions on the more-than-human dimensions of territorial borders and border control (Chuengsatiansup & Limsawart, 2019; Ozguc & Burridge, 2023; Pallister-Wilkins, 2022; Squire, 2014). We think that there is untapped potential here to merge debates in critical border studies and more-than-human geographies.

On the one hand, critical border studies have contributed to the now common understanding of territorial borders as constantly in flux and as continually emerging, being (un)made and (de)stabilized through social and political processes (see Paasi, 2001, 2009; Parker & Vaughan-Williams, 2009). Departing from previous understandings of borders as "natural" lines, there is a rich strand of literature analyzing how borders become continuously enacted and re-produced through different political and cultural practices of various state and non-state actors (Balibar, 2009; Newman, 2006; Paasi, 2001, 2009; Rumford, 2012). This processual and performative understanding has contributed to a multiplication of borders, with a diversification of actors and sites that might potentially be included in studies of de- and re-bordering processes (Kraler et al., 2016; Mezzadra & Neilson, 2013; Sohn, 2016). What follows from this is that bordering not only takes place at the margins of territories but also plays out in everyday practices that might potentially be located at a considerable distance to the administrative borderline (Amilhat Szary & Giraut, 2015). This is mirrored in a shift away from an understanding of borders as lines on the map towards *borderlands* (Anzaldúa, 2012; Balibar, 2009; Brunet-Jailly, 2011) or *borderscapes* (Brambilla & Jones, 2020; Brambilla et al., 2015; Dell'Agnese & Amilhat Szary, 2015). Scholars have also focused on

the everyday practices that continue to subvert or challenge borders, for instance, if humans or goods cross borders irregularly (Bruns & Miggelbrink, 2012; De Genova, 2017) or on the emotional layers of bordering processes (Beurskens, 2023). Yet, despite this ontological opening of critical border studies, researchers have mainly looked at humans and their meaning-making processes (Oliveras-González, 2023; Ozguc & Burridge, 2023). Approaching territorial borders as entirely human-made—and thus as cultural fabrications—risks overstating the role of humans in bordering processes while reifying nature-culture dichotomizations (Ramutsindela, 2015).

On the other hand, the questioning of dominant binary thinking and related boundary work has played a major role in more-than-human geographies (see Pütz & Schlottmann, 2020). For instance, scholars have critically unraveled the processes of boundary-making between nature/culture, human/animal, and object/subject, while pointing at the often violent effects of such "agential cuts" (Barad, 2003, 2007) and their manifestation in spatial demarcations and practices of separation and abjection (Atchison & Pilkinton, 2022; Fleischmann, 2023; Fleischmann & Everts, 2024; Kornherr & Pütz, 2022). In order to blur dominant categorizations and dichotomizations, scholars have focused on the transgressive qualities of nonhumans, pointing out how they inhabit "unruly edges" (Tsing, 2012) from which they disrupt spatial practices of governing and ordering (Jerolmack, 2008; Philo, 1995; Yeo & Neo, 2010). For instance, they focus on species that are approached as ostensible urban problem animals, illustrating their disruptive potentials for conventional orderings in the city: animals frequently refuse to stay within their ascribed boundaries, intruding instead into spaces that are perceived as being exclusively reserved for humans (de Bondt et al., 2023; Kornherr & Pütz, 2022; Philo & Wilbert, 2000; Rutherford, 2018). Others unravel practices of symbolic boundary-making and territorial bordering practices in the context of nature conservation (Arney, 2024; Hawkins & Paxton, 2019; Pütz & Schlottmann, 2020; Ramutsindela, 2015; Valdivia et al., 2014).

We thus think that there is fruitful potential to combine the performative and processual approach to territorial borders with a relational understanding that takes the transgressive and disruptive potentials of more-than-human assemblages into account, thereby avoiding anthropocentric simplifications and nature-culture dichotomizations. This might also come with potentials to enrich recent advances towards a complexity approach in critical border studies (Brambilla, 2024; Wille, 2024). A more-than-human framework approaches territorial borders not as sole products of human intentions and practices but rather centers on the complex relations that unfold between a range of entities, including humans, animals, viruses, plants, terrains, materials, and technologies through bordering processes. As Ozguc and Burridge (2023) argue, "the border is a constantly moving space that is created, maintained and/or dismantled through entanglements with human and nonhuman lives and things" (p. 473). This understanding resonates with works in political geography that have scrutinized how animals, materials, substances, technologies, and viruses do not form passive backdrops of acts of governing but must be regarded as co-constitutive elements therein (see Braun et al., 2010; Fleischmann & Everts, 2024; Fregonese, 2015; Hobson, 2007; Müller, 2015). Thus, nonhumans are elements of networks of power and are entangled in asymmetrical hierarchies with other animate and inanimate entities (Hovorka, 2018)—what becomes explicit in bordering processes.

Along these lines, a fruitful discussion has emerged that approaches borders as more-than-human compositions. For instance, Boyce (2016) analyzes the failed implementation of the U.S. border enforcement technology SBInet at the U.S.-Mexico border. Boyce argues that it engaged in an act of "technological rebellion," resisting and refusing the cooperation with border enforcement (Boyce, 2016, p. 249). He also outlines the wayward role of other nonhumans: "The climate, topography and inhabitants of the border region have never fully cooperated. Instead, even as they pose formidable obstacles to unauthorized crossers, these same forces, objects, and conditions continuously disrupt, frustrate, and constrain enforcement operations" (Boyce, 2016, p. 257). Others have pointed to the adverse effects of fortified borders on nonhumans, for instance, jaguars at the U.S.-Mexico border (Błaszczyk et al., 2024). Pallister-Wilkins (2022) analyzes how the entanglements of terrain, weather, water, and vegetation alongside transport infrastructure co-produce the journeys of illegalized migrants across the Alps. A number of works also look more specifically at the complex borderscapes that are co-produced by rivers (Kanesu, 2024; Kanesu et al., 2025; Thomas, 2021). Cons and Eilenberg (2024) analyze the role of feral pigs in assembling the Texas frontier, while Margulies (2024) discusses the potential of

sonic methods for grasping the atmospheric and sensory affects of more-than-human borders. Territorial bordering processes thus mix and mingle humans and nonhumans in unexpected ways, thereby opening up agendas for future research in diverse empirical contexts as well as for developing innovative methodologies.

Within these debates, the articles in this special issue contribute to three primary areas. The first one is a palpable interest in more thoroughly engaging with questions relating to the agency of nonhumans in bordering processes, in particular, with their ability to transgress and thereby challenge administrative borderlines. For instance, Steiner & Schröder (this issue) illustrate how the unruly mobilities of wolves potentially conflict with and challenge human practices of b/ordering wilderness in the Swiss Calanda region. Pampus (this issue) points out how specialized animal and plant species complicated the exertion of economic interests in relation to lignite mining in the Central German Mining District. Moreover, in her article on the management of ASF in the German-Polish border region, Fleischmann (this issue) illustrates how different entities forged wayward relations that repoliticized the erection of veterinary fences in Germany and brought them under critical scrutiny and contestation. In another article, Kim (this issue) demonstrates how the Korean governments strategically employed and co-opted the agency of nonhumans for the production of biosecurity, which is mirrored in the involvement of natural enemies, such as bugs, in efforts to manage tree diseases. Last but not least, the article by Oelke and Jarynowski (this issue) integrates considerations on the agency of animals in the conceptualization of sovereignty. Taken together, the articles in this special issue illustrate that nonhumans constitute agents in bordering processes through their ability to constantly exceed and complicate human efforts regarding border control and enforcement.

Secondly, the articles demonstrate the need to consider how nonhumans' own borders exceed and differ from the ones that humans intend for and ascribe to them. We thus call for a more thorough engagement with nonhumans' own approaches to border-making. In order to grasp this conceptually, we draw inspiration from Hodgetts and Lorimer's (2020) distinction between animal mobilities and animals' mobilities, whereby the apostrophe is important to "foreground a distinction between considerations of how animals have been spaced by humans, and animals' own lived geographies and experiences" (Hodgetts & Lorimer, 2020, p. 4). In this spirit, we suggest a similar distinction between *nonhuman borders* and *nonhumans' borders*, whereby the former implies the borders with which humans intend to limit the mobilities of nonhumans, while the latter indicates how nonhumans produce and experience borders differently. This resonates with Du Plessi's (2018, p. 391) attempt to conceptualize how infectious microbes "engage in bordering practices by determining where citizens can move around safely," thereby creating borders that are independent of human meaning-making. In this vein, Steiner & Schröder (this issue) also illustrate how wolves' borders exceed human understandings of the limits and spaces reserved for wilderness. In the Calanda region, wolves continuously adapt their mobilities and borders depending on their relations with humans. For instance, the authors argue that wolves' b/ordering processes are different during hunting season. Such a focus on nonhumans' borders allows for grasping how practices of border enforcement and control might actually create spaces where nonhumans flourish and thrive. Paradoxically, thus, humans' borderlands might become living spaces for nonhumans, as is demonstrated in the articles by Kim (this issue) and Pampus (this issue). Kim illustrates how the Demilitarized Zone (DMZ) between North and South Korea creates a hot spot for pine diseases, while Pampus (this issue) outlines how the moving extraction frontier of lignite mining creates habitats for rare and highly specialized animal species, such as the tawny pipit (*Anthus campestris*) or the wildcat (*Felis silvestris*). What follows from this is that territorial borders can turn into "more-than-human contact zones" (Isaacs & Otruba, 2019) or "beastly places" (Philo & Wilbert, 2000). Therefore, this special issue stresses the need to take nonhumans' own logics and experiences seriously to gain a more complex picture of how multiple borderings overlap or co-constitute each other.

Last but not least, a third common theme in three of the five articles that are included here is the relevance of a more-than-human understanding of borders, for instance, for studies on infectious diseases and biosecurity. This chimes in with scholars who point to the relevance of territorial borderings for the governing of infectious diseases and invasive species (Barker, 2015; Barry, 2024; Du Plessis, 2018; Edwards, 2025; Everts, 2015; Hinchliffe et al., 2013; Hinchliffe & Bingham, 2008). Respective works outline how nonhumans turn into unwanted border crossers when

they are classified as disease reservoirs or biosecurity threats (Braun, 2007; Eilenberg & Harrisson, 2023; Enticott, 2017). What comes out of the articles by Kim, Fleischmann, and Oelke and Jarynowski (this issue) is thus a need to consider the ontological primacy and autonomy of nonhuman mobilities in the management and governing of biosecurity. Nonhumans become targets of processes of securitization precisely because they transcend or counteract human intentions of border-making between healthy and diseased, pure and impure, native and foreign (see also Fleischmann, 2023, p. 5). For instance, in the context of ASF, the unruly relations that wild boars forge with a number of different entities in the German-Polish border region continuously counteract human efforts to protect the valuable pork industry, thus becoming framed as a biosecurity threat (see the articles by Fleischmann and Oelke & Jarynowski in this issue). What follows from this is a need to foreground the wayward and unruly mobilities of plants, animals, and viruses and their understanding as logically preceding government's attempts to make life safe.

3. More-Than-Human (Im)Mobilities

Another major focus in the research articles of the special issue is the relevance of a mobility lens for more-than-human border studies. Animals, plants, viruses, goods, and technologies are far from inert; they continually move in space and cross manifold borders. This special issue is thus very much in the spirit of a "nomadic metaphysics," as suggested by Cresswell (2006, p. 43). It starts from an ontological perspective "that emphasize[s] mobility and flow over stasis and attachment." The relations that are forged in a more-than-human world are in constant motion and emergence, subject to continuous change or, as Kwan and Schwanen (2016, p. 243) put it, "mobility is endemic to life, society, and space rather than exceptional." From our perspective, it is therefore central to analyze practices of border-making and border enforcement against the background of the ontological primacy and autonomy of a multiplicity of mobilities (De Genova, 2022). By doing so, this special issue speaks to the "mobility turn" or a "mobility paradigm" in the wider social sciences (Adey, 2010; Cresswell, 2011; Sheller & Urry, 2006).

The articles included here build from and contribute to a body of scholarship concerned with nonhuman mobilities. Many scholars have paid particular attention to the (im)mobilities of animals (Barua, 2014; Bull, 2011; Hodgetts & Lorimer, 2020; Nimmo, 2011; Whatmore & Thorne, 2000). As Cresswell (2014, p. 715) argues: "... animals (dead or alive) also move. Animals and animal parts frequently become visible in moments of panic. Many of the moral panics about animals have had mobility at their core." He thus points to the "productive encounter between animal geographies and the mobility turn" (2014, p. 715). Moreover, Birke et al. (2013) examine how animal mobilities are regulated through animal passports, while Hodgetts and Lorimer (2020) introduce the concept of animals' mobilities in order to stress animals' own sense-making processes and approaches to mobility, which differ from humans. Moreover, a number of works have looked at the mobilities of viruses and infectious diseases (Adey et al., 2021; Barry, 2024; De Genova, 2022; Law, 2006). This special issue expands these discussions through a more systematic account of the more-than-human assemblages that come together in mobilities. It illustrates how not only humans are highly mobile but how, in the context of mobility, manifold relations are formed that (dis)connect humans, animals, viruses, plants, things, and technologies in a variety of ways.

Taking inspiration from the distinction between animal mobilities and animals' mobilities (Hodgetts & Lorimer, 2020), the articles included here signal the productive potential to look more closely at nonhumans' own mobilities and how they exceed, disrupt, or counteract practices of border-making and border enforcement. From our perspective, it is central to approach nonhumans' mobilities in the plural form of the term in order to capture the multiple, at times overlapping spatial movements of entities and beings—movements that are characterized by different speeds, subjects, practices, or spaces of mobility (see also Cresswell & Merriman, 2011; Merriman, 2014, 2017).

As the articles of this special issue demonstrate, through their ability to form relations and bonds with other entities, nonhumans are not only mobile in their own right but can also become mediums or vectors, thus facilitating or impeding the spatial mobilities of other matters and beings. For instance, Kim (this issue) demonstrates how bugs' mobilities are strategically employed in order to limit the mobilities of pine tree diseases in the border region between North and South Korea. Fleischmann (this issue) shows how the wayward mobilities of wild boars, viruses, and a num-

ber of other nonhumans, as well as the relations that are formed between them, counteract the government's intention to hermetically seal the borderline with Poland.

Moreover, we foreground how an engagement with nonhumans' mobilities must necessarily look at simultaneous forms of immobility and immobilization (Hannam et al. 2006; van der Velde & van Naerssen 2011). The special issue thus seeks to advance a conceptual understanding that highlights how forms of nonhumans' mobility and immobility form a dialectical and ambivalent relationship—what is illustrated in the more-than-human co-constitution of borders. Taking inspiration from Cresswell (2014, p. 713) and Söderström et al. (2013), we thus suggest investigating controversial forms of nonhumans' mobilities, in particular those that are problematized in current political discourses and that give rise to contested practices of immobilization, bordering, and securitization.

4. Articles of the Special Issue

The articles included in the special issue evidence bordering processes as constantly emerging and as relational, questioning how they respond to the wayward mobilities of nonhumans—mobilities that logically precede, exceed, and transgress human practices of bordering and ordering.

Based on the case study of wolves in Switzerland's Calanda region, Steiner and Schröder (this issue) analyze more-than-human borderlands of wilderness. They look at how the boundaries between "the civilized" and "the wild" are co-constituted "by complex, relational, and hybrid entanglements of humans, animals, materialities, regulations, politics, discursive-material practices … and transactions" (Steiner & Schröder, this issue, p. 107). Forwarding a holistic transactional perspective, the authors draw on Karen Barad's (2004, 2007) notion of "intra-action" and John Dewey's anti-fundamentalist and classical pragmatist perspective in order to approach entities as "organisms-in-environment-as-a-whole" (Dewey & Bentley, 1949, LW.16.103). From their perspective, b/ordering always implies a discursive-material dimension. They illustrate this by pointing out how wolves' b/ordering processes change over time and adapt to hunting practices and other human activities in the Calanda region. What follows from this is that b/ordering processes are under continuous negotiation between humans and animals, while the agency of wolves, as well as of other involved animals, constantly exceeds human control, thus constituting fluid and dynamic borderlands of wilderness.

Drawing on qualitative fieldwork in the Eastern German state of Saxony, Fleischmann (this issue) looks at the territorial bordering processes that unfold in the context of biosecurity practices. She focuses on the management of ASF, a viral animal disease that affects both domesticated pigs and wild boars, in order to illustrate how border fencing presented a central technique of the government in attempts to limit the wayward mobilities of wild boars—animals that were depicted as an important vector and reservoir of the virus. The author illustrates how government actors *depoliticized* the erection of fences in the border region, presenting them as an apolitical matter of concern, while withdrawing them from public scrutiny and political contestation. Yet, she also points out how different entities, such as humans, different animal species, the virus, or infrastructure in the border region forged unpredictable relations that counteracted the government's intentions and practices of bordermaking.

Oelke and Jarynowski (this issue) interrogate how animal health and territorial sovereignty intersect in the crisis of ASF, asking "how are sacrifices made to animal lives and human livelihoods in the ASF crisis negotiated across space and knowledge regimes" (p. 135). For this purpose, they provide insights from ethnographic fieldwork in the German-Polish border region. Looking at biosecurity measures outside the farm, such as fencing, they argue that the agency of animals constitutes an overlooked component of sovereignty. The authors thus approach ASF fences in the border region as "material manifestations of the respective pig/pork industry and government's hopes to ensure not only the sovereignty of a country's territory but also the body of domestic pigs as property of private multinational corporations" (p. 137). Thus, they highlight the differences and commonalities between Germany and Poland in their respective approach to fighting ASF.

In the fourth research article, Kim (this issue) explores how interspecies relations co-constitute the inter-Korean borderlands, offering an understanding of the DMZ as a site of more-than-human interaction. Theoretically speaking, he seeks to contribute to a

more-than-human reformulation of geopolitics and territoriality in light of the production of biosecurity. Empirically speaking, he focuses on the strategies employed by North and South Korea in response to diseases of the pine tree *(Pinus)*. Both governments tried to manage pine diseases through the introduction of natural enemies, namely two beetle species. By doing so, Kim points out how the governments made animals complicit in their biosecurity strategies. Additionally, Kim illustrates how the management of pine disease brought about inter-Korean cooperation as part of integrated pest management.

The article by Pampus (this issue) looks at (post) mining landscapes in Eastern Germany in order to investigate the interplay between ecological dynamics, human interventions, and conservation practices. She explores this by drawing on the border of lignite mining as well as the constantly moving extraction frontier. In this context, she develops a conceptual understanding of *disturbance* as a socioecological concept by highlighting the significance of ecotones in mining landscapes. Moving beyond ecological understandings of the term, she approaches disturbance through a perspective "that considers the interconnectedness of ecological, social, and political dimensions in the co-constitutive character of landscape (trans)formation" (Pampus, this issue, p. 167). Based on ethnographic fieldwork in the Central German Mining District, she shows how plants in low-nutrient soils, as well as animals, such as birds, wildcats, and toads, shape the fluid mining frontier. She thus illustrates how specialized species fill niche biotopes that are created through the shifting extraction frontier.

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