

# **Governing disturbance regimes:**

## Rewilding and the management of large herbivores in UK nature conservation

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To the memory of Cláudia Sousa (1975-2014),  
friend and mentor, who always believed in me.

And to all those that gave me strengths  
to keep going in the toughest moments.

# Abstract

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In recent years, there has been a rethinking of the role of disturbance regimes in nature conservation: from exceptional and destructive events to be controlled and/or avoided, to key ecological processes to be nurtured and choreographed. These regimes concern the spatiotemporal dynamics of ecological disturbances, understood here as events that disrupt the structure of an ecology, community or population, causing profound changes in an ecosystem. The rethinking of their role precedes but resonates with current enthusiasms for proactive and experimental modes of conservation, such as rewilding.

This thesis draws on three case studies (the New Forest, Knepp Castle Estate and Dundreggan Estate) to explore the ontological, epistemic and socio-political implications of rewilding for the governance of forest disturbance regimes in the UK, particularly through the use of large herbivores. Drawing upon relational understandings of nature, space and time, it develops an understanding of disturbance regimes as process and practice. It first examines how rewilding departs from orthodox biopolitical modes of governing life and the ontological politics at the interface between these various modes. To this end, it attends to the ways in which disturbances have been historically understood and how these understandings have come to shape their governance. Second, it explores the knowledge practices through which ecologists and forest managers know and enact disturbances, comparing a traditional ‘prescriptive’ approach with rewilding. It argues that in practice rewilding is multiple, in contrast to rewilding discourse. Finally, it maps the different and sometimes conflicting social, economic and cultural values associated with working with natural processes, exploring the political ecologies of governing disturbance regimes. It argues that controversies around forest management pertain to a large extent to contrasting perceptions of different types of ‘work’ within the idea of working landscape and how they are ‘naturalised’.

In the conclusion, the thesis explores three empirical and conceptual contributions of these findings for those seeking to understand the logics of rewilding and the processes, practices and dynamics by which nonhuman forms and processes are governed in a post-Natural and uncertain future. First, by deploying a relational approach to the governance of disturbance regimes and by focusing on a long-term disturbance, I draw out the relevance of temporality for thinking through and with disturbances as social and ecological processes. Second, by drawing attention to the intertwining of bio- and socio-political regimes, I propose a reframing of (European) rewilded landscapes as working landscapes. Finally, by attending to the intricacies of practice, I argue that rewilding praxis is multiple and hybrid. It often involves compromises and is shaped by past governance histories and the broader political and social context.

# Acknowledgements

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While writing this thesis, I came across a poem from the Portuguese poet Adília Lopes describing how “writing a poem/ is like catching a fish/ with the hands (...).”<sup>1</sup> This metaphor resonated with my PhD journey, especially while struggling with unexpected health problems. I would had never ‘caught this fish’ without the support, generosity and help of many people.

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<sup>1</sup> In the original: “Escrever um poema/ é como apanhar um peixe/ com as mãos (...)”.

course, the volunteers and all those that work at Dundreggan Nursery. At Knepp estate, many thanks to Knepp's ecologist, as well as the estate owners, the campsite managers and the robin that came every morning to 'share' my breakfast. On this note, I am also grateful to all the nonhumans, wild, domestic or somewhere in-between, that animated my fieldwork.

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# List of Abbreviations and Acronyms

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|              |                                                                                  |
|--------------|----------------------------------------------------------------------------------|
| <b>ANT</b>   | Actor-Network Theory                                                             |
| <b>BANC</b>  | British Association of Nature Conservationists                                   |
| <b>BPS</b>   | Basic Payment Scheme                                                             |
| <b>CAP</b>   | Common Agricultural Policy                                                       |
| <b>DEFRA</b> | Department for Environment, Food and Rural Affairs                               |
| <b>DMG</b>   | Deer Management Group                                                            |
| <b>HLS</b>   | Higher Level Stewardship                                                         |
| <b>IPBES</b> | Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services |
| <b>IUCN</b>  | International Union for Conservation of Nature                                   |
| <b>NFNP</b>  | New Forest National Park                                                         |
| <b>NFNPA</b> | New Forest National Park Authority                                               |
| <b>OVP</b>   | Oostvaardersplassen                                                              |
| <b>RSPB</b>  | Royal Society for the Protection of Birds                                        |
| <b>SAC</b>   | Special Areas of Conservation                                                    |
| <b>SPA</b>   | Special Protection Areas                                                         |
| <b>SSSI</b>  | Site of Special Scientific Interest                                              |
| <b>STS</b>   | Science and Technology Studies                                                   |

# CHAPTER 1. Introduction

---

We—all of us on Terra—live in disturbing times, troubling and turbid times. (...) Mixed-up times are overflowing with both pain and joy (...) with unnecessary killing of ongoingness but also with necessary resurgence. (Haraway, 2016, p. 1)

## 1.1 Disturbing times and weedy hope

Conservation is at a crossroads. Despite increasing efforts worldwide aimed at halting or preventing extinction, many reports and scientific studies paint alarming pictures of rocketing extinction rates, dwindling population sizes and habitat loss (e.g., Ceballos et al., 2017; Dirzo et al., 2014; IPBES, 2019; WWF, 2018). According to the most recent report of the IPBES, for example, up to one million plant and animal species risk becoming extinct, many within decades (IPBES, 2019). The era of the sixth mass extinction is under way, the first for which humankind is deemed responsible. As the editors of *Arts of Living on a Damaged Planet* state, “we live in an impossible present – a time of rupture, a world haunted with the threat of extinction” (Gan et al., 2017, p. G6). This era has also been termed the ‘Anthropocene extinction’ (Kolbert, 2014), signalling the new epoch that, according to Earth scientists, our planet has now entered: the Anthropocene<sup>2</sup>. Herein humankind has become a “major geological force” (Steffen et al., 2007, p. 618) or, in Isabelle Stengers’ words, a “power of disturbance” (in Latour et al., 2018, p. 16). In their attempt to conquer and control nature, modern human projects have threatened or destroyed the livability of the planet, whether intentionally or otherwise (cf. Tsing, 2015, 2017a).

However, as Donna Haraway argues in the quote in the epigraph, the disturbing times of the historical present are characterised not only by an “unnecessary killing of ongoingness,” but

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<sup>2</sup> Aware of the wide-ranging and often contentious debates that the term ‘Anthropocene’ has prompted across the social sciences and humanities, my use of this term is akin to that of *Arts of Living on a Damaged Planet*. Rather than imagining a “homogeneous human race,” it includes the “unequal relations among humans, industrial ecologies, and human insignificance in the web of life” (Gan et al., 2017, p. G3).

also by a “necessary resurgence” (Haraway, 2016, p. 1). As a growing body of literature in the social sciences and humanities has been suggesting, the ‘Anthropocene’ is also bound up with resurgence and abundance (e.g., Cameron, 2013; Clark, 2011; Collard, Dempsey, & Sundberg, 2015; Giraud et al., 2019; Haraway, 2016; Kirksey, 2015; Lorimer, 2015, 2017; Tsing, 2015, 2017b; Tsing et al., 2017). Amidst the haunted, damaged landscapes of the present, one can also notice “weeds—small, partial, and wild stories of more-than-human attempts to stay alive” (Gan et al., 2017, p. G6). These landscapes are thus not only “our disaster” but also “our weedy hope,” as Elaine Gan and co-authors suggest (Gan et al., 2017, p. G7). While not justifying or glorifying ecological destruction, noticing these haunted landscapes and their more-than-human histories of disturbance regimes nurtures more hopeful future environmentalisms. It can offer a guide to possibilities of “getting by in terrifying times” (Tsing, 2018) or to live with the unruly “rhythms and extremes of the earth” (N. Clark, 2011, p. 165).

In response to ‘doom and gloom’ scenarios and the underlying threats of a ‘silent spring’, a growing number of ecologists and conservationists has emphasised the need for novel, proactive and experimental approaches to conservation<sup>3</sup> (see Adams, 2017; Marris, 2011). These depart from and challenge the conventional ‘command and control’ approaches to conservation and forest management, focused on suppressing disturbances and controlling natural dynamics to preserve and maintain specific habitats and species (Callicott et al., 1999; Dandy & Wynne-Jones, 2019; Holling & Meffert, 1996). It is argued, for instance, that these approaches will become increasingly difficult to implement in a rapidly changing world, where the frequency, extent and severity of forest disturbances such as fires, droughts, insect and disease outbreaks are likely to increase in light of projected warming (Dale et al., 2001; Kulakowski et al., 2017; Potter & Urquhart, 2016; Seidl et al., 2017; Turner, 2010). On the contrary, proactive approaches to conservation and forest management are geared towards promoting lively

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<sup>3</sup> These new approaches, especially the so-called ‘new conservation’, have led to heated debates among conservationists (e.g., P. Kareiva et al., 2011; Marris, 2014; Miller et al., 2014; Soulé, 2013; Wuerthner et al., 2014).

ecosystems and anticipating emergent futures that cannot always be predicted. They embrace a “wider vision of nature” (Marris, 2011, p. 13), beyond the modern figure of Nature as single, pure and stable, which acknowledges the nonequilibrium ecologies<sup>4</sup> resulting from the changes set out above. Rewilding is one such approach.

### 1.1.1 Rewilding: ‘Back to the future’

First coined in the late 1980s/early 1990s<sup>5</sup>, the term rewilding has been applied to diverse contexts, visions and management practices, with no single definition (for overviews, see Gammon, 2018; Jørgensen, 2015; J. Lorimer et al., 2015; Perino et al., 2019; Pettorelli et al., 2019; Sandom et al., 2013). It has been termed a ‘plastic’ word (Jørgensen, 2015), in danger of becoming a ‘panchreston’ (i.e., used in such a variety of contexts and with so many different meanings that it risks becoming meaningless) (Hodder & Bullock, 2010).

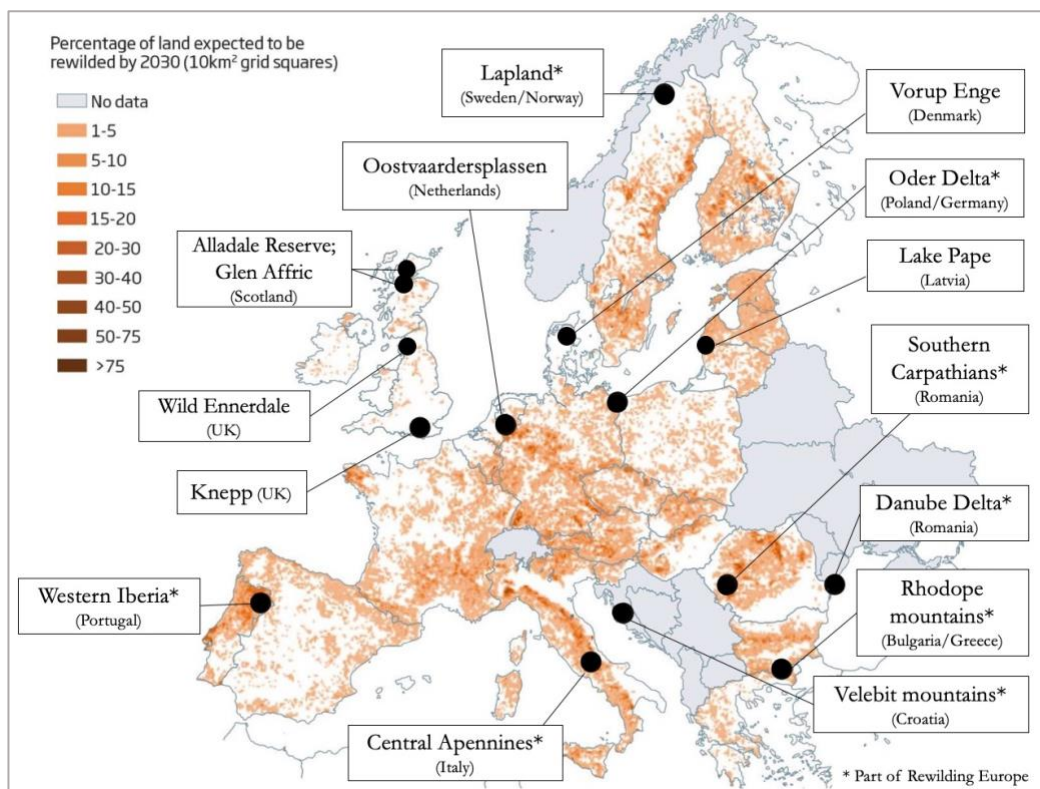
Despite the various meanings that the term has taken on, they cohere around some features. Rewilding is presented as a specific kind of ecological restoration: open-ended, large-scale and focused on ‘self-willed’ ecological processes and functions. To use Isabella Tree’s words, it is “restoration by letting go, allowing nature to take the driving seat” (Tree, 2018a, p. 8). The aim is to foster self-sustaining and dynamic ecosystems that require minimum or no human intervention and management in the long-term. Rewilding can occur spontaneously, for example following farmland abandonment (**Figure 1**) (e.g., Navarro & Pereira, 2012), or in areas that have become inhospitable due to armed conflicts or disasters such as Chernobyl (Carver, 2019; Deryabina et al., 2015; Perino et al., 2019). However, most rewilding initiatives tend to include human interventions at an early stage to kick-start ecological processes (e.g.,

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<sup>4</sup> These have been variously termed ‘novel ecosystems’ (Hobbs et al., 2013), ‘anthromes’ (Ellis, 2015), ‘rambunctious gardens’ (Marris, 2011), or ‘weedy landscapes’ (Tsing, 2017b).

<sup>5</sup> Rewilding was first coined in the 1980s by the environmentalist Dave Foreman, one of the founders of the Wildlands Network (former Wildlands Project) and the Rewilding Institute in the United States of America. The earliest use of the term in print was in 1990, in a *Newsweek*’s article entitled “Trying to take back the planet,” by Jennifer Foote (Fraser, 2009, p. 356n17; Jørgensen, 2015, p. 483; Tree, 2018a, p. 153).

(re)introduction of keystone species<sup>6</sup>) and/or continuous minimal management (e.g., culling in the absence of natural predators, controlled burning, etc.). In this sense, rewilding is a form of “controlled decontrolling” (Keulartz, 2012, p. 60). Although the dynamics of these interventions are primarily spatial, they are also temporal (see M. Hall, 2010). To facilitate the recovery of certain ecological processes and dynamics, ecological change is tipped across thresholds and artificially ‘speeded up’ within the framework of human generational time (Buller, 2013; DeSilvey et al., 2020) or “policy-relevant time scales” (Perino et al., 2019). The temporal dimensions of rewilding have nevertheless received little attention to date, as have the synchronicities (or otherwise) between generational, political and ecological times, and the consequences thereof, which raise important political questions.



**Figure 1:** Land expected to be rewilded or afforested by 2030 in Europe and examples of ongoing projects labelled as rewilding<sup>7</sup>

<sup>6</sup> A keystone species, generally an animal, is “a species whose impacts on its community or ecosystem are much larger than would be expected from its abundance” (Eisenberg, 2010, p. 243). The impacts can be top-down (e.g., carnivore) or bottom-up (e.g., herbivore).

<sup>7</sup> Adapted from Lawton (2018), Navarro and Pereira (2012) and Pettorelli, Durant and du Toit (2019).

Most of the discussions about the complex, and often conflicting, temporalities of rewilding have focused on the choice of ecological benchmarks or baselines to inform future restoration. For some, rewilding envisages a ‘return’ to a pre-human past, which relies on a conceptualisation of nature as ontologically separated from culture (‘wilderness’) and of time as linear and single (cf. §2.1). Dolly Jørgensen, for instance, has argued that rewilding attempts to “erase human history and involvement with the land and flora and fauna, yet nature and culture cannot be easily separated into distinct units” (Jørgensen, 2015, p. 487; cf. M. Hall, 2014). For others, however, the temporalities of rewilding do not rely on a clear demarcation between past and present. Despite the contentious and implicitly temporal prefix ‘re-’, which means back or again, rewilding “seeks to learn from the past rather than recreate it” (Sandom et al., 2013, p. 433; cf. Higgs et al., 2014). Although some projects establish specific historic baselines (e.g., Pleistocene, Palaeolithic), rewilding is often a future-oriented approach<sup>8</sup>. By benchmarking non-analogue futures to prehistorical ecologies, rewilding offers dynamic ‘future-pasts’ characterised by multiple stable states (**Figure 2**) (DeSilvey, 2019; DeSilvey & Bartolini, 2019; Lorimer, 2020; Lorimer & Driessen, 2016). Rewilding thus conjoins retrospection and futurology (Lorimer, 2020). Similar to the depiction of Janus, the god of time and transitions from ancient Roman mythology, as having two faces, rewilding looks both ‘backwards’ into the past, by making reference to past baselines, and ‘forwards’ into a functional future, anticipating emerging yet unpredictable novel ecosystem. As Caitlin DeSilvey and Nadia Bartolini put it, “one might argue that what we are witnessing now can be understood as *co-devolutionary* change, which integrates idealised elements of past human–animal relations into visions of future multi-species landscape relations” (DeSilvey & Bartolini, 2019, p. 13).

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<sup>8</sup> Herein lie some of the semantic and epistemic confusions over the differences between rewilding and restoration (cf. R. M. Anderson et al., 2019; Corlett, 2016; Hayward et al., 2019).



**Figure 2:** The past, present and future of European nature  
(Drawing by Jeroen Helmer, ARK Nature; reproduced with permission)

Rewilding projects can be found throughout the world, with concentrations in Europe<sup>9</sup> (**Figure 1**), North America, and tropical islands (Fraser, 2009; J. Lorimer et al., 2015; Pettorelli et al., 2019). There are two prevailing versions of rewilding: North American and European (cf. M. Hall, 2014; Sandom & Wynne-Jones, 2019). The former tends to advocate establishing large, connected wilderness areas and the reintroduction of large carnivores<sup>10</sup> (Foreman, 2004; Soulé & Noss, 1998). The latter “has been more accepting of anthropogenic legacies” (Sandom & Wynne-Jones, 2019, p. 223), reflecting a densely populated and historically fragmented Europe, with landscapes that have been intensively used and managed for centuries to millennia. Consequently, in Europe the emphasis has been on enabling connectivity and naturalistic grazing through the restoration of (semi-)wild large herbivores (Hodder & Bullock, 2009, 2010;

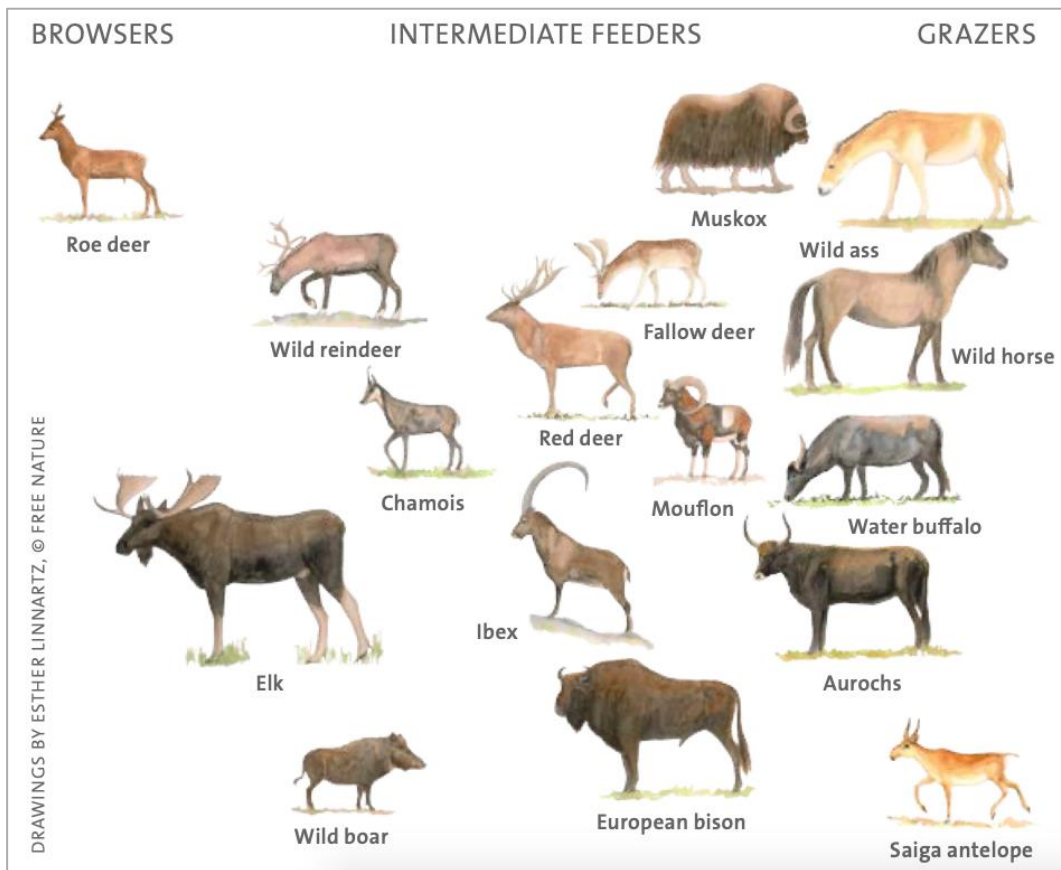
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<sup>9</sup> Important drivers of rewilding in Europe have been the widespread abandonment of farmland in rural and less productive regions since the 1960s (D. MacDonald et al., 2000; Navarro & Pereira, 2012) and the creation of the pan-European initiative Rewilding Europe, in 2011 (Helmer et al., 2015; Schepers & Jepson, 2016; Sylvén et al., 2012).

<sup>10</sup> This has been referred to as the three C's: Cores, Corridors and Carnivores (Soulé & Noss, 1998, p. 22).

K. J. Kirby, 2004; J. Lorimer et al., 2015; Vera, 2009). As described by Jamie Lorimer and his collaborators, European approaches to rewilding aim to re-establish “a guild of large herbivores – cattle, horses, wild boar, beavers, and bison – whose grazing and browsing would restore or create complex and species-rich ecosystems on reclaimed areas or those previously used for agriculture or forestry” (J. Lorimer et al., 2015, p. 44). These would figure as “harbingers of a post-productivist pastoral: future wilds whose ecological baseline is only loosely modelled on the preagricultural landscapes of the end of the Pleistocene” (Lorimer & Driessen, 2016, p. 647) (cf. **Chapter 6**), contrary to the low-intensity premodern agricultural landscapes of medieval Europe that have been the baseline for most European nature conservation.

This herbivore-led, “bottom-up rewilding” (van Maanen & Convery, 2016, p. 306) has been greatly influenced by the paleoecological theory of cyclical vegetation turnover developed by the Dutch ecologist Frans Vera. Contrary to the prevalent understandings of the mid-Holocene lowland temperate European landscapes as closed-canopy forests, Vera (2000) argues instead that they were dominated by a shifting dynamic mosaic of open landscapes, scrub and wood-pastures (cf. Rackham, 1998). This mosaic was maintained by high densities of large herbivores, particularly bison (*Bison bonasus*), aurochs (*Bos primigenius*) and wild horses (*Equus ferus*) (**Figure 3**). Albeit controversial (e.g., Bradshaw, Hannon, & Lister, 2003; Mitchell, 2005; Sandom et al., 2014; Svenning, 2002), Vera’s theory has stimulated debates about the role of large herbivores as disturbance agents in woodland ecology, management and conservation (e.g., Hodder et al., 2005; Kirby, 2003, 2004; Newton et al., 2010). Through their grazing and browsing, physical disturbances and seed dispersal, these ‘environmental engineers’ (after Smit & Putman, 2011) influence both directly and indirectly the structure, dynamics and composition of ecological communities (R. J. Putman, 1986, 1996b; Smit & Putman, 2011; Vermeulen, 2015).



**Figure 3:** Europe’s indigenous species of large herbivores, according to their feeding strategy (Source: Vermeulen, 2015. Drawings by Esther Linnartz, FREE Nature; reproduced with permission)

Over recent years, rewilding has been gaining momentum as a powerful, cost-effective, “ambitious and optimistic agenda for conservation” (J. Lorimer et al., 2015, p. 40). For the journalist George Monbiot, one of rewilding’s most well-known boosters in Britain, it offers “the hope of a raucous summer” (Monbiot, 2013, p. 12). Rewilding has been considered a “panacea” (Hodder & Bullock, 2010; Nogués-Bravo et al., 2016), a “remedial action” to the current biodiversity crisis (Pettorelli et al., 2018, p. 1115), and an antidote to a “highly-managed, overly-human world” (Gammon, 2018, p. 346). Notwithstanding its ambitious and optimistic agenda, rewilding remains a marginal and controversial approach to conservation and forest management. It has been scrutinised and criticised on ecological, political, economic and cultural grounds, both within and outside the academic community (e.g., Bauer et al., 2009; Bulkens et al., 2016; Buller, 2013; Drenthen, 2018; Jørgensen, 2015; J. Lorimer & Driessen,

2013, 2014; J. Lorimer et al., 2015; Pereira & Navarro, 2015; Schwartz, 2006; Wynne-Jones et al., 2018).

Concerns have been raised, for instance, about the uncertain, open-ended and experimental nature of rewilding. Rewilding is a recent conservation strategy and still highly speculative. In Europe, most of the projects undertaken are in their early stages, lacking long-term studies of ecological impacts<sup>11</sup>. Nevertheless, rewilding projects have already challenged well-established scientific knowledge and theories. One of the most famous examples concerns the discovery of trophic cascades<sup>12</sup> following the return of wolves (*Canis lupus*) to the Yellowstone National Park (Beschta & Ripple, 2016; Eisenberg, 2010; Laundré et al., 2010; Ripple & Beschta, 2012; cf. Marris, 2018), which has shaken the belief that natural systems are always controlled from the bottom-up (Monbiot, 2013, p. 122/3). The open-ended nature of rewilding has political implications. It challenges modern forms of governance, notably the orthodox models of Western conservation. These have been concerned with linear models of succession, the maintenance of species composition and the control of disturbance regimes through human intervention (cf. Adams, 1997; Callicott et al., 1999; Hinchliffe, 2008; J. Lorimer et al., 2015; Rogers, 1996; P. Taylor, 2005; Zimmerer, 2000). Besides conservation, rewilding challenges other prevalent modes of governance, such as agriculture, animal welfare, biosecurity and forestry. This has been suggested in relation to the governance of various disturbances under a rewilding regime or following reintroductions, such as large herbivores (e.g., J. Lorimer & Driessen, 2013), wolves (e.g., Buller, 2008; J. Knight, 2006), beavers (e.g., Crowley et al., 2017), deadwood (e.g., Niklasson, 2014; Schnitzler, 2014) and insect outbreaks (e.g., Müller, 2011).

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<sup>11</sup> In Europe, the oldest large-scale rewilding area is the now (in)famous Oostvaardersplassen, in the Netherlands, which dates back to the 1980s (see Vera, 2009).

<sup>12</sup> Trophic cascades refer to the “movement of energy through the community food web when predators are removed (or when they return)” (Eisenberg, 2010, p. 4). In this case, the return of wolves induced significant changes to the local food web due to their impact on the prey’s (deer) abundance and behaviour and consequently on the species eaten by deer (the declining aspen).

Rewilding demands new ways of understanding and evaluating disturbance regimes (described below), with important epistemic, social and political consequences. These are the focus of this thesis, which attends in particular to a biotic disturbance: herbivory (i.e., the consumption of plants by animals, through grazing or browsing).

## 1.2 Please, do (not) disturb

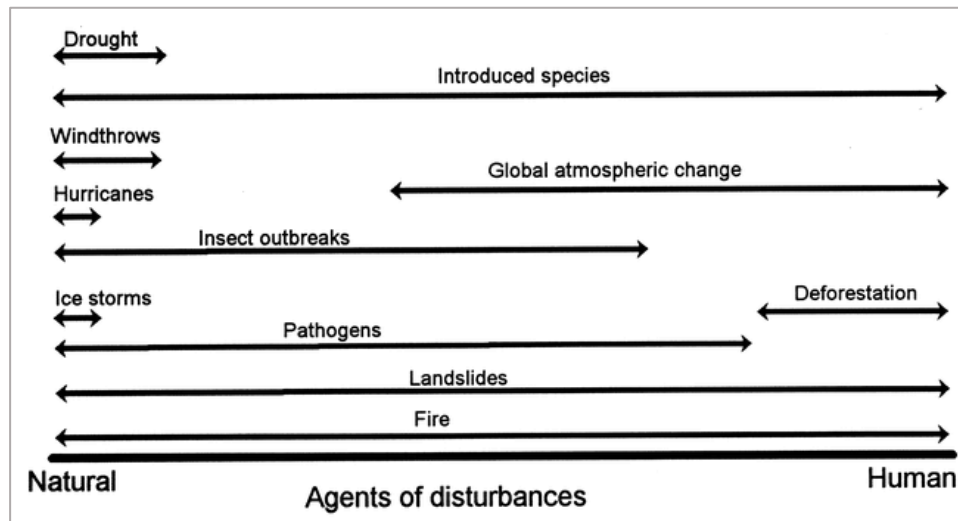
Etymologically, disturbance derives from the Latin verb *disturbāre*, meaning ‘to throw into disorder’, ‘to disturb’<sup>13</sup>. The Oxford English Dictionary defines it as an “interruption and breaking up of tranquillity, peace, rest, or settled condition; agitation (physical, social, or political),” or “a tumult, an uproar, an outbreak of disorder” (‘Disturbance’, 2018, sec. 1a/b). It thus concerns disruption, troubling, perturbation, interruption of a previously settled condition (ecological, social, economic, political, or mental).

In ecology, the most consensual definition of disturbance considers it as “any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment” (P. White & Pickett, 1985, p. 7). The spatial and temporal dynamics of disturbances over a longer period of time constitute a disturbance regime (M. Turner, 2010, p. 2834). Disturbances can be caused by abiotic (e.g., wind, fire, water) and/or biotic agents (e.g., grazing animals, pathogens, humans), anthropogenic and/or other-than-human forces (**Figure 4**). Fire, floods, storms, disease and insect outbreaks, herbivores, and forest management, to name but a few, can renew or destroy ecologies, depending on their spatial and temporal scale, magnitude (intensity and severity), frequency, and predictability (see Attiwill, 1994; Reice, 2001; Rogers, 1996; Sousa, 1984; M.

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<sup>13</sup> *Dis*-‘utterly’ + *turbāre* ‘disorder, disturb’, from *turba* ‘tumult, crowd’ (Onions, 1966, p. 277).

Turner, 2010; P. White & Pickett, 1985). They are key processes of ecosystem dynamics and drivers of spatial and temporal heterogeneity in ecosystems.



**Figure 4:** Examples of agents of forest disturbance (Source: Dale et al., 2001, p. 724)

According to Anna Tsing, “deciding what counts as disturbance is always a matter of point of view” (2015, p. 161). The vulnerability to and impacts of disturbances vary both between and within species. Disturbances are also perceived differently by different social groups and individuals. Wildfires, for instance, are beneficial from an ecological point of view as they renew ecosystems, but they can also cause damages to life (human and otherwise) or to properties. As scholars from disaster studies and political ecology of hazards have suggested, the potential for a catastrophe or disaster to occur lies at the intersection between a (hazardous) disturbance and broader socioeconomic and political factors, notably conditions of vulnerability (e.g., poverty, racism, gender) and power/knowledge dynamics (e.g., Goemans & Ballamingie, 2013; Mustafa, 2005; Anthony Oliver-Smith, 2002; Pelling, 2001). In this sense, the sociocultural, economic and political dimensions of disturbance regimes should be considered. Disturbances, their impacts and their management have the potential to either bring communities together or trigger political conflicts that can hinder forest management. This has been suggested, for example, in the case of wildfires (e.g., Carroll et al., 2005; N. Gill, 1994; Goemans & Ballamingie,

2013; Whittaker & Mercer, 2004), insect forest disturbances (e.g., Flint et al., 2009; Müller, 2011; Prentice et al., 2018; Stokstad, 2017), and flood risk (e.g., Whatmore, 2013; Whatmore & Landström, 2011).

### 1.2.1 Disturbance regimes in ecology and conservation

The concept of disturbance has been of interest to vegetation ecologists since at least the early 20<sup>th</sup> century, in relation to vegetation succession. However, it was not until the 1970s/80s that it became a key concept in ecology, with the emergence of the so-called ‘new ecology’ (Botkin, 1992; Scoones, 1999; Zimmerer, 1994) or ‘ecology of chaos’ (Worster, 1989).

In ecology’s early days, the notion of a ‘balance of nature’<sup>14</sup> predominated. Nature was conceived of as constant, stable and capable of returning to an equilibrium state if disturbed (Botkin, 1992; Pickett & Ostfeld, 1995; Worster, 1989; Wu & Loucks, 1995). As described by George Perkins Marsh, in his classic *Man and Nature*, first published in 1864:

Nature, left undisturbed, so fashions her territory as to give it almost unchanging permanence of form, outline, and proportion, except when shattered by geologic convulsions; and in these comparatively rare cases of derangement, she sets herself at once to repair the superficial damage, and to restore, as nearly as practicable, the former aspect of her dominion. (Marsh, 1965, p. 29).

Particularly influential in the early-20<sup>th</sup> century was the ‘climax ecology’ of the American ecologist Frederic Clements, who argued that vegetation would progress towards a final climax stage, in isolation from human beings<sup>15</sup> (see Cameron, 1999; Worster, 1992, Chapters 11–12). Under this model, disturbances, particularly human-induced ones, were considered exceptional events obstructing the linear, teleological progression. This idea would be criticised, for

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<sup>14</sup> This notion has a long lineage in Western thought, stretching back to Ancient Greece (for reviews, see Egerton, 1973; Simberloff, 2014).

<sup>15</sup> As William Cronon has pointed out, the idea of wilderness as pristine and untouched lies at the foundation of the Clementsian climax (Cronon, 1995, p. 480n25).

instance, by the British ecologist Arthur Tansley, who became an influential figure within British conservation. Working on the intensively managed landscapes of Britain, notably Wicken Fen<sup>16</sup>, Tansley rejected “the isolation of modern man’s [*sic*] activities from the climax ideal (...) especially the assumption that he [*sic*] is always an intrusive, disruptive force in nature” (Worster, 1992, p. 239). For Tansley, British vegetation had been thoroughly, if not completely, disturbed by human actions (Cameron, 1999). It was, in his own terminology, ‘semi-natural’ (Adams, 2003a, p. 84).

The idea of a static and passive nature that follows a predictable trajectory has been highly influential for environmentalists, in general, and conservationists, in particular (Adams, 2003c, p. 222/3; Neumann, 2014, p. 31; Simberloff, 2014, p. 3; cf. McKibben, 1990). Traditionally, and still most commonly, conservation has sought to preserve “a fixed Nature from modern, urban, and industrial Society by enclosing it in National Parks” and to control both human and non-human life (J. Lorimer, 2015, p. 5). As Jamie Lorimer argues, in North America and much of Africa and South Asia this static Nature took the form of a supposedly pristine, prehistorical wilderness from which people should be excluded (cf. Cronon, 1995), whereas in Europe it took the form of premodern agrarian landscapes. In Britain, Bill Adams notes that for most of the 20<sup>th</sup> century, conservation was concerned with “establishing or recovering control, both over human impacts on nature (in ‘stopping habitat loss’) and over nature itself (in habitat management)” (Adams, 1997, p. 285). Tansley’s aforementioned ideas played an important role here. In dissolving the boundary between ‘normal’ and ‘disturbed’ vegetation, he rejected “any climax achieved by purely natural processes as an ideal for man [*sic*] to respect and follow” (Worster, 1992, p. 241) and thus helped to “mobilize and stabilize a Nature that required expert management” (Cameron, 1999, p. 18).

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<sup>16</sup> Wicken Fen, located in Cambridgeshire, is one of Britain’s oldest nature reserves. A large part of it is owned and managed by the National Trust since 1899. Herein, Arthur Tansley and Harry Godwin investigated the succession of fen vegetation (Cameron, 1999, pp. 12–15).

In this tradition of “conservation as control” (Adams, 2003c), designated reserves were closely managed and maintained as it ‘ought to be’, drawing on the authority of ecological science. Ecologists were “nature’s managers, nature’s trustworthy analysts” (Cameron, 1999, p. 16). Disturbances, in particular, were to be controlled and/or avoided, as they threatened the perceived equilibrium and stability of ecosystems and economically valuable resources (Adams, 1997, 2003c; Bengtsson et al., 2000; Thom & Seidl, 2016). To manage (potential) risks, great and successful efforts have been made to ‘domesticate’ disturbances (e.g., fire suppression, flood control), either for conservation or forestry purposes (Carroll et al., 2005; Clark, 2011; Higgins & Natalier, 2004; Navarro et al., 2015; Pyne, 1997). By freezing ecological processes and reducing diversity, such efforts have tended to “render the present eternal” (Hinchliffe, 2008), sometimes with deleterious and unforeseen consequences. As some ecologists have argued, this type of management has resulted in a ‘pathology’ (Holling & Meffert, 1996): the lack of diversity and variation decreases resilience and increases the vulnerability to shock.

Scientific forestry<sup>17</sup> provides a compelling example. It epitomises the “subjugation of disorderly nature to human rationality,” according to Anthony Oliver-Smith (2002, p. 32). As explained by James Scott, “the real, diverse, and chaotic old-growth forest [was transformed] into a new, more uniform forest” to ease management and economic return (J. C. Scott, 1998, p. 15). This transformation entailed careful and orderly seeding, planting, and cutting, as well as the suppression of “unauthorised disturbances,” such as fire (J. C. Scott, 1998, p. 18). However, the uniformization and simplification of the forest led to the reduction of biodiversity, rendering it more vulnerable to the effects of emergent and unexpected events, like storms, fires, insect and disease outbreaks (J. C. Scott, 1998, p. 19/20). This exemplifies what Nils Bubandt and Anna Tsing consider as ‘feral effects’ or unintended ecological consequences of “high modernist

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<sup>17</sup> Scientific forestry was originally developed in the mid-18<sup>th</sup> century, largely in Prussia and Saxony, as part of the “centralized state-making initiatives of the period” (J. C. Scott, 1998, p. 14). It would become the basis of forest management techniques in France, England, the United States and throughout the Global South (for an overview, see J. C. Scott, 1998).

designs” (Bubandt & Tsing, 2018a, p. 4). According to them, these designs are ways of “making landscapes but not living with them,” in the sense that the intensive control that they advocate neglects any possibility “that human will might not control everything” (Bubandt & Tsing, 2018a, p. 4). Nevertheless, as they further argue, this human-generated order and ecological simplification, which has taken various forms in different parts of the world, has been key to much of the environmental disruptions of the Great Acceleration, ranging from resurgent wildlife in post-industrial ruins to pests and pathogens that thrive in industrial plantations (Bubandt & Tsing, 2018a, 2018b; Gan & Tsing, 2018; Tsing, 2018; Tsing et al., 2019).

By the late 1970s, ecologists had largely moved away from the idea of a balanced nature towards the ‘nonequilibrium model’ (Botkin, 1992; Pickett & Ostfeld, 1995; Reice, 2001; Scoones, 1999; M. Turner, 2010; Worster, 1989, 1992; Wu & Loucks, 1995; Zimmerer, 1994). This model emphasises the complex, dynamic and nonlinear aspects of ecosystems, which are in perpetual flux. With this shift came a rethinking of the ecological and functional roles of disturbances in the dynamics of ecosystems. Disturbances, including human-induced ones<sup>18</sup>, started to be acknowledged as ubiquitous, necessary and generative characteristics of ecosystems. In particular, they contribute to the maintenance of ecosystem structures, nutrient cycling, and species composition and diversity (Attiwill, 1994; Bengtsson et al., 2000; Mori, 2011; Navarro et al., 2015; Reice, 2001; Rogers, 1996; Thom & Seidl, 2016; M. Turner, 2010; P. White & Pickett, 1985; Zimmerer, 2000). Disturbances, notably recurrent ones (e.g., fire, storm, disease), give rise to landscapes that are heterogeneous in terms of age and vegetation composition (P. White & Pickett, 1985). This heterogeneity creates patches or mosaic patterns that are more resilient than homogenous ecosystems, such as the monocultures advocated by scientific

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<sup>18</sup> Several studies have acknowledged the pervasiveness of human-induced disturbances even in so-called intact, virgin tropical rainforests (see Raffles & WinklerPrins, 2003; Willis, Gillson, & Brncic, 2004; cf. Caro et al., 2012). In the Amazon basin, for example, extensive areas of dark earth fertile soils (“terra preta”) were found to have anthropogenic origins, from burning and agricultural activities dating from around 2500 years ago (Willis et al., 2004, p. 402).

forestry. Despite being vital and sometimes part of the planet's rhythms (e.g., earthquakes) (N. Clark, 2011), certain kinds of disturbances can nevertheless be life-changing, life-threatening. As Reice contends, disturbances are 'paradoxical' (2001, p. ix), a 'two-edged sword' (2001, p. 74). They are both generative and disastrous.

Non-equilibrium ideas have had important implications for conservation and forest management (Adams, 1997, 2003a; Botkin, 1992; Grabbatin & Rossi, 2012; Mori, 2011; Pickett & Ostfeld, 1995; Scoones, 1999; Worster, 1989). As Daniel Botkin asks, rhetorically: "How do you manage something that is always changing?" (Botkin, 1992, p. 10). Non-equilibrium theories have challenged core ideas of conventional conservation thinking (e.g., wilderness, naturalness) and mainstream ways of knowing and managing ecological rhythms and dynamics (Adams, 1997, 2003c; Grabbatin & Rossi, 2012; Marris, 2011; Scoones, 1999; Zimmerer, 1994, 2000). As Laura Cameron put it, "no longer idealizing purified categories of nature, nor expecting perfection or a 'cure,' ecologists manage places that are inevitably messy, contingent and uncertain" (Cameron, 1999, p. 19). This demands attending "both to the human-influenced past and to the dynamics of natural change" (Adams, 1997, p. 286). It requires, as has also been suggested, more dynamic and proactive modes of conservation and forest management, which entail "working with, rather than against, natural processes" in a rapidly changing world (Kulakowski et al., 2017, p. 128; see also Bengtsson et al., 2003).

Such is the case of rewilding, mentioned above, where disturbance regimes are encouraged, reintroduced and sometimes emulated (Fuhlendorf et al., 2009; Kulakowski et al., 2017; Navarro et al., 2015). For Andrea Perino and collaborators, rewilding is about releasing ecosystems "from continued and controlled anthropogenic disturbances to allow for natural variability and sources of stochasticity," thus enhancing spatial and temporal heterogeneity (Perino et al., 2019; see also Kulakowski et al., 2017).

### 1.2.2 Disturbance regimes in social thought

By the time disturbances came to the forefront of ecological thinking, scholars in the humanities and social sciences were also beginning to worry about instability and change, in the context of “the transformative encounters of history, inequality, and conflict” (Tsing, 2015, p. 161). With few exceptions, much of this work remained attached to the static view of ecology (for an overview, see Scoones, 1999; cf. Biersack, 1999; Grabbatin & Rossi, 2012; Zimmerer, 1994).

Disturbances, understood here in the sense of *modern* human projects (e.g., capitalism, urbanisation, plantation, extractivism, etc.), are considered disruptors of a perceived natural equilibrium. They are thus mostly damaging. This idea is present, as Doreen Massey notes (2005a, p. 160), in the writings of Félix Guattari and Brian Massumi, who reinforce the idea of humans disrupting a ‘nature’ that would otherwise be ‘in balance’. The re-establishment of “natural equilibriums” (Guattari, 2014, p. 45) relies, according to them, upon human intervention. Guattari argues, for instance, that “in the future much more than the simple defence of nature will be required; we will have to launch an initiative if we are to repair the Amazonian ‘lung’, for example, or bring vegetation back to the Sahara” (Guattari, 2014, p. 45). Likewise, in Anthony Giddens and Ulrich Beck’s writings about ‘the risk society’, “while cultural mobility and mutability is celebrated, ‘disturbances’ of nature’s pattern are viewed with alarm” (Massey, 2005a, p. 160; cf. N. Clark, 2002).

This pervasive vision of the externality of nature and of “a static and benign climax community in nature that contrasts with dynamic, but destructive human change” (Cronon, 1990, p. 1128) has been challenged. The ‘post-Natural’, relational ontologies on which this thesis draws (reviewed in §2.1) provide but one example. Rather than a mere passive background to human dramas, nonhuman nature is conceived of as dynamic, historical, always changing and responding to a range of disturbances. Natural history is in this sense a history of disturbances. As Donald Worster notes, “disturbance *is* history” (Worster, 1994, p. 8). Likewise, Anna Tsing,

alone and in collaborative works, develops an understanding of disturbances as history and brings histories of disturbance into social theory (Bubandt & Tsing, 2018a; Tsing, 2014, 2015, 2017b, 2017a; Tsing et al., 2019). According to her, disturbances are moments of (un)intentional temporal and spatial coordination between overlapping projects of world-making, human and nonhuman, with landscape-making effects.

The example of *satoyama* woodlands in Japan that Tsing uses in *The Mushroom at the End of the World* (Tsing, 2015) is telling here. These landscapes are traditional peasant landscapes that combine rice agriculture and water management with woodlands. Herein, farmers have cut down broadleaf trees, using them for firewood, charcoal-making and nontimber forest products, sometimes completely eroding hillsides. These anthropogenic disturbances have advantaged, albeit unintentionally, pines. With little organic soil, pines are able to grow in these human-disturbed landscapes through their association with mycorrhizal fungi, such as matsutake, which mobilise nutrients from rocks and sands. As Tsing puts it, “matsutake, pines, and humans together shape the trajectories of these landscapes” (Tsing, 2015, p. 171). Disturbances play a central role in understanding the entangled more-than-human histories of landscapes through which ‘patchy’ landscapes are made and remade. They “might initiate a story of the life of the forest” (Tsing, 2015, p. 160; cf. Mathews, 2017).

In an increasingly troubling, uncertain, always in motion world, disturbances become a useful analytic tool, as has been suggested by recent calls to rethink them (e.g., N. Clark, 2002, 2011; Hinchliffe et al., 2017; Tsing, 2015, 2017a, 2017b; Tsing et al., 2019). This thesis responds to these calls, drawing out the importance of history and temporality for theorising disturbances as process and practice. It develops a processual approach to disturbances. Rather than discrete events that ‘punctuate’ a linear temporal continuum, they are here considered as ecological, socio-material and political processes that intertwine myriad agents, humans and nonhumans, and multiple spatial and temporal trajectories. Thus considered, herbivory-as-disturbance,

which is at the core of this research, will not just refer to the trophic interaction at a particular space and time between an animal, the agent of disturbance, and a plant, whose development is arrested. It also includes, for example, the broader ecological relations that affect and are affected by this trophic relation, the selective grazing preferences that are shaped by plants and trees palatability, or the economic and cultural relations that affect interactions between humans and nonhumans, to name but a few.

Attending to the multiple temporalities of socioecological disturbance regimes runs counter to a linear conception of time, which assumes that “by understanding the past we might be able to anticipate and shape the future” (Braun, 2015b, p. 239). As Bruce Braun argues in relation to the Anthropocene, “although time might come toward us from the future, (...) the past continues to haunt the present and (...) ignoring this leaves us poorly equipped to address crucial social differences in how we face the future” (Braun, 2015b, p. 240). Likewise, Collard and collaborators argue that the pursuit of abundant and diverse futures demands a “temporal orientation to reckon with the past” (Collard et al., 2015, p. 323). This reckoning with the past aims not to provide “an Edenic benchmark but to understand the discursive material infrastructure we have inherited” (Collard et al., 2015, p. 327) and to point to possibilities. These considerations have important implications for rewilding and the governance of disturbance regimes, as will be explored in this thesis.

### **1.3 Research aims and study sites**

The overall aim of this research is to explore the ontological, epistemic and socio-political implications of rewilding for the governance of forest disturbance regimes in the UK. It focuses in particular on the extent to which the governance of disturbance regimes through rewilding differs from prevalent modes of understanding, knowing and governing life in the UK,

attending also to the different and sometimes conflicting social, economic and cultural values associated with working with disturbances.

Although rewilding is the starting point of this thesis, underpinning it is a broader interest in the politics and governance of disturbances (as process and practice) in a post-Natural world, bringing to it a historical perspective. For reasons that will be further explained in §3.1, the research is focused on herbivory, drawing on the governance of large herbivores as disturbance agents in Britain, since medieval times.

More explicitly, the thesis is guided by the following research questions (RQs):

**RQ1. How have disturbance regimes been conceived and governed in the UK? How do they differ under rewilding?**

**RQ2. How do ecologists and forest managers know and enact disturbance regimes?**

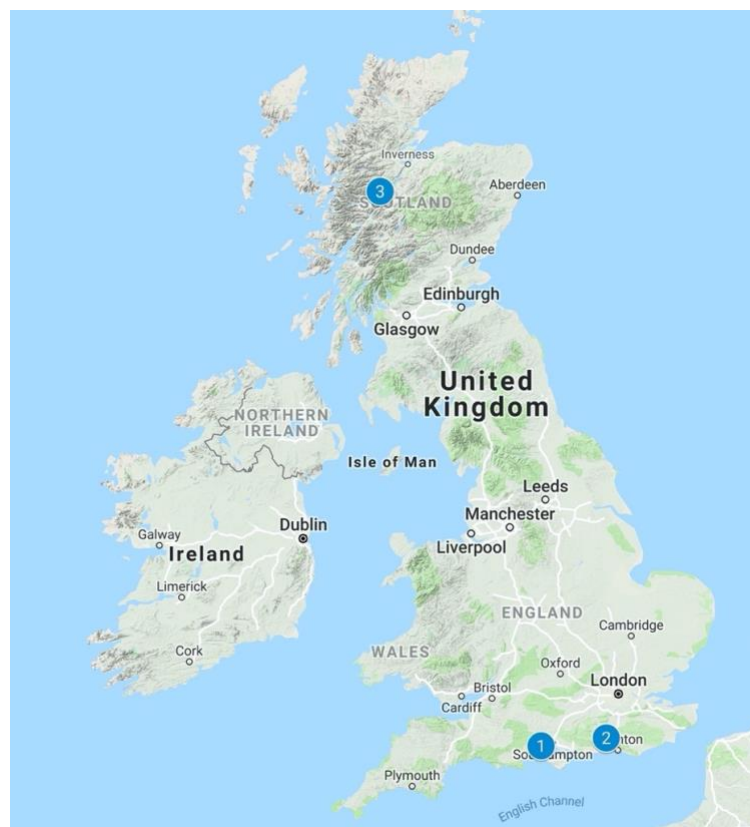
**RQ3. Whose values count in the management of disturbance regimes and how are these contested?**

Each empirical chapter corresponds to one of the three research questions: **Chapter 4** corresponds to RQ1, **Chapter 5** to RQ2 and **Chapter 6** to RQ3. By addressing these interrelated modes of enquiry, the thesis contributes to ongoing discussions around the politics of rewilding and the processes, practices and dynamics of governing life in a changing and uncertain world. In particular, this research provides conceptual and empirical contributions to the literatures on which it draws at three levels (cf. **Chapter 2**). First, by deploying a relational approach to the governance of disturbance regimes, it draws out the relevance of temporality for thinking through and with disturbances as social and ecological processes. Second, by drawing attention to the synergies between bio- and socio-political regimes, it proposes a reinterpretation of (European) rewilded landscapes as post-pastoral, working landscapes. Finally, by attending to the intricacies of practice, it argues that rewilding is multiple and shaped

by past governance histories and the broader socio-political context. These contributions will be further developed throughout the thesis and drawn together in the concluding chapter.

### 1.3.1 Rewilding the New Forest?

To address the research questions set out above, three study sites were selected for empirical investigation. The main case study is the New Forest, which is compared to two secondary case studies: Knepp Castle Estate and Dundreggan Estate (**Figure 5**) (described in more detail in **Chapter 3**). Whilst Knepp and Dundreggan estates are two well-established rewilding projects, the New Forest is not considered a rewilding site per se<sup>19</sup>. Despite (and also for) this reason, the New Forest occupies a central place in this study, thus departing from most studies related to rewilding that draw exclusively on rewilding sites.



**Figure 5:** Location of the three study sites: 1) the New Forest; 2) Knepp Castle Estate; 3) Dundreggan Conservation Estate (Map data: Google, GeoBasis-DE/BKG)

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<sup>19</sup> Interestingly, the association Friends of the New Forest organised a meeting in February 2019 called *Rewilding the New Forest?* (<http://newforestassociation.org/rewilding-the-new-forest/>). The keynote presentation was given by Sir Charles Burrell, owner of Knepp Castle Estate. Unfortunately, I was unable to attend due to ill-health.

Why, then, the New Forest as the main case study? Its selection is based on four criteria that relate to the focus of this thesis on how rewilding differs from prevalent modes of understanding, knowing and governing life and, more broadly, on the governance of disturbance regimes and their temporalities. First, the New Forest has been considered by some to be a modern analogue for the Holocene ecological conditions and processes that have been suggested as rewilding benchmarks in Europe (e.g., Hodder et al., 2005; K. J. Kirby, 2003). Since medieval times, the New Forest has stocked populations of large herbivores that are analogous to extinct wild megaherbivores and whose return is often advocated by rewilders in Europe (Hodder & Bullock, 2009; Hodder et al., 2005; Sandom & Wynne-Jones, 2019; P. Taylor, 2005). This continuous and ongoing grazing pressure, mostly by deer and free-roaming cattle and ponies, has maintained a wood-pasture/heathland system likely to have continuity with prehistoric lowland Britain, akin to the Frans Vera's aforementioned model that has informed the European, herbivore-led version of rewilding (Hodder et al., 2009; K. Kirby & Watkins, 2015b; Newton, 2011; P. Taylor, 2005). As such, the New Forest has become an influential exemplar for many rewilding initiatives (Newton et al., 2015; Vera, 2000). Indeed, Frans Vera cited it as evidence to support his theory (Cook, 2017; K. Kirby & Watkins, 2015b; Newton, 2011; Newton et al., 2010; Vera, 2000) and his ideas have in turn influenced some of the New Forest's conservation management plans (e.g., Wright & Westerhoff, 2001). Doubts remain, however, regarding their applicability to the New Forest (Newton et al., 2010). Decades before Vera, the field botanist Francis Rose<sup>20</sup> had already argued that the closed canopy theory was false and that large grazing animals were an integral part of the native lowland deciduous forest in western Europe ('wildwood'), based on his work on the distribution and ecological tolerance

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<sup>20</sup> Francis Rose (1921-2006) was a Reader in Biogeography at King's College London. He undertook extensive fieldwork throughout north-west Europe and Southeast England. Rose was a council member of the Hampshire & Isle of Wight Wildlife Trust.

of flowering plants, bryophytes and lichens in the New Forest since the 1960s (Streeter, 2007, p. 516)<sup>21</sup>.

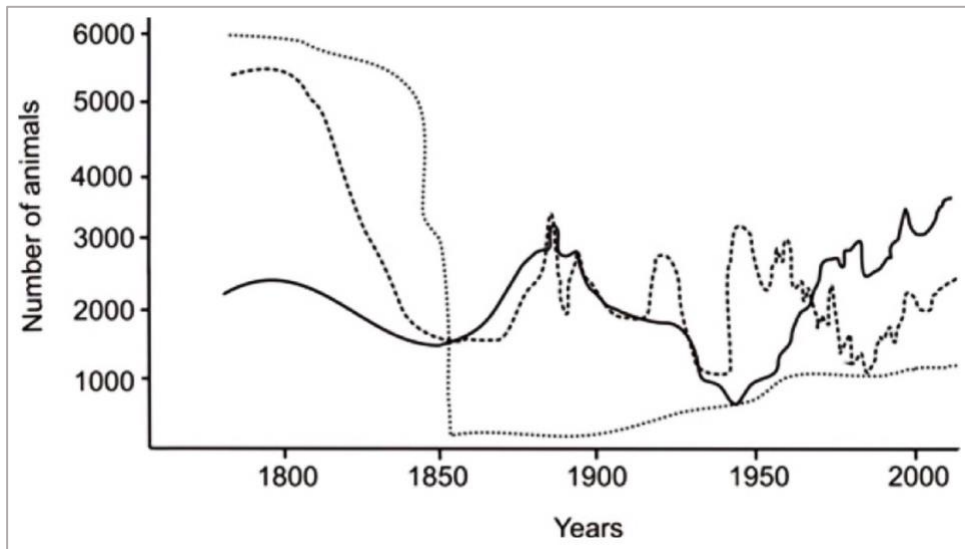
Second, and related to this, the disturbance regimes of the New Forest have been highly dynamic over time. This is illustrated, for instance, by the fluctuations in the number and relative importance of the three main large herbivores (**Figure 6**). As the graph below illustrates, during the past 200 years there has been a broad shift in their relative abundance, mostly due to political, economic and cultural reasons: from deer to free-roaming cattle and ponies by the mid-19<sup>th</sup> century (cf. **Chapter 4**) and from cattle towards ponies since 1965 (cf. **Chapter 6**). Grazing (and browsing) by these three large herbivores has been a constant and dominating pressure on the whole ecological functioning of the forest system for over 900 years, influencing its entire structure, dynamics and ecological functioning (Newton, 2011; R. J. Putman, 1986, 1996b, 2010a; Stagg, 1986; Tubbs, 1986; D. W. Young, 1969a). Large herbivores are for this reason described as ‘architects of the Forest’.

Despite the variations in grazing pressure, which lead to local vegetation changes, at the landscape scale the New Forest has remained relatively stable over time and multiple stable states can be identified over short and long timescales, based on the dominant plant forms (e.g., woodland, heathland, acid grassland, shrubland, mire) (Newton, 2011). Although grazing pressure is the main disturbance influencing vegetation composition and structure, fire, wind, vegetation cutting and drainage have also played an important role in modifying the transitions between vegetation types (**Figure 7**). The ‘degrees’ and intensity of these disturbance regimes have shifted throughout time, mostly for political reasons. The New Forest therefore provides an opportunity to attend to the spatio-temporal and political dynamics of transformation,

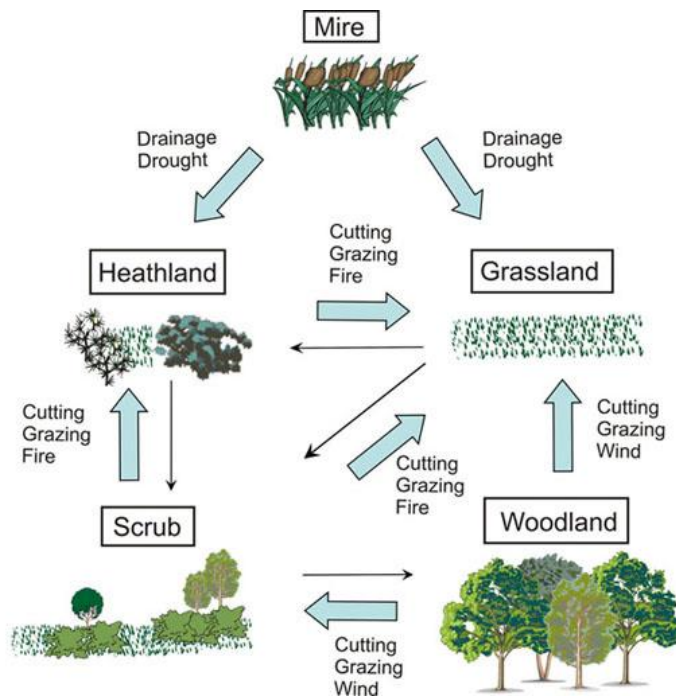
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<sup>21</sup> Before Frans Vera’s book was published in English, he presented his ideas in a paper entitled “Large herbivores and the management of natural landscapes – oak and hazel as metaphors for diversity.” After having read the paper, which unlike the book did not mention the New Forest, Francis Rose wrote enthusiastically to Vera agreeing with his theory and providing examples from the New Forest that could prove it. I had access to this letter and the subsequent exchange of correspondence between Rose and Vera, but due to copyright they will not be used.

resilience and resistance at various timeframes. These dynamics are also relevant in the context of rewilding interventions that tip ecologies across thresholds and stable states (e.g., who or what has the power to change ecological trajectories, who or what is left is being displaced in the process, etc.).



**Figure 6:** Temporal dynamics (late-18<sup>th</sup> to early 21<sup>st</sup> centuries) in the number of the three main large herbivores in the New Forest: deer (dotted line), cattle (dashed line) and ponies (continuous line) (Source: Newton, 2011)



**Figure 7:** Schematic diagram indicating the different ecosystem states and transitions in the New Forest. Narrow arrows indicate successional changes, broad arrows indicate transitions induced by different forms of disturbance (Source: Newton, 2011)

The ecological impacts of the large herbivores throughout the centuries are well documented (e.g., Flower, 1977; Illingworth et al., 1991; Kenchington, 1944; Lascelles, 1915; Peterken & Tubbs, 1965; R. J. Putman, 1986, 2010a; Tubbs, 1986), unlike most of the rewilding initiatives that, as previously mentioned, are still in their infancy. This brings us to the third criteria: the long (and well-documented) history of the New Forest and its management (see **Appendix I**) provides a rare opportunity to explore shifts in ecological and conservation thinking and praxis, notably in relation to disturbance regimes, changing land uses, management and perceptions, as well as the ensuing controversies and challenges, which rewilding initiatives might face.

Finally, the New Forest's wood-pastures and heathlands are feral, "weedy landscapes" (after Tsing, 2017b) that have been shaped by the historical interactions between natural processes and human practices. They provide a privileged site in which to notice the entangled more-than-human histories of disturbance regimes. This is due in part to its "undramatic mundaneness" (after Bubandt & Tsing, 2018a, 2018b) in the lowland UK, which contrasts with the massive political or ecological tragedies that characterise much of the Anthropocene elsewhere (e.g., deforestation of the Amazon, desertification of Sub-Saharan Africa or melting glaciers in the Arctic), bringing into focus the processes of "more-than-human landscape-making negotiations" – the complicity between human world-making practices (i.e., the political, socioeconomic and cultural histories of management) and non-human forms of landscape-making (Bubandt & Tsing, 2018a, p. 8). It is thus a good place to explore disturbance regimes at a relational level.

Although the New Forest can be considered a proxy for some of the landscapes and processes that rewilding aims to reinstate, and it can provide important lessons regarding the management of forest disturbance regimes due to its long history and relatively large scale and resilience, it is not a rewilding site per se. For example, the extensive grazing regime is target- rather than process-led. It is geared towards the maintenance of habitats of high conservation value, thus

aligning more with the prevalent prescriptive modes of governing disturbances (cf. **Chapter 5**). Nevertheless, current and future management plans for the New Forest also include, for instance, the restoration of native woodlands through minimal intervention and of pastoral woodland structures through grazing and fences removal to increase the resilience of the Forest to future, uncertain disturbances (e.g., pests, diseases and climate change). This future-oriented approach is in a way akin to rewilding approaches benchmarked to pre-historical ecologies. Moreover, as the ecologist George Peterken argues, the New Forest may provide the “best guide” for rewilding in Britain:

[How] far dare we go, and what is the optimal degree of re-wilding [in Britain]? (...) Perhaps the New Forest is our best guide. Despite the press of residents and nearby urban sprawl, it is large and still wild enough for visitors who do not always recognise that it survives only with careful and largely unobtrusive management. (Peterken, 2016, p. 286)

This ‘hybrid’ position between being simultaneously an analogue/model for rewilding initiatives and a representative of some of the conventional approaches to forest management in the UK makes the New Forest a very interesting place to address the research aims and questions set out before. In particular, its rich natural and social histories give scope to ‘speculate’ about the possible implications of a rewilding regime (a wild *with* people, in this case) if it were to be implemented in the New Forest, in similar lowland (post-)agricultural landscapes, or in Britain more broadly.

To complement and support this ‘speculative’ approach to the potential shifts and challenges of rewilding, Knepp and Dundreggan estates were also included in this research, albeit with a minor role. Both case studies are already undertaking more radical approaches to forest management, based on rewilding. *Trees for Life*, Dundreggan estate’s owners, and Knepp Castle

Estate were amongst the first projects in Britain to publicly define their approach as such (Wynne-Jones et al., 2020) and are both members of the European Rewilding Network<sup>22</sup>.

Although the approach to rewilding differs in both estates, the aim is to revert land degradation caused by former land uses through the return of dynamic natural processes, as will be described in more detail later in the thesis (§3.1.2 and §3.1.3). At Dundreggan, which was a deer stalking estate until 2008, the rewilding project is focused on planting native trees and reducing deer grazing pressure to allow natural regeneration to occur. At Knepp, rewilding started in 2001 after several decades of intensive dairy farming and has at its core naturalistic grazing. Post-agricultural landscape changes have been driven by introduced free-roaming grazing herbivores, which would act as proxies for some of the extinct megafauna (e.g., aurochs, wild horses, wild boar).

As rewilding sites, it could be argued that Knepp and Dundreggan estates might offer better contexts for investigating rewilding than the New Forest. Nevertheless, and given the broader interest of this research in the temporalities of ecological change and the management of disturbance regimes, a focus on these sites would offer a temporally short period for the analysis of the intertwined social and natural histories of disturbance regimes. Rewilding in these sites is very recent (early and mid-2000s) and there is little information about how disturbance regimes were historically conceived and managed therein (cf. RQ1). Moreover, as privately-owned properties with no conservation designations, Knepp and Dundreggan would not offer as rich an account as the New Forest in terms of the synergies between shifting ecological and social-political regimes (cf. RQ2). For these reasons, both cases occupy a minor role in this thesis and are used sporadically in **Chapters 4** and **6** as points of comparison with the New Forest. These

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<sup>22</sup> The European Rewilding Network is an initiative led by Rewilding Europe that aims to bring together myriad rewilding projects, from small private estates to national parks, as part of a pan-European movement. All the members of the Network are included in an online database (<https://rewildingeurope.com/european-rewilding-network/>) and are supported by Rewilding Europe (e.g., funding, contracts, promotion, seminars, etc.). Until the end of 2019, the Network included 71 rewilding initiatives (total of 6 million hectares) in 27 European countries.

chapters bring a historical perspective to the analysis of the bio- and socio-politics of the governance of large herbivores, being empirically grounded on the New Forest and its history since the 11<sup>th</sup> and mid-20<sup>th</sup> centuries, respectively. To understand and go beyond merely ‘speculating’ about the potential shifts and challenges of rewilding, examples from the two other case studies are included in the concluding parts. In **Chapter 5**, on the contrary, the three case studies are directly compared to explore how (and whereas) the knowledge practices through which disturbances are known differ under ‘prescriptive’ and experimental approaches, exemplified by the New Forest and the two rewilding sites, respectively. Herein, Knepp and Dundreggan estates play a valuable role as examples of experimental modes of knowing and enacting disturbances *in practice*.

## 1.4 Outline of the thesis

**Chapter 2** offers an overview of the key conceptual resources that inform this research. It starts with the broader theoretical framework that runs throughout this thesis, which largely pertains to relational, more-than-human understandings of nature, space and time as applied to the governance of life. I then draw together the three main concepts on which each empirical chapter focus: biopolitics, knowledge practices, and the post-pastoral. In **Chapter 3**, I detail the methodology and research design deployed in this thesis. It starts with a description of the case studies that were selected for empirical investigation, followed by an outline of the qualitative methods used to both generate and analyse the empirical materials, and some reflections on my own positionality.

The three following chapters (**Chapters 4-6**) form the core of the thesis. They consist of the analytical chapters in which I address my research questions. The organisation of the chapters is structured around these questions and the three main concepts reviewed in Chapter 2.

**Chapter 4** explores how historical understandings of large herbivores as part of forest

disturbance regimes come to inform their governance in the UK. It deploys the conceptual lens of biopolitics and responds to the first research question of the thesis. Drawing on the example of the New Forest deer, I identify four dominant, often overlapping, modes of understanding and managing deer: deer as *game*, *spectacle*, *ecological agent* and *vermin*. To these I add a fifth (*rewilding*), exploring the possible obstacles, frictions or similitudes with the previous categories, using also examples from Knepp and Dundreggan estates. **Chapter 5** focuses on the knowledge practices through which ecologists and forest managers know and enact disturbances, in their multiple spatiotemporal dynamics. In so doing, it responds to the second research question, following an STS-type of approach to knowledge as practice. The analysis is empirically grounded in an examination of the methods that are used to assess deer populations and/or impacts at the three study sites. Drawing on these, I compare and contrast two sets of knowledge practices, which I term: *calculating* and *experimenting with* disturbances. This comparison is structured around two axes (*deductive-inductive* and *objective-subjective*), concerning the different modes of knowing that ecologists and managers rely upon and draw together. **Chapter 6** explores the cultural politics of governing disturbances, focusing on how the ‘post-pastoral’ (i.e., reinvented pastoral imageries in terms of socio-ecological baselines and understandings of nature) has come to shape the management of the New Forest’s disturbance regimes. It thus responds to the third research question. The chapter starts with a brief outline of the main socioeconomic, political and ecological changes in the New Forest since the mid-20<sup>th</sup> century. Through the example of the New Forest’s ponies and their management, I then explore how disturbances are contested and what sparks these contestations into being. The chapter concludes with a reflection on the pertinence of these themes for rewilding, including examples from Knepp.

The concluding chapter (**Chapter 7**) brings together the analyses undertaken in the preceding chapters and reflects upon the contributions of the thesis as a whole. It begins with a summary

of the research findings in relation to the three guiding research questions, followed by a discussion of the conceptual and empirical contributions of the thesis to the body of work on which it draws. I conclude by considering the practical implications of this research for the governance of disturbance regimes and for rewilding praxis, and suggest pathways for future research.

## CHAPTER 2. From ‘theory talk’ to ‘theory walk’

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This chapter offers an overview of the conceptual resources that the thesis draws upon. They provide the theoretical framework for addressing the research questions and for analysing the empirical materials – from “talking the theory talk” to “walking the theory walk” (Pryke et al., 2003, p. 1). As my analysis is theoretically pluralist, the diverse literatures drawn together derive from distinct disciplines. It is informed by insights from (more-than-)human geographies, rural geography, environmental humanities, anthropology, political ecology and science and technology studies (STS). I bring these into conversation with writings from disturbance ecology, conservation biology and environmental history.

The chapter is divided into two parts. It begins with an introduction to the ontological toolkit employed throughout the thesis, particularly in terms of the ‘more-than-human’, relational turn as applied to the governance of life. The second part draws together the distinct theories that were used to answer each of the research questions. It is divided into three sections, each corresponding with the main concepts underlying the three empirical chapters: biopolitics (**Chapter 4**), knowledge practices (**Chapter 5**), and the post-pastoral (**Chapter 6**). For each, I flag where and how they will be employed and developed in later chapters, and the contributions I make.

### PART I

#### 2.1 More-than-human geographies

In 2002, Sarah Whatmore argued that by the turn of the millennium, life seemed to “have been sucked out of the worlds that Geography has come to inhabit” (Whatmore, 2002, p. 2; cf. Philo, 1995). Despite the diverse and often conflicting attempts to theorize human-nonhuman

relations in the 1980s/90s<sup>23</sup>, these were premised on an *a priori* separation of nature and society. Conceived as materially or discursively constructed, nonhumans were portrayed as “putty in the hands of capitalism or else a carrier of social values” (Greenhough, 2014, p. 94).

In recent decades, however, the ontological status of ‘nature’ has come to the fore, associated with a refocused attention on how “matter comes to matter,” to use Karen Barad’s (2003) phrase. Inspired by the work of feminist and STS scholars like Donna Haraway, Bruno Latour and Isabelle Stengers, as well as the “vital materialism” (after Bennett, 2009, 2015) of Henri Bergson, Alfred North Whitehead and Gilles Deleuze, amongst others, cultural geographers have sought to retheorise human-nonhuman relations through a ‘more-than-human’ or ‘multinatural’ approach (J. Lorimer, 2012, 2015; Whatmore, 2002, 2006). This approach acknowledges the ‘livingness’ of the world and is attentive to what Whatmore considers to be amongst the most enduring of geographical concerns: “the vital connections between the *geo* (earth) and the *bio* (life)” (2006, p. 601). It rejects ontological dualisms, adhering instead to non-essentialist, processual ontologies<sup>24</sup>, which have been variously termed ‘relational’ (Barad, 2003; Bennett, 2015; Castree, 2003; Clark, 2011; Hetherington & Law, 2000; Whatmore, 2002), ‘multinatural’ (J. Lorimer, 2015, 2012; after Latour, 2004), or ‘performative’ (Blaser, 2013; Braun, 2008), to name but a few.

Processual ontologies depart from prevalent ways of conceiving human-environmental relations to figure, as Donna Haraway puts it, “myriad temporalities and spatialities and myriad intra-active entities-in-assemblages – including the more-than-human, other-than-human, inhuman, and human-as-humus” (Haraway, 2016, p. 101). These ontologies herald ‘the end of nature’, to follow McKibben (1990), unsettling the modern figure of Nature as singular, pure, pristine, external and timeless (Bingham & Hinchliffe, 2008; Hinchliffe, 2007; J. Lorimer, 2012,

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<sup>23</sup> For overviews, see Braun (2008), Castree (2003, 2005) and Castree and Braun (1998).

<sup>24</sup> These bear resonance with non-Western and Indigenous cosmologies (e.g., Blaser, 2013; Descola, 2005; Ingold, 2000; Kohn, 2013; Todd, 2014; Vannini & Vannini, 2019; Viveiros de Castro, 1998).

2015; Whatmore, 2002). They bring to the fore ideas of nature-culture hybrids, with important challenges for conservation (cf. Zimmerer, 2000). Nature is instead conceived of as a set of ongoing relational processes and entanglements, whose constituent parts are continually re-configured as they relate or engage with one another (Braun, 2008; Greenhough, 2014; Hinchliffe, 2007). Bodies, human and otherwise, are understood as lively and interactive materials that are “always already an effect of their *composition* in and through their relations with the world” (Braun, 2004, p. 1354). In this sense, there are no pre-existing essences (*beings*), only relations (*becomings*), which Haraway considers to be “the smallest possible unit of analysis” (Haraway, 2003, p. 20). The world is conceived of as being in ceaseless motion, always unfolding, “always in-the-making” (Haraway, 2008, p. 163). As Alfred North Whitehead put it, “Nature is a process. (...) [It] is always moving on” (Whitehead, 1964, p. 36). Relational approaches have nevertheless been criticised due, for example, to the ‘flattening’ of difference or an insufficient acknowledgment of questions of power (e.g., Castree, 2002; Demeritt, 2005; Philo, 2005; Rocheleau & Roth, 2007).

Within cultural geography, relational thinking has had a great influence on a growing body of research concerned with developing more- or other-than-human approaches to understanding how life is governed through wildlife conservation and biosecurity (e.g., Braun, 2008; Buller, 2008, 2014; Collard et al., 2015; Hinchliffe, 2008; Hinchliffe et al., 2013, 2017; Hinchliffe & Whatmore, 2006; J. Lorimer, 2006, 2012, 2015; Whatmore, 2002). This thesis draws upon and expands this literature, adding to ongoing debates about the role of disturbance as an ecological and cultural process and practice which combines both human and nonhuman agencies and multiple spatiotemporalities. Below, I explain two aspects of these approaches that are relevant for the arguments developed throughout the thesis: a) the acknowledgement of nonhuman difference and agency; and b) the unsettling of the dualistic ontologies upon which conservation thinking and praxis have tended to rely.

### 2.1.1 Naturecultures<sup>25</sup>

The contested notions of wilderness and ‘wild’ are a good place to start. They are relevant not only in the context of discussions about rewilding, where they have already raised controversies, but also to understand disturbances and their governance. Fraught with historical baggage, the ‘wilderness idea’ has been central to colonial and postcolonial conservation (Adams, 2003b; Callicott & Nelson, 1998; Ward, 2019). It depicts a pristine, untouched, ahistorical place that belongs to a realm outside of the social. As critical social scientists have argued, most famously William Cronon (1995), this transcendental and Romantic idea is a ‘cultural construction,’ underpinned by Cartesian dualisms such as nature/society, pristine/disturbed. However, as Whatmore contends, while this cultural constructivist narrative exposes the “disturbing and disruptive place” of wilderness, it tends to erase “all but ‘humans’ as agents in the making of these wild places” (Whatmore, 2002, p. 13/4). In response to this, more-than-human approaches to governing life in cultural geography and cognate disciplines have offered alternative concepts and perspectives that think beyond human agency and normative orderings. Whatmore’s now canonical *Hybrid geographies* has been particularly influential. Therein, she fleshes out a topological conception of wildlife that acknowledges the “bodily presence of living creatures” (Whatmore, 2002, p. 14), their agency in the making of wild places, and their disturbance or disruption of human spatial orderings (Whatmore, 2002, p. 35; cf. Philo & Wilbert, 2000). Wildlife, she contends, “is a relational achievement spun between people and animals, plants and soils, documents and devices in heterogeneous social networks which are performed in and through multiple places and fluid ecologies” (Whatmore, 2002, p. 14).

Within these ‘hybrid’ networks and emergent ecologies, heterogeneous organisms, materials and forces are animated as active subjects in the co-production and shaping of ‘wild’ spaces and their dynamics. Wildlife thus blurs the boundaries between human agencies, other forms of life

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<sup>25</sup> After Haraway (2003, 2008).

and the material world. In *Wildlife in the Anthropocene*, Jamie Lorimer (2015) develops this understanding to suggest an ‘ontology of wildlife’ that conservationists might use in place of Nature. According to him, this ontology “acknowledges the hybrid and lively character of a world animated by a vast range of human and nonhuman difference adhering to multiple and discordant spatio-temporal rhythms” (J. Lorimer, 2015, p. 5). Aligned with these considerations, other scholars have suggested ‘wildness’ as alternative to wilderness, understood as a relational, vital entity in which change is the norm, not the deviation (e.g., Collard et al., 2015; Vannini & Vannini, 2019). Wild nature, as Henry Buller notes, is “a ubiquitous and contemporary expression of relational vitality that is more than a mere vestige of a non-anthropocentric past, a wild of miniature as well as spectacular scale” (Buller, 2014, p. 238).

Similarly, in conservation biology definitions of nature have also expanded beyond the ideal of a pristine wilderness, following a growing interest among ecologists and conservationists in hybrid forms and spaces. New concepts have emerged in recent years, more attuned to ‘hybridity’ and the challenges of conservation in a world of changing biophysical conditions. Examples include ‘novel ecosystems’ or ‘new natures’ (Hobbs et al., 2013), and ‘(rambunctious) gardens’ (P. Kareiva et al., 2011; Marris, 2011). As I explain in more detail later (§2.4.1), the concept of ‘working landscape’ has also been brought to the fore, not without contestation (e.g., P. Kareiva et al., 2011; Marris, 2011; C. White, 2017; Wuerthner, 2014). It describes a landscape in-between an ‘asocial nature’ and an ‘antinatural civilisation’ (Abrams & Bliss, 2013; Huntsinger & Sayre, 2007; Paxson, 2013; cf. Marx, 2000). Rather than pristine, these hybrid, ‘weedy’ spaces are “always sites of disturbance” (Tsing, 2014, p. 90). They are co-inhabited and co-produced by multiple agencies, human, nonhuman and ‘inhuman’ (after Clark, 2011), and are haunted by ‘ghostly presences’ (Mathews, 2017).

Nonhuman agency has been increasingly acknowledged in cultural geography and cognate disciplines over the last decades, particularly through engagements with actor-network theory, new materialisms, and multispecies ethnographies. According to Lorimer, more-than-human thinking draws attention “to the role of a range of nonhuman actors, caught up inside and outside relations with humans, that shape the form and dynamics of any ecology” (J. Lorimer, 2015, p. 25). There has been a tendency to extend agency to discreet objects or biological forms, particularly animal organisms (e.g., Barua, 2014a, 2014b; Bear & Eden, 2011; Collard, 2012), rather than processes. Some exceptions include, for instance, David Hulka’s (2004) work on wildlife management and bison mobilities or the work of Steve Hinchliffe and co-researchers on biosecurity and urban conservation (e.g., Hinchliffe, 2008; Hinchliffe et al., 2013, 2017, 2005; Hinchliffe & Lavau, 2013). Other scholars have considered (and exhorted us to consider) the agencies of cosmic, earthly, and hydro processes and material flows beyond the scope of human involvement (e.g., Clark, 2011; Jones, 2011; Peters, 2012).

Relational ontologies go beyond the scale of the organism. They encompass dynamic processes of circulation and interaction created within assemblages of multiple human and nonhuman, organic and inorganic actors and forces<sup>26</sup>, with profound implications for human/nonhuman life. The collective work *Pathological Lives* provides a good example (Hinchliffe et al., 2017). Herein, the authors deploy a processual approach to emerging infectious diseases in which disease is understood in terms of topologies of intensive relations, instead of its conventional mapping as a matter of pathogenic microbes ‘out there’ or ‘to come’ that infect discrete territories. Diseases, they contend, are “more than a matter of microbes alone. They are instead a product of relations<sup>27</sup> that involve microbes, their hosts and their social as well as physical

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<sup>26</sup> As J. Lorimer (2015, p. 203n52) suggests, this bears resonance with Jane Bennett’s work on ‘vibrant matter’ in which she flags the agencies (‘thing-power’) of organic and inanimate bodies (see Bennett, 2009, Chapter 1).

<sup>27</sup> These entail not only epidemiological relations (e.g., host-pathogen and environmental interactions), but the broader interplays of bodies, microbes, infrastructures and practices, including, for example, economic relations generated through markets for livestock or governmental relations that affect the ways in which diseases are monitored (Hinchliffe et al., 2017, p. xiv).

environments” (Hinchliffe et al., 2017, p. xiii). It is the ‘intensity’ or spatial interrelations of these socio-ecological relations that generates what the authors call ‘pathogenicity’ – the emergence of disease (Hinchliffe et al., 2017, p. xiv).

The processual approach to disturbances deployed in this thesis aligns with these considerations, attending to the multifarious agencies and relations involved in the making and governance of ‘bio-social’ practices, at various space-times. This understanding goes beyond the ecological definition of disturbance as a discrete event or moment in time that causes a change in the form and dynamics of an ecology (cf. §1.2.1). Rather, a disturbance is herein considered a relational phenomenon or process that emerges out of interactions between a range of nonhuman and human actors. In the case of herbivory, which is in itself an ecological, trophic relation between an herbivore and a plant, it emerges out of interactions between myriad other agencies, which comprise, amongst others, animals, trees, soil, forest managers, ecologists, farmers, tourists, policies, management plans, fences.

The entanglements between these more-than-human forces are marked by particular ecological and political relations of differing intensities that generate deliberate or unintentional re-entanglements after disturbance. Back to the example of herbivory, it is not the outcome of discrete causative agents; large herbivores are but one component. Agency is dispersed or distributed through the many interactions involved. These are not only ecological, but also economic (e.g., economic relations generated through markets for livestock; cf. **Chapter 6**), sociocultural (e.g., social change and changes in power dynamics; cf. **Chapter 6**), biopolitical (e.g., human orderings and practices through which humans and nonhumans are folded into (cf. **Chapters 4 and 6**), which nonhumans sometimes disrupt by transgressing boundaries or changing behaviours (cf. **Chapter 4**), or which affect the ways in which they are known and acted upon (cf. **Chapter 5**)), to name but a few. These heterogeneous interactions fold together

not only multiple, more-than-human agents, but also multiple temporalities, to which I now turn.

### 2.1.2 Discordant spatiotemporalities

*After nature* ontologies offer new, processual ways of thinking about space and time, in terms of fluid, multiple topologies (cf. Deleuze & Guattari, 2013; Law, 1999; Law & Mol, 2001; Massey, 2005a; Mol & Law, 1994; Murdoch, 2006; Whatmore, 2002). This imagery is rhizomatic, to borrow from Deleuze and Guattari: made of interconnected lines that “always tie back to one another” in the event of rupture<sup>28</sup> (Deleuze & Guattari, 2013, p. 9) and that are in continual flux or immanence (cf. Ansell-Pearson, 1999). Space and time are not external to relations between entities, but defined within, with reference to the processes and “intensive relations” (after Hinchliffe et al., 2017) through which they emerge. This processuality of space-times, as Derek McCormack argues, is “a vision of worlds in composition through a multiplicity of processually resonant space-times” (McCormack, 2008, p. 3). In terms of conservation, it challenges, for instance, the underpinning binary, fixed geographical categories, such as wild/domestic, alien/native, *in/ex situ* (e.g., Braverman, 2014a, 2015; Buller, 2013, 2014; Clark, 2002; Hinchliffe & Whatmore, 2006; Warren, 2007).

Debates within critical geography about space and, to a lesser degree, time are informative here. Doreen Massey’s work, in particular, stands as an exemplar of relational approaches to space-times<sup>29</sup>. In *For Space*, Massey deploys an alternative approach to space: not “static, closed, immobile, as the opposite of time” (Massey, 2005a, p. 18), but “open, multiple and relational, unfinished and always becoming” (Massey, 2005a, p. 59). Aligning herself with Henri Bergson,

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<sup>28</sup> Deleuze and Guattari illustrate this through the example of ants, whose ‘animal rhizome’ can rebound time and again after most of it has been destroyed (Deleuze & Guattari, 2013, p. 8).

<sup>29</sup> For a review of these approaches, see Murdoch (2006).

Alfred North Whitehead and Henri Lefebvre, Massey contends that space and time are implicated in each other and thus “must be thought together” (Massey, 2005a, p. 18). In her reflections on “moving mountains” in the Lake District, for instance, she reconceptualises landscape and place as “*events*, as happenings, as moments that will be again dispersed” (Massey, 2006, p. 46). These “events of place,” as she calls them, are “the coming together of the previously unrelated, a constellation of processes rather than a thing” (Massey, 2005a, p. 141). They are temporary points of intersection of multiple, intertwined and contrasting trajectories of space and time, ranging from the temporalities of tectonics to those of the taskscape. Considering places as events allows room for myriad, more-than-human processes to become part of “place-in-process”, in such a way that “seemingly settled (even ancient) landscapes have to be seen as literally on the move” (Jones, 2011, p. 2291).

In a short essay called *Into the Woods*, John Berger similarly describes a forest as a “meeting place,” as a unique “intricate conglomeration of times, energies and exchanges” (Berger, 2010, p. 127). The multiple timescales herein range from solar energy to insects that live for a day, from the ant to the oak tree, from photosynthesis to fermentation. Within this intricacy of multiple paths and temporalities, he notes, there are “recalcitrant incidents, unaccommodated in any timescale and therefore (temporarily?) waiting *between*” (Berger, 2010, p. 127). Although Berger does not use the term disturbance and is referring to something sublime, transcendent, this ‘in-betweenness’ bears resemblance with Anna Tsing’s consideration that disturbances are “always in the middle of things” (Tsing, 2015, p. 160). They do not follow a previous harmonious state, but rather other disturbances, thereby being ubiquitous and ordinary in every landscapes. Disturbances, she argues, are moments of coordination between multiple, overlapping space-times that do not follow linear temporalities. They are spatial and temporal at once. Disturbances happen *in* time, and are “generative and destructive *of time itself*” (N. Clark et al., 2018, p. 273).

Time, in this sense, is ‘eventful’, as suggested by Nigel Clark and co-authors in relation to volcanic processes: “rather than conceiving of time as a continuous flow sutured or punctuated by events, we might think of events as generative of time” (N. Clark et al., 2018, p. 274). It erupts, irrupts, interrupts everyday lives, entailing a “rupture with preexisting states of affairs, pathways whose opening precludes other trajectories” (N. Clark et al., 2018, p. 274). Steve Hinchliffe and his co-researchers also allude to events and ruptures in their topological analysis of ‘pathological lives’. They argue that for there to be change, “for there to be ruptures or events, there is a requirement for there to be space (...) there is a need for mixture, heterogeneity and multiplicity” (Hinchliffe et al., 2017, p. 216). A disease situation, according to them, emerges from multiple and relational space-times and eventful juxtapositions, rather than the “rearrangement of disease factors into an outbreak or illness” (Hinchliffe et al., 2017, p. 216).

Recently, an incipient, but growing, body of research has acknowledged the need to rethink time and temporality in relation to more-than-human, sociocultural processes and praxis (e.g., Bastian, 2009; Brice, 2014; N. Clark et al., 2018; Fitz-Henry, 2017; Jones, 2011; C. Phillips, 2020). Such rethinking provides opportunities not only to consider how seemingly discordant temporalities and timescales coexist, but also to bypass the dualistic conception of time as comprised of social *or* natural temporalities (cf. Adam, 2005). Rather, these “more-than-human ‘temporal ecologies’” (Brice, 2014, p. 950; cf. Jones, 2011) are comprised of “complex intertwinings and foldings,” according to rhythms both fast and slow (C. Phillips, 2020, p. 316). Engaging with these multiple space-times demands looking towards the “really *longue durée*” (Massey, 2005b, p. 356; cf. N. Clark, 2011; N. Clark et al., 2018; Jones, 2011; Massey, 2006). It demands attending to “the temporal rhythms of processes as different as rapidly moving fires and slow-growing trees, soil formation, daily cycles of weather, and the structural violence of politico-economic transformation and state formation” (Mathews, 2018, p. 389).

This is what Anna Tsing (2015) calls “polyphonic assemblages”<sup>30</sup>. Similar to a polyphony, in which autonomous melodies intertwine, disturbance-based ecologies consist of multiple, more-than-human temporal rhythms and trajectories that come into being in unexpected moments of harmony and dissonance (Tsing, 2015, 2017a, 2017b; cf. Sullivan, 2018). These trajectories either “forge assemblages of multispecies livability in the midst of disturbance” (Tsing, 2017a, p. 52) or threaten them. Tsing labels these two ecological modes resurgence and proliferation, respectively. The former depends upon and/or thrives in anthropogenic disturbances. Examples include *satoiyama* forests in Japan (Tsing, 2015, 2017a), an abandoned Danish brown coal mining site (Tsing, 2017b; see also Bubandt & Tsing, 2018a, 2018b), or shifting cultivation in Indonesian Borneo (Tsing, 2005). When resurgence is blocked, proliferation occurs. Such is the case of plantations, which Tsing understands in its largest sense as “simplified ecologies designed to create assets for future investments” (Tsing, 2017a, p. 51/2). These ecologies become ‘incubators’ for pests and diseases, like ash dieback and other fungal pathogens (Tsing, 2017a, 2018; Tsing et al., 2019). As already mentioned in the Introduction, ‘events’ such as disturbances are vital, albeit destructive, to the shaping of life.

Whilst some studies have considered the discordant spatiotemporalities underlying disturbance regimes, they have tended to focus on episodic, hazardous ones, like earthquakes, volcanoes or disease outbreaks, and their implication for social life (e.g., Adam, 2005; Clark, 2011; Clark et al. 2018; Müller, 2011). My approach to herbivory as disturbance aims to contribute to these discussions and analyses of temporalities as multiple and eventful. They are both a moment in, and a process of time. Contrary to a volcano, for example, which nonetheless has roots in a deeper past, herbivory is a long-term, recurrent, continuously present disturbance. It is “in the middle of things” (after Tsing, 2015), following and being followed by other disturbances that

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<sup>30</sup> Anna Tsing is not alone in engaging with music as an analogy to explain temporalities and rhythms. For other examples, see Deleuze & Guattari (1987), Ingold (2000), Lefebvre (2015).

simultaneously produce stability and change, depending on the temporal and spatial scale of observation. Its governance and enactment imply choreographing multiple and discordant trajectories, deliberately or otherwise, within shifting ecological and social contexts, as will be explored in this thesis. Attending to these multiple rhythms and changes in relation to a ‘benign’ disturbance (for some), rather than a hazardous, catastrophic one, provides a deeper understanding of landscape dynamics and ‘patchiness’ as continuously shaped and reshaped at myriad scales by both biotic and social processes, which cannot be held apart.

To date, these considerations have received little attention, especially in temperate ecologies. They can nevertheless provide important insights for current debates about human-environmental relations in light of shifting ecological conditions and a deeper understanding of past, present and future practices of forest management and conservation (including rewilding), as well as their consequences (cf. Hecht et al., 2014). Furthermore, these insights can also contribute to discussions about the meaning of cultural landscapes in relation to conservation and, in particular, rewilding, which is sometimes considered ahistorical and inattentive to nonhuman and/or (certain) human agencies (cf. §1.1.1). As James Feldman notes, rewilding landscapes are “examples of the ongoing impact of human choices on natural processes and of natural conditions on human history. These landscapes represent both history *and* nature, working simultaneously and together” (Feldman, 2013, p. 9; see also Hecht et al., 2014; Mathews, 2017; Tsing et al., 2019). In his analysis of the ‘spontaneous’ rewilding of the Apostle Islands, Northern Wisconsin, Feldman argues that it was not accidental, nor was it simply an ecological process. It required a set of economic, social, and political conditions and choices that also need to be attended to, alongside “ecological processes like evolutionary potential or predator-prey relationships” (Feldman, 2010, p. 43). The same applies to deliberate interventions, wherein spatio-temporal and power dynamics are even more evident.

## PART II

### 2.2 Biopolitics

Biopolitics has recently become a “buzzword” in the social sciences and humanities (Lemke, 2011, p. 1). Campbell and Sitze talk about a “biopolitical turn” (2013, p. 4), to which geography has not been immune (see S. Rutherford & Rutherford, 2013; Schlosser, 2008). This ‘turn’ has drawn inspiration from the work of Michel Foucault in the mid-1970s, particularly his insights into ‘biopower’, from which biopolitics stems<sup>31</sup>. My aim in this section is not to give a comprehensive overview of this concept, which has already been done elsewhere (e.g., Campbell & Sitze, 2013; Lemke, 2011; P. Rutherford & Rutherford, 2013). Rather, I offer a brief review of Foucauldian conceptualisations of biopolitics, focusing on how these have been expanded into “the realm of governing nonhuman animals” (Braverman, 2015, p. 13), particularly wildlife management and conservation. As will be explained in more detail below, I engage with the notion of ‘more-than-human biopolitics’ in **Chapter 4**.

#### 2.2.1 Foucauldian and more-than-human biopolitics

In tracing the genealogies of modern, liberal forms of government power in Western Europe, Foucault argued that the 17<sup>th</sup> and 18<sup>th</sup> centuries saw a gradual shift in the government of human societies from “sovereign power” (the power to *take* life or *let* live) towards “biopower” (the power to *make* live and *let* die) (Foucault, 1984, 2003, 2007). According to Foucault, the former encompasses the imposition of totalitarian laws through violence, being targeted towards the territory and its inhabitants. In contrast, biopower is targeted towards the “intrication of men

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<sup>31</sup> Foucault mentioned the term biopolitics for the first time in 1976 in a short piece that was part of the first volume of *Histoire de la Sexualité (La volonté de savoir)*. This piece would appear two years later in English, under the title “Right of death and power over life,” in the closing pages of the first volume of *History of Sexuality* (Foucault, 1984, pp. 258–272). The concept was further developed in Foucault’s various lectures at the Collège de France in the late-1970s, which have been recently published in English (Foucault, 2003, 2007, 2008).

[*sic*] and things<sup>32</sup>” (Foucault, 2007, p. 97), being “a matter of (...) the disposition of things, that is to say, of employing tactics rather than laws” (Foucault, 2007, p. 99).

Within biopower, Foucault identifies two distinct albeit complementary forms of political technologies. The first (*anatomo-politics*), centred on the “body as a machine” (Foucault, 1984, p. 261), aims to discipline the individual body and behaviour. The second (*biopolitics*), which emerged in the 19<sup>th</sup> century, centres on “the species body, the body imbued with the mechanics of life and serving as the basis of the biological processes” (Foucault, 1984, p. 262). It concerns the non-disciplinary and “calculated management of life” (Foucault, 1984, p. 262) at the level of the population or species, through mobilising particular knowledges, notably life sciences and statistics<sup>33</sup>. These become intricate with politics in the guise of regulatory technologies. Recent literatures have identified a third mode of biopower (*environmental*) (e.g., B. Anderson, 2012; Braun, 2014; Massumi, 2009), based on Foucault’s (2008) lectures on neoliberal governmentality. It is focused not on “discipline-normalization, but [on] action on the environment,” understood here as modulation of the socio-ecological *milieu* (Foucault, 2008, p. 260). Despite its emphasis on vitality, or “the power to invest life through and through,” as Foucault put it (1984, p. 262), biopolitical technologies involve both generative and destructive processes. Investing in life, Bruce Braun notes, paradoxically entails “killing—or at least abandoning or exposing to risk—some populations in the name of the vitality of valued forms of life” (Braun, 2013, p. 54; see also Foucault, 2003, pp. 253-254; cf. Mbembe, 2003).

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<sup>32</sup> According to Foucault, these ‘things’ are “wealth, resources, means of subsistence, and, of course, the territory with its borders, qualities, climate, dryness, fertility, and so on (...) customs, habits, ways of acting and thinking (...) accidents, misfortunes, famine, epidemics, and death.” (Foucault, 2007, p. 97; cf. Lemke, 2015).

<sup>33</sup> For Foucault (2007), the emergence of “the science of the state” known as statistics, and the underlying measurements and quantifications, played a crucial role to manage and regulate the state’s population. In *Seeing like a State*, James Scott (1998) extended Foucault’s considerations to grand state-based environmental schemes. Drawing, for instance, on the rise of scientific forestry in late-18<sup>th</sup> century Germany, Scott argues that censuses, cadastral maps, or grids (“regulatory technologies,” in Foucauldian terms) were also fundamental for the management of state forests and resources at a distance. In **Chapter 5**, I expand on this when addressing calculation as one of the knowledge practices deployed to understand disturbance regimes, in their multiple spatiotemporal dynamics.

The historical shifts in the dominant governmental logics – sovereign, disciplinary and biopolitical – are, nevertheless, not linear transitions but “at most shifts in emphasis,” Schlosser notes (2008, p. 1624). In fact, as Foucault himself argued, “we have a triangle: sovereignty, discipline, and governmental management, which has population as its main target and apparatuses of security as its essential mechanism” (Foucault, 2007, p. 107/8). These different forms of power are not mutually exclusive, but coalesce in particular contexts and situations (Dalby, 2013, p. 186; Schlosser, 2008).

It is often remarked that Foucauldian approaches to biopower and biopolitics render the material and nonhuman world as merely “something to be manipulated” (Hinchliffe et al., 2017, p. 18). They can be read as yet another form of “human exceptionalism” (after Haraway, 2008). However, more relational readings of Foucault’s writings have prompted a growing number of scholars to stress the ‘more-than-human’ (Asdal et al., 2017b; Cavanagh, 2014, 2018), ‘lively’ or ‘cosmopolitical’ (Hinchliffe et al., 2017, 2005; J. Lorimer, 2015) dimensions of contemporary biopolitical regimes (for an overview, see Asdal et al., 2017b).

Over the last decades, an emergent body of research in geography, anthropology, animal studies and political ecology has encouraged livelier, more-than-human, and more affirmative approaches to biopolitics (e.g., Asdal et al., 2017a; Cavanagh, 2014; Haraway, 2008; Hinchliffe et al., 2017; Hodgetts, 2017; J. Lorimer, 2015, 2017; J. Lorimer & Driessen, 2013). This body of research has shown the multifarious ways in which “combinations of forms of human *and* non-human life are encouraged, stymied, shaped and resisted” (Büscher, 2018, p. 159), broadening thus the terrain upon which biopolitics operates. Connor Cavanagh, for example, argues that, under the current historical-geographical conjuncture of global climatic and environmental change, “biopolitics mutates from simply constituting a specific mode of governing humans, if it ever truly was, and instead manifests as the politics and political economy of supporting

certain and asymmetrically valued forms of both human and nonhuman lives within rapidly shifting ecological conditions” (Cavanagh, 2014, p. 277). Understood in this way, biopolitics is “an assemblage of matters of life” (Asdal et al., 2017b, p. 3). It is “always a more-than-human endeavour” (Hinchliffe, 2017, p. 157), which entails the relations between “a complex collective of things: humans, nonhumans, ideas, words, practices, and so on” (Crowley et al., 2018, p. 122). I draw upon and develop this ‘more-than-human biopolitics’ in **Chapter 4**, when tracing the multiple and historical understandings and management practices of disturbances through differing regimes of forest governance.

Further literatures have engaged with ‘environmental’ modes of biopower in the context of environmental security. Although I do not engage with these directly, they are nevertheless worth mentioning. Environmental biopower pertains to a set of pre-emptive practices and technologies to govern transgressive and unruly life or earthly forces that have the potential to destroy human existence, such as (re)emerging diseases or climate change (e.g., B. Anderson, 2012; Braun, 2007, 2014; Chandler, 2018; N. Clark, 2011, 2013; Hinchliffe et al., 2013, 2017; Massumi, 2009). In such modes of government, “*molding life* is replaced by *modulating natural processes*, now extended to include the nonhuman world itself,” as Bruce Braun suggests in his analysis of urban flood management (Braun, 2014, p. 60). This entails, for instance, allowing natural processes and disturbances to occur rather than changing or avoiding them, to build resilience towards future threats to (human) life. Contrary to modernist biopolitical technologies (‘command and control’), which are now seen to exacerbate and intensify threats rather than protecting society, in this mode of biopower “one does not work against nature (...); rather, one works *with* it” (Braun, 2014, p. 58/9). Some authors have argued that biopower/biopolitics has now shifted towards ‘ontopower’ (Büscher, 2018; Massumi, 2009) or ‘ontopolitics’ (Chandler, 2018) due to the complexity, nonlinearity and unpredictability of future threats to life. Others have claimed that “biosecurity wedds biopolitics with geopolitics” (Braun, 2007, p.

23) stressing that the threat posed by “a constant state of emergency (...) is increasingly geographically all-encompassing” (N. Clark, 2013, p. 23).

## 2.2.2 Biopolitical conservation

Foucauldian and post-Foucauldian<sup>34</sup> readings of biopolitics have proven useful for theorising and rethinking contemporary modes of governing interspecies relations, including agriculture, forestry, hunting, animal welfare and biosecurity. To a lesser extent, an incipient number of theoretical and empirical analyses have approached conservation as biopolitics, foregrounding how and why certain species are let live while others are made killable (e.g., Biermann & Anderson, 2017; Biermann & Mansfield, 2014; Braverman, 2015; Buller, 2008, 2013; Cavanagh, 2018; Collard, 2012; Crowley et al., 2018; Fredriksen, 2016; Hodgetts, 2017; J. Lorimer, 2015; J. Lorimer & Driessen, 2013, 2016; Srinivasan, 2014; Youatt, 2008). Drawing on the ‘relational ontologies’ sketched out in **Part I**, these analyses have afforded some “power to the ‘bio’” (J. Lorimer, 2015, p. 14). They are attuned to the multiple ways in which the often unruly and unpredictable lives (human and other-than-human) can resist, escape and unsettle the spatial orderings facilitated by biopolitical conservation regimes (e.g., Bingham, 2006; Buller, 2008; Collard, 2012; Fredriksen, 2016; Hinchliffe, 2008; Hodgetts, 2017; J. Lorimer & Driessen, 2013). Biopolitics shifts from the ‘control over life’ towards processes of ‘living with’ or ‘cosmopolitics’ (Hinchliffe et al., 2013, 2017, 2005; J. Lorimer, 2015; J. Lorimer & Driessen, 2013, 2016). For instance, in their analysis of ‘bovine biopolitics’, Jamie Lorimer and Clemens Driessen argue that a *biopolitics of living with* “enhances an appreciation of the power of human classification and ordering with a sensitivity to the lively potentials of nonhumans to mould, transgress and unsettle such orderings in their making of their own worlds” (J. Lorimer & Driessen, 2013, p.

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<sup>34</sup> Foucault’s concepts of biopower and biopolitics have been reworked by a range of scholars, including Giorgio Agamben, Antonio Negri, Roberto Esposito and Donna Haraway (for overviews, see Campbell & Sitze, 2013; Hinchliffe & Bingham, 2008; P. Rutherford & Rutherford, 2013; S. Rutherford & Rutherford, 2013; Schlosser, 2008).

257). Similarly, in *Pathological Lives*, Steve Hinchliffe and co-researchers argue that “we need to move away from a version of life politics (bio-politics) where norms are policed and re-enforced (often materially with a system of barriers and boundaries) to a lively politics (cosmopolitics)” that attends to the circulation of human and nonhuman actors in heterogeneous topologies (Hinchliffe et al., 2017, p. xvi). Elsewhere, they call these two versions borderlines and borderlands, respectively (Hinchliffe et al., 2013).

Most of the biopolitical analyses of wildlife management have tended to focus on governing nonhuman individual bodies and populations, notably animals. By bringing ongoing, historical disturbance regimes and ecological processes to the fore, I aim to expand the scope of those analyses, contributing in particular to emerging biopolitical approaches to rewilding (e.g., Biermann & Anderson, 2017; Buller, 2013; J. Lorimer, 2015, 2017; J. Lorimer & Driessen, 2013, 2016). In some ways, this speaks to the set of literatures mentioned above that concentrate on environmental and biological security. As Jamie Lorimer (2017, 2020) suggests, they are akin to “probiotic environmentalities,” which rewilding exemplifies. Both ‘environmental biopower’ and ‘probiotic environmentality’ encompass deliberate interventions or “environmental technologies” (Foucault, 2008, p. 259) to modulate the socioecological *milieu* and thus secure desired systemic properties, be them national security (e.g., Dalby, 2013; Massumi, 2009) or a functional ecology (e.g., J. Lorimer, 2017, 2020; J. Lorimer & Driessen, 2016). They nevertheless differ in relation to the temporality of the crisis to which they respond: “While forms of biosecurity seek to manage circulations to build resilience in the face of imminent but unavoidable disaster, probiotic approaches figure the present as already disastrous” (J. Lorimer, 2017, p. 10).

Understanding conservation as a type of biopolitics requires being open to immanence and the ‘likely presence’ of nonhuman life, as Hinchliffe (2008) suggests. Different modes of

conservation enact and come to shape different worlds, “cutting up wildlife and performing particular ideas of what life should be saved (...) according to different knowledges and in the interests of different human and nonhuman actors” (J. Lorimer, 2015, p. 12). These multiple conservation biopolitics or “ontological choreographies” (after Haraway, 2008) rest on overlapping and sometimes contradictory logics and practices (e.g., Biermann & Anderson, 2017; Buller, 2008, 2013; Crowley et al., 2018; Fredriksen, 2016; Hinchliffe, 2008; Hodgetts, 2017; J. Lorimer, 2015, 2017; J. Lorimer & Driessen, 2013). Ultimately, as Henry Buller (2008) notes in relation to wolves in the French Alps, these tensions rest on and reveal different ontologies or philosophies of nature. Besides multiple, conservation logics also coexist and interact with other “*materially heterogeneous* orderings” (Law, 1994, p. 2; see also Hinchliffe & Bingham, 2008; Whatmore, 2002), modes of relating and concerns, such as welfare, biosecurity or agriculture, sometimes in conflicting ways. This creates tensions between “competing biopolitical paradigms” (Buller, 2013, p. 184) or “conflicting modes of nonhuman biopolitics” (J. Lorimer & Driessen, 2013, p. 250). The result is what Annemarie Mol (1999) has termed “ontological politics,” with significant implications for the various actors involved, human and otherwise – what is ‘made live’ and ‘let die’.

I draw on these considerations in **Chapter 4**, when exploring the ontological politics of governing disturbance regimes. In particular, I draw on and depart from Lorimer and Driessen’s (2013) teratological approach to bovine modes of biopolitics, which focuses on the frictions at the interfaces between rewilding and other modes of living with and governing cattle (agriculture, conservation, animal welfare and biosecurity). I follow their suggestion to think biopolitics “schematically” (J. Lorimer & Driessen, 2013, p. 257), expanding their analysis to the mapping of the biopolitics of ongoing disturbance regimes. My contributions to this literature are threefold. To begin with, this research provides the first detailed empirical analysis of the biopolitics of rewilding in relation to disturbance regimes and ecological processes.

Secondly, by bringing a biopolitical lens to the analysis of historical geographies of forest and wildlife management, I draw attention to the entangled human and non-human bodies and histories, the potentialities of nonhumans to disrupt human classifications, the logics haunting management and rewilding, and the biopolitical significance of these entanglements and disruptions. These go beyond more traditional understandings of biopolitics as merely human efforts to control life, providing useful conceptual and empirical resources to grasp contemporary modes of wildlife management and broader interspecies relations. Finally, by looking at continuous and long-term disturbance regimes that combine various ecological and social processes (of continuity and change), my analysis draws attention to the intertwined biopolitical and socio-political regimes, which go beyond the more dominant emphasis on the cross fertilisation of geopolitics and biopolitics, notably in relation to biosecurity (e.g., Braun, 2007, p. 23, 2014; N. Clark, 2013; Hinchliffe et al., 2013; Hinchliffe & Lavau, 2013).

### **2.3 Knowledge practices**

Underlying the biopolitical approaches mentioned in the previous section are not only the ways in which life is ontologically conceived, but also how it is known and rendered manageable. For Foucault himself, what he termed “regulatory technologies” are, Paul Rabinow notes, “joinings of knowledge and power” (Rabinow, 1984, p. 17). They are produced by the discourses<sup>35</sup> that characterise the dominant system of thought within a historical period (what Foucault labelled ‘episteme’) and establish the grounds for truth – or, as he put it, the “conditions of possibility of all knowledge, whether expressed in a theory or silently invested in a practice” (Foucault, 1994, p. 168).

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<sup>35</sup> In its Foucauldian version, and contrary to semiotics, discourse is not synonym with language. As Stuart Hall notes, it “is about the production of knowledge through language. But since all social practices entail *meaning*, and meanings shape and influence what we do – our conduct – all practices have a discursive aspect (...) It is about language *and* practice” (S. Hall, 1997, p. 44). Understood in this way, discourse both ‘rules in’ and ‘rules out’ (S. Hall, 1997, p. 44): it frames ways of thinking about certain topics, things and objects, but it also “sets limits to what is possible or knowable” (Law, 2004, p. 159).

Partly in response to the strictly discursive and representational focus of approaches such as Foucault's, scholars in STS, particularly within what has come to be labelled Actor-Network Theory (ANT), have brought practices<sup>36</sup> to the fore as a way to better grasp the complexities and "messes of reality" (Law, 2004, p. 2). Rather than undermining or negating the relevance of discursive analyses, attending to knowledge practices "supplements Foucault's accounts of the practices and materialities of power," as Steve Hinchliffe and collaborators contend (Hinchliffe et al., 2017, p. 30). Through detailed empirical investigations, work in STS and ANT has focused on how scientific knowledge is produced by multiple agents, human and otherwise, and on how it enacts multiple 'realities' (see Latour, 1999, 2005; Law, 2004, 2008; Law & Mol, 2002; Law & Urry, 2005; Mol, 2002). According to John Law, "to understand mattering of the material, you need to go and look at practices, and to see *how* they do whatever reals that those practices are doing, relationally. ('Reals' because different realities are being enacted in different practices.)" (Law, 2010, p. 174/5).

As sociologists and geographers of science have long pointed out, "the world is not merely sitting out there waiting to be revealed" (Greenhough, 2014, p. 101). Contrary to the "modernist settlement" (Latour, 1999), which rests on the separation of Science<sup>37</sup> from politics, science is a set of "social, uncertain and consequential practices taking place in specific locales" (J. Lorimer & Driessen, 2014, p. 170). Knowledge is embedded in practices and reflects the context in which it is produced, being thus partial and situated, as Donna Haraway (1988) famously put it. In this sense, rather than the disembodied "god-trick of seeing everything from nowhere" (Haraway, 1988, p. 581; cf. Shapin, 1998), it encompasses "the joining of partial views and

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<sup>36</sup> For an overview of the meanings and engagement with practice within STS, see Gad and Jensen (2014).

<sup>37</sup> Science, in the singular and capitalised, refers to "the normative epistemology scientists impose theoretically upon their practices," in contrast with "the actual practices - sciences, plural and without the capital S" (Despret, 2013, p. 72; see also Latour, 2004, p. 9/10).

halting voices into a collective subject position that promises (...) views from somewhere” (Haraway, 1988, p. 590).

Within geography, a small but growing body of work has engaged with these considerations to explore the ways through which the practices and science behind wildlife management and conservation “pack the world into words” (after Latour, 1999, p. 24) and render life knowable (e.g., Braverman, 2014a, 2015; Hinchliffe, 2008; Hinchliffe & Lavau, 2013; J. Lorimer, 2006, 2008, 2015). This literature, grounded in the relational ontologies explored in **Part I**, has “sought to register the force of things in our *understanding* of the non-human world,” as Bruce Braun explains (2008, p. 671). Instead of a pregiven form, conservation assemblages “emerge as the result of what people and things do” (Braun, 2008, p. 670). I draw on and depart from these literatures in **Chapter 5** to analyse the multiple ways of knowing and enacting disturbance regimes.

### **2.3.1 Conservation practices**

The work of Steve Hinchliffe and Jamie Lorimer on what conservation comes to mean in practice is instructive here. For instance, Hinchliffe (2008) argues that the “metaphysics of presence” that underlies nature conservation in theory contrasts with the multiple and animated natures that conservationists work with in practice. According to him, natures are “often far from being known, understood, predictable or matters only of control” (Hinchliffe, 2008, p. 88; see also Hinchliffe et al., 2005). Likewise, Lorimer argues that practical understandings of biodiversity “emerge from the messy and situated practices of biodiversity conservation” (J. Lorimer, 2006, p. 540). In contrast with the panoptic, disembodied and objective understandings of biodiversity in official documents, for example, practical understandings of it depend on and are influenced by partial and heterogeneous embodied skills, emotions and non-human agencies (J. Lorimer, 2006, 2008, 2015). In practice, conservation is multiple.

Similarly, existing discussions around rewilding, with which I engage and contribute to, also point towards its multiplicity in practice (contra rewilding discourse).

Considering that natures are not “pre-set matters which only need better management” but are continuously “in the making” (Hinchliffe, 2008, p. 88) through messy, situated and more-than-human practices has consequences for how disturbances are known and become subject to conservation ‘biopolitics’. It jeopardises the pretensions to objectivity and rationality of Natural Science’s positivist epistemologies, which have played a central role in Western environmental policy. In particular, it challenges the preeminent idea that the modern figure of Nature can be “known by objective Science and defended and restored by rational environmental management” (J. Lorimer, 2015, p. 2), mostly through calculative and modelling practices. Furthermore, dealing with the epistemic uncertainty that characterises the present historical conjuncture places in question “our ability to know and predict socio-ecological futures” (Braun, 2015a, p. 103). This demands ‘realist’ epistemologies (after J. Lorimer, 2015) that inform myriad modes of knowing and relating to the world, not all of which are scientific or human.

Below I briefly sketch out two sets of knowledge practices which structure the analysis of modes of knowing disturbances (large herbivores) in **Chapter 5**: calculation and experimentation. Both are geared towards governing present ecologies in the name of “futures in the making” (Adam & Groves, 2007), but differ in terms of how future ecologies and surprising events are imagined and acted upon (or not) and the speculative futures being produced in the process.

## **Calculation**

Throughout much of the 20<sup>th</sup> century, as Bill Adams notes, “nature conservation practice has formed part of a rationalizing project engaged in controlling nature” (Adams, 1997, p. 278). This rationalising imperative has relied on the ‘scientific authority’ of ecology as a means to

understand and control human and nonhuman life, predict environmental change and provide “a technocratic recipe book for directing and controlling that change” (Adams, 1997, p. 287). The main objective of mainstream conservation (‘command and control’) has been to “render the present eternal” (Hinchliffe, 2008) and thus maintain the *status quo*, mostly through the governance of and through threats or risks – what Irus Braverman calls the ‘present-future governance’ of catastrophic events (e.g., trans-species epidemics, climate change, extinction) (Braverman, 2017; cf. B. Anderson, 2010). Hence, conservation has been predominantly reactive (J. Lorimer, 2015, p. 5) and anticipatory (Braverman, 2017), associated with modes of knowing that render disturbances calculable, predictable and, therefore, amenable to control.

Calculation has indeed played a fundamental role in modern forms of governance (Foucault, 2007; N. Rose, 1991)<sup>38</sup>. It is, according to Ben Anderson (2010), a mode of knowing, anticipating and rendering the future present to be thereafter acted upon, through the “numericalization of a reality to come” (B. Anderson, 2010, p. 784). According to Braverman, calculation connects the “biopolitical making and ranking of life and the future-oriented government of risk” (Braverman, 2017, p. 19). In wildlife conservation and management, calculative practices are part of a generalised attempt to make things *present* (after Hinchliffe, 2008) and to control and secure life, notably through practices of wildlife surveillance (Braverman, 2014a; Hinchliffe & Lavau, 2013; J. Lorimer, 2008). Examples include counting species through censuses or surveys (e.g., Hinchliffe, 2008; Hinchliffe & Lavau, 2013; J. Lorimer, 2008; Youatt, 2008), calculating and managing extinction risks (e.g., Biermann & Mansfield, 2014; Braverman, 2014a, 2017), or assessing and calculating the risk probabilities of epidemic events like zoonotic diseases (e.g., Enticott, 2001; Hinchliffe et al., 2013, 2017; Hinchliffe & Lavau, 2013). As several scholars have argued, these practices and calculative “technologies” (Biermann & Mansfield, 2014, p. 260) also have material consequences.

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<sup>38</sup> As already mentioned in the previous section, for Foucault biopolitics entails “the calculated management of life” (1984, p. 262) (cf. footnote 33).

Databases, lists, models and the like actively shape subjects and future ecologies in relation to the knowledge that informs them (J. Lorimer, 2015, p. 12/3; cf. Biermann & Mansfield, 2014; Bowker, 2000; Braverman, 2014a, 2017; J. Lorimer, 2006). In this sense, conservation is performative<sup>39</sup> when applied to the governance of those enlisted: “If we are only saving what we are counting, and if our counts are skewed in many different ways, then we are creating a new world in which those counts become more and more normalized” (Bowker, 2000, p. 675).

Most of the studies addressing calculative practices in conservation have tended to focus on the population or species level. My comparative analysis of the calculative practices associated with managing disturbance regimes, both in more ‘prescriptive’ conservation modes and rewilding, aims to contribute to expanding the scope of this burgeoning field.

## **Experimentation**

Recent years have seen a ‘turn to experimentation’ in geography and elsewhere. According to Bruce Braun, underlying this ‘turn’ is the conceit that “by working with materials and material others we can potentially open ourselves to events that surprise and disturb, allowing the world to force thought” (Braun, 2015a, p. 241). For Sarah Whatmore, in turn, “posthumanist thinking requires a more experimental tack capable of articulating the affective force” of environmental processes and disturbances, like flooding or earthquakes (Whatmore, 2013, p. 34).

In the face of an increasingly volatile and uncertain world, without a Nature to protect, a Science to define its properties and ecological baselines or certain knowledge of the future to serve as guide, commentators have identified the need to engender new, open-ended and experimental forms of knowing (Braun, 2015a; Hinchliffe et al., 2013; J. Lorimer, 2015). Particularly relevant for the arguments of this thesis is the growing number of studies focused on “cosmopolitical

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<sup>39</sup> This term draws upon the STS concept of ‘performativity of methods’ (Asdal & Marres, 2014; Law, 2004; Law & Urry, 2005), which has been brought to the fore by economic sociologists (e.g., MacKenzie et al., 2006).

experiments” (after Hinchliffe et al., 2005) or “government by experiment” (after Bulkeley & Castán Broto, 2013), and their respective epistemological and political implications. Some examples include urban conservation (e.g., Hinchliffe et al., 2005), the management of flood risk (e.g., Lane et al., 2011; Whatmore, 2013; Whatmore & Landström, 2011), ecological or microbiome restoration (e.g., Gross, 2010; Gross & Hoffmann-Riem, 2005; J. Lorimer, 2020), and rewilding practices (e.g., J. Lorimer, 2015; J. Lorimer & Driessen, 2014). Cosmopolitical experiments are not about rendering the present eternal; rather, they are proactive, requiring a processual and “careful political ecology” (after Hinchliffe, 2008) that is open to the “inventive practices of conviviality, of living with or co-fabricating, in which all those (humans and nonhumans) enjoined in them can, and do, affect each other” (Whatmore, 2013, p. 46). They demand ‘attuning’ to or ‘learning to be affected’ (Despret, 2004; J. Lorimer, 2008, 2015) by a target organism or ecology.

Experimentation here is understood not in terms of the positivistic meaning of hypothesis testing, but as a “trial or venture into the unknown” (Gross, 2010, p. 4; cf. Braun, 2015a; J. Lorimer, 2015; J. Lorimer & Driessen, 2014). It entails an open-ended set of practices outside the contained and controlled spaces of the laboratory, which are likely to generate surprising events. Furthermore, experimental knowledge practices involve multiple forms of expertise and distributed forms of knowledge production. Natural scientists are but one type of actor, with nonhuman forces and processes also playing a part, some unexpectedly. They are granted agency, for instance, to drive landscape changes and to “make a mess of experimental controls” (Braun, 2015a, p. 108). In this sense, experimental knowledge practices are “real-world experiments” (Gross & Hoffmann-Riem, 2005; Krohn & Weyer, 1994) or “wild experiments” (J. Lorimer & Driessen, 2014). The latter, which can be defined as “speculative practices unsure of future outcomes” (J. Lorimer, 2015, p. 9), involve several modes of experimentation that go beyond long-held distinctions between, for example, a ‘made’ and ‘found’ nonhuman world,

‘artificial’ and ‘natural’ sites, ‘secluded’ and ‘wild’ decision-making processes, or ‘order’ and ‘surprise’ as epistemic values (J. Lorimer & Driessen, 2014). I expand on this last axis, order-surprise, when drawing out the distinctiveness of calculative and experimental practices towards knowing disturbance in forest management, through examples of management practices that sit between the extremes of the axis, rather than at the end of it.

Although calculation and experimentation tend to be discursively portrayed as opposed, my analysis of how disturbances are known and enacted in mainstream conservation and rewilding shows that in practice the stark distinction is blurred. Herein lies one of the main contributions that this research brings to the literatures on knowledge practices, particularly in relation to rewilding.

## **2.4 The post-pastoral**

The concept of the post-pastoral, with which I engage in **Chapter 6** to address the conflicting values associated with governing disturbances, draws on Heather Paxson’s (2013) ethnographic study of the artisan cheesemaking revival in the USA. For Paxson, the post-pastoral consists of reinvented pastoral imaginations of socio-ecological baselines and understandings of nature.

According to the literary theorist Terry Gifford (1999, 2013), on whose writings Paxson draws, the term ‘pastoral’ can be used in three distinct ways. First, it is a specific literary form or genre, whose origins date back to Ancient Greek and Ancient Roman poetry. It refers to poems and dramas of a specific formal type with (mostly) idealised descriptions of an Arcadian countryside, and particularly the life of shepherds. Second, and following the European Renaissance’s rediscovery of this classical pastoral, the term has come to refer any literature that describes the countryside in contrast to the urban, either implicitly or explicitly. This second usage is defined by a common theme rather than form, as in the first case. Herein, nature and culture, as well as

production and consumption, are perceived as opposed realms. The countryside and its landscapes are depicted as bucolic and harmonious places where life is 'pure' and to which urban residents could retreat. Finally, the pastoral is also used in a pejorative sense. In *The Country and the City*, for example, Raymond Williams (1973) argues that the classic pastoral imagination is simplistic and masks structural inequalities and rural exploitation. According to Gifford, this counter- or anti-pastoral is mostly visible in English pastoral literature. In American literature, Leo Marx (2000) considers that the pastoral ideal is continually interrupted by the "machine in the garden," which characterises what he terms the "complex pastoral." As explained by Paxson, underlying the latter is a paradox at the heart of American industrialism: "while *land* is seen by agricultural and mining industries as a resource for value extraction, *landscapes* are framed as objects of contemplation and sites of relaxation" (Paxson, 2013, p. 16).

The post-pastoral, in turn, combines aspects of both pastoral and anti-pastoral literatures (Gifford, 1999). Rather than temporal, Gifford contends that the prefix 'post-' is conceptual: it "does not mean "after," but "reaching beyond" the limitations of pastoral while being recognizably in the pastoral tradition" (Gifford, 2013, p. 26). It entails, as he further notes, a collapse of the human/nature divide, "seeking not a stable, complacent form of harmony in the human relationship with nature (...) but [a] dynamic, self-adjusting accommodation to 'discordant harmonies'" (Gifford, 2013, p. 28). In Paxson's case study of cheesemaking, the post-pastoral encompasses a selective reinvention of pastoral practices, values and knowledges by (sub)urban migrants in a post-productivist American landscape. It entails, according to her, a "revised pastoral that critiques industrial capitalism's wholesale exploitation of nature and culture yet retains, while modifying, an opposition between city and country" (Paxson, 2013, p. 17). Central to the post-pastoral is the concept of the 'working landscape,' which is a manifestation of broader socioeconomic and political changes in rural settings. I explore these below.

Rather than a nostalgic return to a premodern rural pastoral, the post-pastoral is future-oriented. Jamie Lorimer (2020) further develops these concepts in relation to the political ecologies of rewilding and biome restoration, arguing that they offer “future-pasts” (cf. DeSilvey & Bartolini, 2019; J. Lorimer & Driessen, 2016). According to Lorimer (2020), rewilding should be understood as post-pastoral projects, in which non-analogue futures are benchmarked to past ecologies. Drawing on the example of the organisation Rewilding Europe, Lorimer argues that the imagined social and ecological relations are still pastoral (i.e., nostalgic, idealised rural to be contemplated by urban, post-productivist observers, notably scientists and tourists). They are, however, benchmarked not to premodernity but to the Palaeolithic and are reinvented through modern governance mechanisms. For contemporary rewilders, humans are recast as stewards that, by returning keystone species as tools for naturalistic grazing, for instance, create and manage functional landscapes, “putting nature to work in a novel set of post-productive economic practices” (Lorimer, 2020).

#### **2.4.1 Changing ruralities**

In the mid-20<sup>th</sup> century, profound changes took place in the rural areas of post-industrial countries, like the UK. These changes fostered the interest of scholars from rural studies, rural geography and cognate disciplines, particularly since the 1970s, leading to a revival in rural studies (Cloke et al., 2006, p. xi)<sup>40</sup>. With this came new theorizations of rurality, including how it is produced, reproduced and contested<sup>41</sup> (cf. Cloke, 2003, 2006; M. Phillips, 1998; Woods, 2009b, 2012), and ‘rural natures’ were reclaimed “as a legitimate and provocative component of reconstructed rural studies” (P. Cloke, 1997, p. 371; see also Castree & Braun, 2006).

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<sup>40</sup> For overviews of rural studies and the various theoretical underpinnings, see Castree and Braun (2006), Cloke (1997, 2006), Murdoch and Pratt (1993), M. Phillips (1998) and Woods (2009a, 2009b).

<sup>41</sup> For discussions about the meanings of rurality, see for example Cloke (2006), Halfacree (1995), Hoggart (1990), Murdoch and Pratt (1993).

These authors argued that one of the most important manifestations of rural change has been a transition towards what has been termed post-productivism<sup>42</sup> or multifunctionality (cf. Evans et al., 2002; Halfacree, 1997; J. Holmes, 2006; López-i-Gelats et al., 2009; Mather, 2001; McCarthy, 2005; Urquhart et al., 2012; Wilson, 2001). This describes the increasing use of rural space for other-than-agricultural purposes and the consequent predominance of consumption over production interests (Halfacree, 1997, p. 69). In Britain, as in other post-industrial contexts in Western Europe and North America, ongoing crises in productivism during the second half of the 20<sup>th</sup> century, associated with increasing land and house prices, led long-term farmers to withdraw or retire and to sell their (usually small) farm holdings. These were purchased generally by white middle-class people from (sub)urban areas with a non-agricultural background and sources of income outside of farming. This urban-to-rural migration or counterurbanisation<sup>43</sup> has been attributed to multifarious factors (see Abrams et al., 2012; Gosnell & Abrams, 2011; Halfacree, 1997; J. Holmes, 2006). Yet, it is largely motivated by representations of an idyllic, premodern rurality – a romanticised, nostalgic view of the countryside as counterpoint to the polluted, decadent city (Bell, 2006; Bunce, 2003; Hildyard, 2014; Short, 2006). As Cortes-Vazquez notes, it is “a search for an alternative life, not merely the result of a move from the city to the countryside, and as such it depends on the production of ‘rural idylls’” (Cortes-Vazquez, 2017, p. 115).

Whilst the shift towards post-productivism has been generally framed in stark terms, it does not entail a “wholesale eclipse of production” but a “radical re-ordering in the basic three purposes underlying human use of rural space, namely *production*, *consumption* and *protection*” (J. Holmes,

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<sup>42</sup> Despite some criticisms, post-productivism is the term most frequently used in the literature, especially in Britain, and hence will be used in the thesis. For a discussion of terminology, see Evans et al. (2002), Holmes (2006), López-i-Gelats et al. (2009), McCarthy (2005), Murdoch and Pratt (1993), Wilson (2001).

<sup>43</sup> Counterurbanisation is the term most frequently used for the British context, not without contestation. Other terms have been deployed in different cultural contexts and disciplines, such as amenity migration or exurbia, mostly in North America, and ‘seachange’ or ‘treechange’ in Australia. The term rural gentrification is also used, although it is a consequence of counterurbanisation, rather than synonym (for a review of this terminology, see Argent et al., 2010; Cloke, 1985; Gosnell & Abrams, 2011; C. J. A. Mitchell, 2004; M. Phillips, 2010; L. Taylor, 2011).

2006, p. 142/3). The concept of ‘working landscape’, which was already mentioned in **Part I/§2.1.1** and with which I engage in **Chapter 6**, provides a good example. In the context of counterurbanisation, it is part of a post-industrial reconfiguration and reimagination of the landscape that is based on premodern agrarian, pastoral ideals (Abrams & Bliss, 2013; Paxson, 2013). It conveys a mix of aesthetic and instrumental values of farmland, pasture and forests (Paxson, 2010), in-between wilderness and the city (Abrams & Bliss, 2013; Huntsinger & Sayre, 2007; Marx, 2000; Paxson, 2013). In the study conducted by Paxson (2013), for instance, the migrants relocating to the New England countryside since the early 2000s considered cheesemaking to be both productive of commercial goods and a vehicle for social and aesthetic value (Paxson, 2013, p. 20). The continuity with (and reinvention of) traditional practices maintains the general contours of a working landscape, which is central to what Paxson terms “the post-pastoral ethos.” According to her, this ethos recognises that “culture and nature are not in fundamental opposition to each other; instead, nature, no less than culture, contains and unleashes creative as well as destructive forces<sup>44</sup>— and therefore requires responsible human guidance” (Paxson, 2013, p. 18). Rather than a mere objectified resource for value extraction or contemplation, nature collaborates in the production of material and symbolic value. It is to be worked over by human skills in concert with the agencies of the natural world. Whereas in Paxson’s example cheesemaking is also productive of commercial goods and profitable, the example I explore in **Chapter 6** (commoning in the New Forest) is neither directed towards the provision of food, nor profitable. In this sense, it aligns more with (European) post-pastoral visions for rewilding. My analysis contributes to this literature by reinterpreting rewilded landscapes as working, post-productivist landscapes – a topic that has received scant attention (cf. J. Lorimer, 2020).

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<sup>44</sup> These are two of the six elements that Gifford considers when characterising the post-pastoral: an awareness of the collapse of the human/nature divide (“nature as culture,” “culture as nature”), and the “recognition of a creative-destructive universe equally in balance in a continuous momentum of birth and death, death and rebirth, growth and decay, ecstasy and dissolution” (Gifford, 1999, p. 153).

Counterurbanisation has had significant social, cultural, economic and ecological consequences. Some authors suggest that it creates a “rural-urban ‘fusion’”, in terms of values, cultures and landscapes, blurring conventional boundaries between the country and the city (Gosnell & Abrams, 2011; Woods, 2009b), the wild and the domestic (Buller, 2004). For the newcomers, farms are ‘places to live’ or ‘lifestyle assets’, rather than sites of agricultural production or ‘livelihood assets’ (Abrams & Bliss, 2013, p. 856; Bohnet et al., 2003, p. 362). As ‘lifestyle farming’ expands, agriculture becomes “a means to an end rather than an end in itself” (Bohnet et al., 2003, p. 362). Nonhumans, both ‘domesticated’ and ‘wild’, are revalued and reimagined “in an almost wholly aesthetic sense, divorced from the dirty noxious aspects of agriculture and the harsh predatory order of nature,” being expected to act as ‘props’ for an imagined rural idyll (Woods, 1998, p. 1221). As Henry Buller notes, they are used in novel ways to represent “new, different, alternative and sometimes conflictual conceptualisations, on the one hand, of rurality (its functions, its appearance, its management and its governance) and, on the other hand, of nature (its definition, its relationship to human activities and endeavours, its composition and also its management)” (Buller, 2004, p. 133).

These changes associated with counterurbanisation also have consequences for the structure and management of the emergent rural-amenity ecologies, as has been suggested by some scholars<sup>45</sup> (e.g., Abrams & Bliss, 2013; Abrams et al., 2012; Bohnet et al., 2003; Cadieux, 2011; Cooke & Lane, 2015; Dale et al., 2005; Paquette & Domon, 2003; Tsing, 2014, 2015). However, those ecological changes have been mentioned mostly in passing and from a ‘cultural constructivist’ lens. I aim to fill in this gap by tracing the ecological implications of socioeconomic and political changes in the New Forest for the management of disturbance regimes in **Chapter 6**.

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<sup>45</sup> Examples include the increase of invasive species at the expense of endemic ones, the increase of fragmentation, re-forestation/‘wilding’ of abandoned fields, or the erosion of traditional knowledge and traditions that had been important in sustaining the landscape’s character.

## 2.4.2 The cultural politics of nature

Some authors have suggested that terms such as working landscape imply the reconciliation of production and non-production values (e.g., Abrams & Bliss, 2013; McCarthy, 2005). However, they mask tensions over land use practices and understandings of the countryside. Examples from the UK highlight, for instance, how (class-based) constructions of rurality are normative and power-infused (Bell, 2006; cf. Halfacree, 1993; Matless, 2005; Murdoch & Pratt, 1997; Woods, 1998) and how newcomers tend to hold stereotyped images of rurality and seek to impose “‘their’ rurality” (Murdoch & Pratt, 1993, p. 411). In fact, urban and non-farming interests, values and lifestyles have exerted an increasing influence on rural areas, to the detriment of farmers and long-term residents (Cortes-Vazquez, 2014; Halfacree, 1997; López-i-Gelats et al., 2009; Murdoch & Pratt, 1993; Paquette & Domon, 2003). This creates *frictions* (after Tsing, 2005), underlying which are competing ‘constructions’ of rurality and nature (Abrams et al., 2012; Buller, 2004, 2008; Cadieux, 2011; Cortes-Vazquez, 2014; Gosnell & Abrams, 2011; Woods, 1997, 1998, 2012). As Kirsten Cadieux argues, “considerable power relations are embedded in these constructions of nature, as people in different positions with different amounts of power produce and use different (often selective) representations of nature to support ideological claims and management goals” (Cadieux, 2011, p. 352).

Understandings of ‘nature’ (and rurality) as a contested arena and an effective medium for the exercise of power have figured strongly within rural studies and cultural geography literatures, particularly following the ‘cultural turn’. The cultural politics<sup>46</sup> of nature has indeed proved a fertile arena for cultural geographers and political ecologists since the late 1990s (e.g., Braun, 2002; Escobar, 1997, 1998; H. Lorimer, 1999, 2000; F. MacDonald, 1998; Mather, 1993; Neumann, 2004; Toogood, 1995, 2003). The focus has been on how particular representations

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<sup>46</sup> Cultural politics is here understood in the sense proposed by Arturo Escobar: “the process enacted when social actors shaped by or embodying different cultural meanings and practices come into conflict with each other” (Escobar, 1997, p. 203).

of nature (e.g., wilderness) are used by dominant social groups to support normative claims while silencing others, as well as the counter discourses that unsettle hegemonic cultural meanings and narratives. This “politics of ideas” (Adams, 2015a, p. 68) underpins many conservation conflicts. In this sense, an “apparent conflict over something material (access to a forest) can result from conflict over an idea about how the forest *should* be” (Adams, 2015a, p. 71).

Likewise, a growing number of studies of conflicts in post-disturbance landscapes reiterate the political implications of differing understandings and perceptions of nature and landscapes (e.g., Adams, 2003c; Fairhead et al., 1996; Tsing, 2017b). As the authors of a review of the human dimensions of forest disturbance by insects contend: “Whether or not, and how, to incorporate natural disturbance regimes in natural resource management is often complicated by competing values and perceptions from within the human dimensions of changing ecosystems” (Flint et al., 2009, p. 1174). For example, when analysing the renegotiation of the meanings of landscape following a bark beetle epidemic in the Bavarian Forest National Park, Germany, Müller (2011) explores how cultural meanings of landscapes are tied to conflicting politics of land management. For a significant part of the local population, the bark beetle “produces a barren, deserted wasteland of dead wood and destructs their homeland” (Müller, 2011, p. 937). The beetle is considered a threat to local identity and the post-disturbance landscape of deadwood mirrors the dominance of outside interests in land management. For the National Park managers, visitors and civil society groups, on the contrary, it is a sign of “a natural process of forest rejuvenation in a newly emerging wilderness” (Müller, 2011, p. 937). They thus oppose interventions to control the bark beetle. Some of these issues bear resonance with conflicts around rewilding (e.g., Bauer et al., 2009; Deary & Warren, 2017; J. Lorimer & Driessen, 2013; Schwartz, 2006; Wynne-Jones et al., 2018).

Less explored in these studies of post-disturbance conflicts in the Global North, as well as the political ecologies of conservation (cf. Cortes-Vazquez, 2014), are the ecological implications of the new power relations generated by the rural incomers and their ‘post-pastoral ethos’, which are addressed in this thesis. Furthermore, as these literatures have focused mostly on short-term, sporadic disturbances considered ‘hazards’, namely fire and insect outbreaks (e.g., Carroll et al., 2005; Flint, 2006; Flint et al., 2009; McFarlane et al., 2006; Müller, 2011), the focus of this thesis on a long-term, ongoing disturbance aims to broaden these debates. In fact, and as previously mentioned in this chapter, attending to the ‘longue durée’ and the intertwined spatial and temporal dynamics of disturbance regimes reveals the processes of both continuity and change (biotic and social) that have shaped a particular landscape and the roots of conflicts.

## **2.5 Conclusion**

In this chapter, I have outlined the conceptual resources informing the thesis. I started with the broader theoretical framework that runs throughout this work, which largely pertains to relational understandings of nature, space and time as developed in cultural geography and cognate disciplines. In the second part, I drew together three thematic sections that underlie and structure the empirical chapters, in accordance with the research questions. These sections focused on the broad concepts of biopolitics, knowledge practices and the post-pastoral, each of which pertains to distinct but entangled modes of politics: ontological, epistemological and cultural, respectively. Taken together, and when combined with resources from more-than-human geography, they offer an analytical guide to think about the political ecologies of disturbance management and to engage with the complex and multiple (bio)politics of nature conservation, forest management, and rewilding in a changing and uncertain world.

## CHAPTER 3. Methodology and research design

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Research is not a linear process. Despite the normative views about how it *should* be done, it is iterative, non-linear and messy (Bernard, 2006; Clifford et al., 2010; Law, 2004; Pryke et al., 2003). The research process entails thinking through the relationships between theoretical resources, research design and the methods and techniques to gather, analyse and interpret ‘data’ (Clifford et al., 2010; Cresswell, 2014). It is thus an ontological and epistemological endeavour, in which “the concerns of theory and research (...) run together” (Pryke et al., 2003, p. 2).

This chapter offers an overview of the methodology and research design deployed in the thesis. These are informed by the processual, ‘more-than-human’ theoretical framework outlined in the previous chapter and the overarching aims underpinning this research. Given the multiple spatiotemporalities of the phenomena under investigation, the research adopted a qualitative study research design that is multi-sited. This will be described in the first section, wherein I introduce the case studies that were selected for empirical investigation. I then outline my methodology, detailing and justifying the range of qualitative methods and techniques employed to generate<sup>47</sup> and analyse the empirical materials. Finally, I reflect upon my own positionality.

### 3.1 Introducing the ‘field’

[The] ‘field’ has come to be understood less as a site ‘out there’ at which research takes place, but as a space of distributed agency, action, and encounter within which research materials are not so much discovered as co-generated. (McCormack, 2008, p. 5)

This study focuses on temperate, broadleaved woodlands in the United Kingdom as a means to consider the ongoing paradigm shift in wildlife conservation and management that precedes

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<sup>47</sup> I use the term ‘generating materials’ instead of the more common ‘collecting data’ following Whatmore (2003). According to her, data are not found but produced, and this production “is not all vested in the researcher” but co-fabricated.

but resonates with current enthusiasms for rewilding. The UK provides a compelling case study to analyse the governance of forest disturbance regimes and the implications of rewilding. Its well-established conservation landscape and long history of intensive forest management allows the exploration of shifts in ecological thinking about disturbance regimes, as well as changing perceptions of woodlands and their management (explored in more detail in **Chapter 4**). Interest in rewilding in Britain has also increased recently, boosted to a great extent by George Monbiot's book *Feral*, published in 2013. *Feral* served simultaneously as a source of inspiration and controversy among conservationists, land managers and the general public, having also led to the creation of Rewilding Britain<sup>48</sup>, in 2015. Although rewilding in Britain did not start with Monbiot<sup>49</sup>, he transformed its potential and was responsible for an explosion of interest (see Sandom & Wynne-Jones, 2019; P. Taylor, 2011b). Another influential book is Isabella Tree's *Wilding*, published in 2018. It charts the story of the rewilding project at Knepp Castle Estate (see §3.1.2), which is owned by Tree and her husband, Sir Charles Burrell. The book has received both praise and criticism, and has become a commercial success.

Furthermore, there are some aspects of Britain's ecological, social, cultural and political-economic conjunctures that make it an interesting case in its own right in terms of rewilding, as suggested by Chris Sandom and Sophie Wynne-Jones (2019, p. 223). For instance, Britain has one of the lowest woodland cover areas in Europe: 12% in 2015, compared to the European average of 38% (Eurostat, 2015; K. Kirby & Watkins, 2015a). It also lacks many keystone species, particularly large carnivores, due to historical extirpation (cf. P. Taylor, 2005). Given the country's insularity, there is no opportunity for natural recolonization, as has been occurring

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<sup>48</sup> This charitable organisation seeks to "bring nature back to life" and to restore "living systems," reversing some of the problems associated with the intensive use and management of land in Britain, namely farming (Rewilding Britain, 2014).

<sup>49</sup> Peter Taylor argues that there has been a 'rewilding' movement in Britain since at least the mid-1980s (e.g., Trees for Life's project in Glen Affric). It has emerged from Britain's "own roots and circumstances, with a philosophy appropriate to a crowded island, rather than on a continental scale" (P. Taylor, 2011a, p. 9). Bill Adams also notes the role of the British Association for Nature Conservation (BANC). According to him, BANC's journal *ECOS* "has been planting and watering ideas about the wild in conservation, and how to get more of it" since the 1990s (Adams, 2015b; cf. P. Taylor, 2011b).

in continental Europe. Moreover, many parts of the country are densely populated, with historically high land-use pressures and management, unlike other European countries. In fact, most ecosystems in Britain have been heavily impacted by human action for millennia to such a profound degree that “it is reasonable to say that they are *made* by them,” as Bill Adams argues (Adams, 2003a, p. 85; cf. Rackham, 2000). Related to this, and as Henry Buller notes, “the British rural aesthetic is firmly embedded in a romantic Arcadian sensibility” (Buller, 2013, p. 185). Likewise, Sandom and Wynne-Jones contend that while “unpopulated ‘wild’ landscapes have (a not unproblematic) appeal in a British context,” particularly in the uplands, “a pastoral idyll is also dominant in the UK, which celebrates more agrarian visions” (Sandom & Wynne-Jones, 2019, p. 225). A final point worth noting pertains to recent political events. The vote to leave the European Union (June 2016) and the publication of the 25-Year Environment Plan in 2018 (DEFRA, 2018) have “energised discussion about the future of Britain’s countryside, with rewilding being discussed as part of a post-Common Agricultural Policy (CAP) transition” (Sandom & Wynne-Jones, 2019, p. 223). Whilst these two events took place after fieldwork was completed and are not directly explored in the thesis, the increasing discussions about the incorporation of rewilding into land management and environmental policy in a post-Brexit scenario make the phenomena under investigation here timely and relevant.

For the purposes of this thesis, and as already mentioned in **Chapter 1**, three study sites were selected for empirical investigation: the New Forest (Hampshire, England), Knepp Castle Estate (West Sussex, England), and Dundreggan Estate (Glenmoriston, Scotland) (see location in **Figure 5**). Before proceeding with a description of the sites, it is worth reiterating that they occupy an ‘uneven’ position within this research. For reasons already mentioned in **Chapter 1** (§1.3.1) that do not need repetition here, the study is mostly focused on the New Forest. It

occupies a central place in the empirical chapters, being sporadically compared to the two other sites that play a secondary role (Dundreggan and Knepp estates).

Despite the interesting differences between the cases, notably in terms of geographies, histories, ownership, conservation designations, or ecologies (**Table 1**), these will not be directly explored in the thesis as they go beyond its scope. Rather, the comparison will be focused on particular aspects related to the management and governance of herbivory, in order to analyse the potential shifts and challenges proposed by rewilding. This comparison is most evident in **Chapter 5**, wherein the knowledge practices enacted in Dundreggan and Knepp, on the one hand, and the New Forest, on the other, are directly compared and contrasted. In the two other empirical chapters, which bring a historical perspective to the analysis of the bio- and socio-politics of disturbances governance, Dundreggan and Knepp are only briefly used as examples in the concluding sections to explore, for instance, the possible obstacles and frictions between rewilding and more conventional biopolitical regimes and the possible compromises therein (cf. §4.3), or the pertinence of considering rewilded landscapes as post-pastoral, working landscapes to address some of the local contestations around rewilding initiatives (cf. §6.4).

|                                                             | <b>New Forest</b>                                                                                                                                                                                  | <b>Knepp<br/>(Southern Block)</b>                                                                    | <b>Dundreggan</b>                                                                  |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Area</b>                                                 | 380 km <sup>2</sup> (Perambulation)                                                                                                                                                                | 4.7 km <sup>2</sup><br>(whole estate: 14 km <sup>2</sup> )                                           | 40 km <sup>2</sup>                                                                 |
| <b>Location</b>                                             | Southern England<br>(lowland)                                                                                                                                                                      | Southern England<br>(lowland)                                                                        | Scottish Highlands                                                                 |
| <b>Ownership</b>                                            | Public estate<br>Common land                                                                                                                                                                       | Private estate                                                                                       | Private estate                                                                     |
| <b>Conservation designations</b>                            | Yes                                                                                                                                                                                                | No                                                                                                   | No                                                                                 |
| <b>Agri-environment subsidies</b>                           | Yes                                                                                                                                                                                                | Yes                                                                                                  | No                                                                                 |
| <b>Past management</b>                                      | Hunting (Royal forest),<br>commercial plantations and<br>commoning (ongoing)                                                                                                                       | Intensive dairy farming<br>until 2001                                                                | Sporting estate for<br>deerstalking until 2008                                     |
| <b>Large herbivores<br/>(species and densities in 2016)</b> | ~1,500 <b>deer</b> (fallow, red,<br>roe, sika and muntjac deer)<br>>12,000 commoners' animals (mostly <b>cattle</b> and <b>ponies</b> ; smaller numbers of <b>pigs, donkeys</b> and <b>sheep</b> ) | >300 <b>deer</b> (roe, red and fallow deer)<br>113 <b>cattle</b> , 22 <b>pigs</b> , 11 <b>ponies</b> | <b>Deer</b> (>380 red deer, few Sika deer)                                         |
| <b>Large herbivores<br/>(management)</b>                    | Culling (deer); Management of stocking density and age/sex                                                                                                                                         | Minimal intervention; Management of stocking density and welfare                                     | Culling or creation of disturbances by human volunteers ('Project wolf')           |
| <b>Main focus of rewilding</b>                              | -                                                                                                                                                                                                  | Naturalistic grazing to arrest succession                                                            | Natural regeneration, through planting native trees and reducing browsing pressure |

**Table 1:** Main characteristics of the case studies

Moreover, the selection of herbivory as case study was only made in the initial stages of fieldwork. Prior to it, three disturbance regimes had been selected as potential case studies, the two others being coppicing<sup>50</sup> and fire (prescribed burning). These three are established disturbance regimes that are both of interest to rewilding and relevant not only in the New Forest, but also at least in one of the comparative sites. They are subject to regulation by UK forestry authorities, have well-established expert networks, and are controversial in cultural, ecological and economic terms, to differing degrees. In this sense, all of them would enable a

<sup>50</sup> Coppicing is a traditional form of management and resource extraction that involves the repeated and periodic cutting of trees to engender regrowth from the cut stumps (Fuller & Warren, 1993). It mimics the dynamics and structures of natural disturbance regimes, namely the effects of grazing by large herbivores that rewilding seeks to return (Joys et al., 2004; Monbiot, 2013). Monbiot, for instance, considers that the regrowth of trees after coppicing can be an adaptation to recovering from the assaults of elephants and other megafauna that once inhabited European ecosystems (Monbiot, 2013, p. 91/2).

comparison of the different agencies and roles afforded to humans and nonhumans, the knowledge practices and forms of expertise involved, as well as the underlying sociocultural and political dimensions.

The decision to focus on herbivory was taken after informal meetings with individuals responsible for the New Forest's management. Herbivory was selected due to its long-term character and dominating influence on the whole ecological functioning of the New Forest since medieval times, due to the number of actors involved with different vested interests and, importantly, due to the high number of management activities throughout the year that I could witness. Furthermore, from the three examples, herbivory is the only case in which the lives and deaths of animals are directly at stake, which raises interesting and important biopolitical questions. In the New Forest and Knepp, grazing and browsing are mostly performed by wild deer and free-ranging cattle, ponies, and pigs; at Dundreggan, red deer have played a central role (**Table 1**).

### **3.1.1 The New Forest<sup>51</sup>**

The **New Forest** came into being as a legal entity in 1079, when it was established by William the Conqueror as a Royal Forest\*. This legal status played a crucial role in its ecological and social history. By imposing restrictions on local land uses to protect deer and other game species as an exclusive resource for the King, it restrained the expansion of settlements and the conversion of woodland to pasture. In compensation, local dwellers (commoners\*) were granted certain forest rights that are still exercised nowadays, the most prominent of which is the Common of Pasture (**Table 2**).

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<sup>51</sup> In this section, all the terms followed by an asterisk (\*) are described in the **Glossary**.

| <b>Rights of common</b>                 | <b>Description</b>                                                                                                                            |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pasture</b>                          | The right to turn out ponies, cattle and donkeys on the Open Forest* and certain Inclosures* on the Crown Land* and adjacent commons*.        |
| <b>Pasture of sheep</b>                 | The right to turn out sheep on the Forest. Very few properties have this right, which is currently exercised by only one commoner.            |
| <b>Mast</b>                             | The right to turn out pigs in the autumn (pannage* season) to eat the fallen acorns and beech mast, which are poisonous to cattle and ponies. |
| <b>Estovers<br/>(Fuelwood)</b>          | The right to receive free firewood annually from the Forestry Commission. Less than 100 households benefit from this right.                   |
| <b>Marl</b><br>(no longer practiced)    | The right to dig marl (lime-rich clay) from marl pits to use as fertiliser or building material.                                              |
| <b>Turbary</b><br>(no longer practiced) | The right to cut turf for fuel.                                                                                                               |

**Table 2:** Rights of common exercised in the New Forest  
(Adapted from: Forestry Commission, 2008; Newton, 2011; Tubbs, 1986, 1997)

This medieval system of customary common rights\* resulted in the development of a vigorous pastoral economy that persists in modified form today (Forestry Commission, 2008; Newton, 2011; R. J. Putman, 1986; Read & Spencer, 2001; Tubbs, 1986, 1997; D. W. Young, 1969a). Together with deer management and silviculture, it has greatly influenced the ecological structure and composition of the New Forest, comprised of a complex mosaic of semi-natural habitats that includes mostly woodland, heaths, grassland, scrub and mires, with a marginal value for crop cultivation (Chatters, 2009; Newton, 2011, 2013; R. J. Putman, 1986; Tubbs, 1986, 1997). Once widespread throughout lowland Britain and continental Europe, some of these habitats, like heathlands (**Figure 8**), are now rare and fragmented (Newton, 2011), making the New Forest “one of the most important areas for nature conservation in western Europe” (Spencer, 2002, p. 123). Such importance is reflected in its many conservation designations: National Nature reserve, Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area for birds (SPA), Ramsar site and, since 2005, National Park<sup>52</sup>.

<sup>52</sup> In the UK, National Parks correspond to IUCN Category V of protected areas (‘Protected Landscape/Seascape’), which result from biotic, abiotic and human interactions through traditional management



**Figure 8:** Heathland habitat in the New Forest

The New Forest is characterised by a unique and very complex governance structure, which involves a large number of policies, plans, institutions and individuals. Its management is driven by the need to balance different and sometimes conflicting interests, notably in terms of forestry and timber production, commoning, conservation and recreation. The main institutions responsible for it are: the Forestry Commission, which manages wildlife populations and vegetation; the Verderers\*, “as managers of matters relating to the commoners\* and common rights\*” (Tubbs, 1986, p. 67); and the New Forest National Park Authority (NFNPA), mostly responsible for planning<sup>53</sup>. Their responsibilities are spatially demarcated.

Since 2005, the New Forest is circumscribed by the National Park boundary (571 km<sup>2</sup>), within which there is the perambulation\* boundary, established in 1964 (**Figure 9**). The latter delimits the area under the Verderer’s jurisdiction (380 km<sup>2</sup>) and is contained by cattle grids and fences

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practices. Of the 15 National Parks in Britain, the New Forest National Park is one of the newest and smallest, and has the highest concentration of internationally important wildlife sites (Chatters, 2009, p. 13).

<sup>53</sup> Other organisations and interested parties include: Natural England, National Trust, Hampshire & Isle of Wight Wildlife Trust, New Forest Association, New Forest Commoners' Defence Association, New Forest Pony Breeding & Cattle Society and The New Forest Trust, among others.

(Figure 10). Around three quarters of the perambulation consists of the so-called Crown Land\* (260 km<sup>2</sup>), owned by the State and managed by the Forestry Commission, on behalf of the Department for Environment, Food and Rural Affairs (DEFRA). The remaining area consists of privately owned land that is primarily used for agricultural and residential purposes (Newton, 2010; Read & Spencer, 2001; Stover, 1985; Tubbs, 1986).

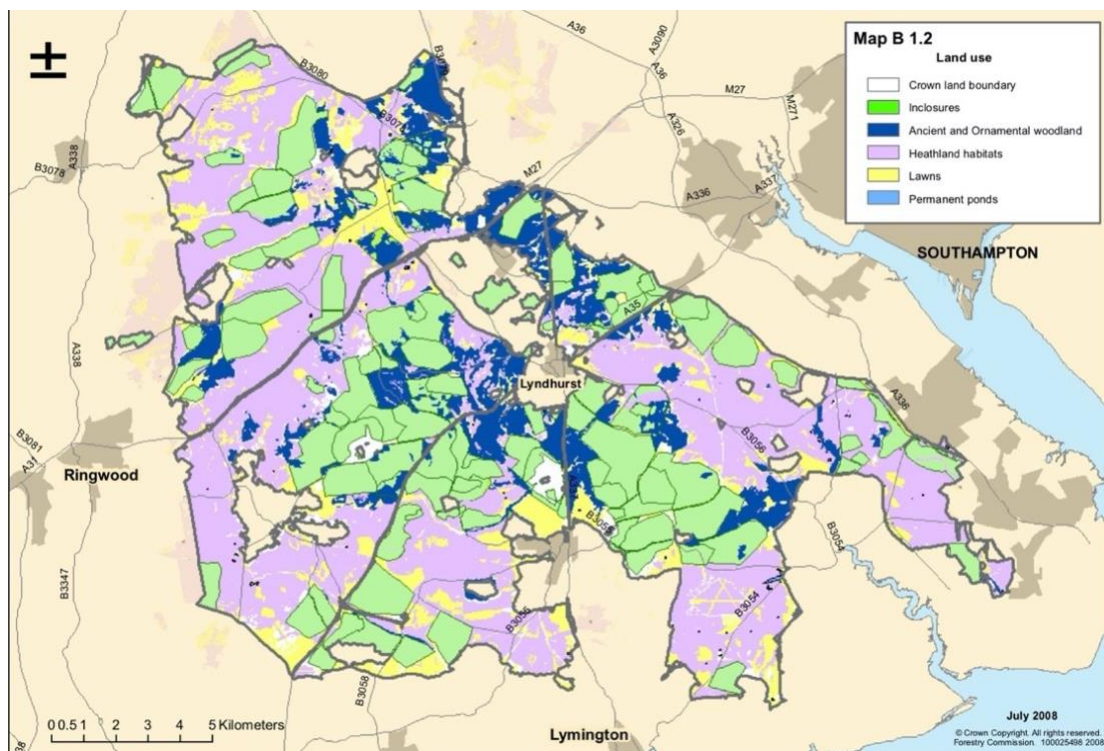


Figure 9: Map of the New Forest National Park and perambulation area (©NFNPA)



Figure 10: Cattle-grid and fence marking the perambulation boundary

Most of the Crown lands\* (**Figure 11**), on whose management this thesis focuses, consists of unenclosed land (the so-called Open Forest\*) in which the commoners' animals can graze and roam freely. It includes large tracts of ancient pasture woodlands<sup>54</sup> (**Figure 12**), heathlands, grasslands and valley mires (Newton, 2010; Read & Spencer, 2001; Tubbs, 1986). The Crown lands also comprise Statutory Inclosures\*, which are areas of enclosed woodland<sup>55</sup> that were designated as timber plantations between the 18<sup>th</sup> and mid-20<sup>th</sup> centuries and are still commercially managed for forestry (**Figure 13**). These are free of common rights “only so long as they remain fenced and at least 12% has to remain unenclosed at any one time” (Tubbs, 1986, p. 17).



**Figure 11:** Map of the New Forest’s Crown land and land uses (Source: Forestry Commission, 2008)

<sup>54</sup> Locally known as Ancient and Ornamental (A&O) woodlands\*. They comprise a mixture of native trees and bushes of varying ages, predominantly oak (*Quercus robur* and *Q. petraea*), beech (*Fagus sylvatica*) and holly (*Ilex aquifolium*).

<sup>55</sup> Mostly coniferous plantations of Douglas fir (*Pseudotsuga menziesii*), Scots pine (*Pinus sylvestris*) and Corsican pine (*Pinus nigra*). The inclosures can also include broadleaf plantations (e.g., beech and oak), many of which are over 200 years old.



**Figure 12:** Ancient and Ornamental (A&O) woodland



**Figure 13:** Coniferous plantations in a Statutory Inclosure

Most of the New Forest National Park (NFNP) is located within the New Forest District Council<sup>56</sup> (see **Figure 9**). A total of 37 parishes and towns are wholly or partly located within it, where around 35,000 people live. This number makes it one of the most densely-populated national parks in England (61 people/km<sup>2</sup>) (National Parks UK, 2019). It is also one of the

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<sup>56</sup> The NFNP also includes parts of the former Salisbury District (now Wiltshire Council unitary authority) and of the Borough of Test Valley.

most visited, with an estimated number of 13.5 million day visits per year, due largely to its location within easy reach of London, Bournemouth and Southampton by car or train.

In 2018, there were 665 practicing commoners<sup>57</sup>, which accounts for circa 2% of the population living within the NFNP (*pers. com.*). In terms of the gender and age of the commoning population, data from the last census of the New Forest's commoners shows that over half of the commoning population (54%) are women, similar to previous censuses, and that the largest percentage of commoners is in the age group between 40 and 70 years old (66%) (Ivey, 2011, p. 5). Moreover, as more secure and higher sources of income were sought outside the local rural economy by the mid-20<sup>th</sup> century, commoning became a source of supplementary income. According to the 2011 Census, for example, the majority of the commoners declared occupations in the tertiary sector, and only a quarter works in agriculture and forestry. Commoning has nevertheless persisted for social or cultural reasons, supported by external sources of money (full-time jobs and/or agri-environment subsidies under the European Union's Common Agricultural Policy (CAP))<sup>58</sup> (cf. **Chapter 6**).

The number of animals that are turned out varies from year to year (**Figure 14**), with a mean number of over 8,500 animals since 2000. In 2018, 13,661 animals were turned out. Of these, the majority were ponies and (beef) cattle (5748 and 7034, respectively), followed by smaller numbers of pigs, donkeys and sheep (415, 213 and 251, respectively). As the graph below illustrates, the total number of animals has generally increased since the early 2000s<sup>59</sup>. For

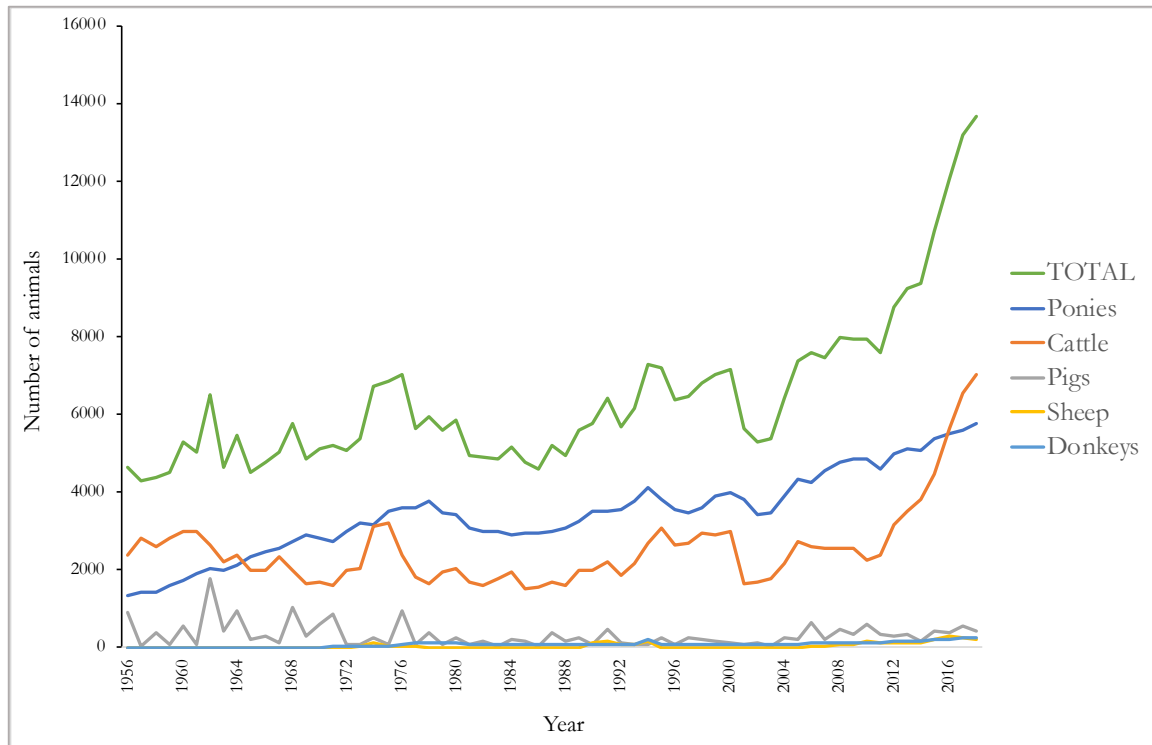
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<sup>57</sup> This number, which is based on the number of marking fees\* paid, is an approximation and might not correspond to the actual number of commoners turning out stock. Although the great majority of commoning households only pay one marking fee, some are paid by partnerships (e.g., couples, groups of siblings, or business partnerships), and a number of commoners pay more than one fee in a single year (for different groups of animals or as part of multiple business arrangements) (Ivey, 2011, p. 35).

<sup>58</sup> Following the CAP reform 2013, EU's agri-environment schemes are of two kinds (or pillars): Basic Payment Scheme (BPS), paid directly to the farmers (former Entry Level Stewardship), and the Higher Level Stewardship (rural development programme). Currently, the commoners can receive subsidies from both the BPS and the Verderers' Grazing Scheme since 2010, which is part of the New Forest Higher Level Stewardship scheme. The latter is a partnership between the Verderers, Forestry Commission, NFNPA and Natural England.

<sup>59</sup> Similar to the number of commoners (cf. footnote 57), the number of animals corresponds to the marking fees\* paid in 2018 and might not correspond to the actual number of animals that are out in the New Forest over the year. Each commoner decides when and where to turn out animals, without the need to report.

reasons that will be further explained in §6.2, the number of equines (ponies and, to a lesser extent, donkeys) has tended to increase since mid-20<sup>th</sup> century; the number of cattle has risen and fallen until 2010, since when it has almost tripled.



**Figure 14:** Number of commoners’ animals between 1956 and 2018  
(Based on data from Verderers of the New Forest, 2018)

The survival of these commoning pastoral land uses has greatly influenced the ecological characteristics of the New Forest, as has its history as a medieval hunting forest. Together, these have led to the maintenance of populations of large, free-ranging herbivores since medieval times: the commoners’ animals (notably ponies and cattle), managed by the Verderers, and the wild deer, managed by the Forestry Commission. These large herbivores have exerted a constant and dominant grazing and browsing pressure on the vegetation, arresting succession (cf. §1.3.1). Their distinct feeding habits, behaviour and hence disturbances are complementary and keep the habitats in favourable condition. As a commoners’ proverb puts it: “The deer start the work, the ponies follow it up, and the cattle finish it” (cited in Kenchington, 1944, p. 126). From the

range of large herbivores, two will be the main protagonists of the analytical chapters to follow and will be briefly introduced below: deer (**Chapters 4 and 5**) and ponies (**Chapter 6**).

Currently, the New Forest deer community comprises five species (**Figure 15**): the native red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*), and the non-native fallow deer (*Dama dama*), sika deer (*Cervus nippon*), and Reeves' muntjac (*Muntiacus reevesi*). Around 1,500 wild deer have access to the entire New Forest, including the Inclosures. This number is regulated by the Forestry Commission through an annual culling programme (explained in more detail in §4.1).



**Figure 15:** The five species of deer that can be found in the New Forest. Clockwise from top left: fallow deer, red deer, sika deer, muntjac and roe deer. (Copyright Sally Fear; reproduced with permission.)

Over 5,700 ponies are presently turned out in the New Forest. Although other breeds can also be depastured, the majority are New Forest ponies<sup>60</sup> (**Figure 16**): a registered British Isles breed indigenous to the New Forest that has adapted to thrive in it all year round, with minimum assistance. Owned by the commoners, ponies are nevertheless ‘semi-feral’. They are out in the Open Forest throughout the year, where they can roam freely. They are thus not kept in stables and are rarely handled, with little interaction with commoners. As will be further explained in §6.2.2, mares, young foals (<2 years old) and castrated ponies may be released onto the forest all year round, while stallions are only allowed for few weeks per year. Commoners’ ponies are neither ridden<sup>61</sup>, nor used for domestic purposes or human consumption. Despite the poor markets (mostly for ridding), ponies are still depastured due to cultural and aesthetic reasons (cf. §6.2.1).



**Figure 16:** Two New Forest ponies

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<sup>60</sup> The origin of this breed is uncertain, with evidence of “experimental breeding or ‘improvement’” between the late 18<sup>th</sup> and early 20<sup>th</sup> centuries, followed by attempts “to ‘breedback’ the ‘original’ pony” (Stover, 1985, p. 40; see also Pasmore, 1976, Chapter 5; R. J. Putman, 1986, pp. 27–28; Tubbs, 1986, pp. 116–117). In 2014, the breed was listed by the Rare Breeds Survival Trust in its ‘minority breed’ category (<3,000 breeding females).

<sup>61</sup> Besides the commoners’ ponies, there are also ‘recreational horses,’ which are kept in stables. According to Cox et al. (1994), this category includes “all horses and ponies that are kept for private riding and pleasure, whether ridden or unriden, including those at riding schools. It therefore excludes Commoners’ ponies, professional stud animals and all other commercial horses.” They are ruled by a set of policies implemented by the NFNPA.

### 3.1.2 Knepp Castle Estate

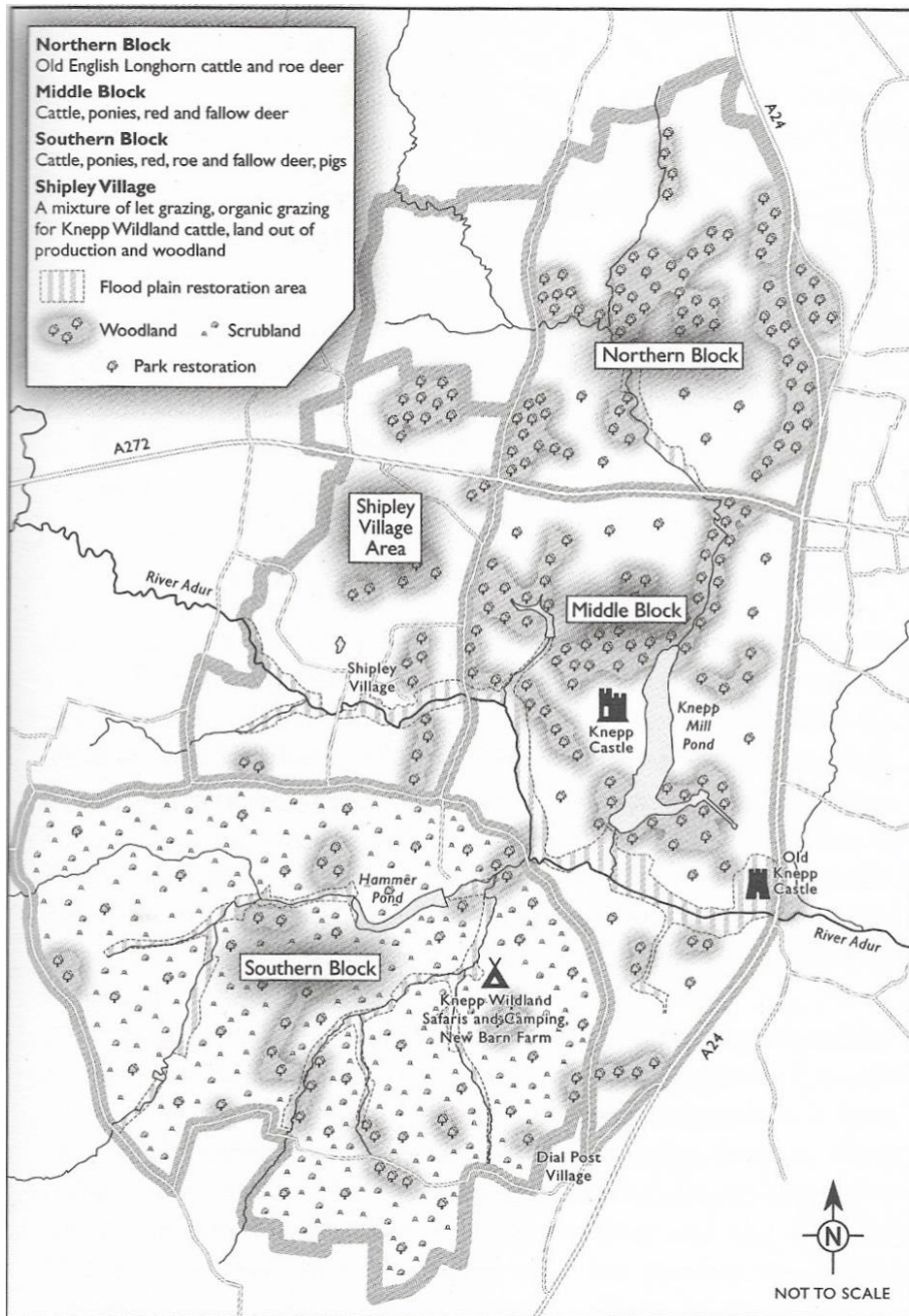
**Knepp Castle** is a privately-owned estate of over 14 km<sup>2</sup> that originated in the Middle Ages as a hunting park<sup>62</sup>. Knepp lies within the Low Weald (southeast of England), characterised by heavy clay soil that is unsuited to modern farming practices. As described by Isabella Tree in the aforementioned book *Wilding*, “our land has never lent itself to modern intensive production. We are hampered by poor drainage, small, hedged fields and our heavy soil” (Tree, 2018b, p. 30).

Knepp is divided into three distinct areas separated by major roads<sup>63</sup> (**Figure 17**) and is crossed by around 26 km of public footpaths. The three areas are characterised by distinct land uses, management and types of grazing animals (see Burrell & Tree, 2015; Greenaway, 2011; Tree, 2018a, 2018b). I focus below on the Southern Block, where I conducted fieldwork.

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<sup>62</sup> For an introduction to Knepp, its history and the rewilding project, see Tree (2018a).

<sup>63</sup> There is an underground passage between the Middle and Southern Blocks, only for deer. Ideally all the blocks would be connected, but it would be very expensive (*pers. com.*).



**Figure 17:** Map of Knepp Estate and its three distinct areas (Source: Tree, 2018a, p. xix)

The Southern Block had been intensively farmed between the 1980s and 2004, but is now “by far the wildest area” (Tree, 2018b, p. 32). It is home to the **Knepp Wildland Project**, which was established in 2001 by the landowners who, faced with an unprofitable farming business, decided to switch to a new land-use regime that entails “working *with* the land rather than battling against it” (Burrell & Tree, 2015, p. 9). This project has been designed as an open-ended

experiment where, as far as possible, emergent properties and dynamic natural processes are encouraged to return with minimal intervention (Burrell & Tree, 2015; P. Taylor, 2006; Tree, 2018a). Through a mix of free-roaming grazing herbivores and the naturalisation of river and water systems, the aim is to “kick-start natural processes and monitor the response of plant and animal species” (Spencer, 2016). It involves what the landowners describe as “sitting back and simply seeing what happens” (Burrell & Tree, 2015, p. 14), which is made easier by the absence of conservation designations or protected landscape status within the block, as well as by private ownership of a single estate.

Informed and inspired by Frans Vera’s experiments at the Oostvaardersplassen (see Tree, 2018a, Chapter 4), this process-led, non-goal-orientated project has naturalistic grazing at its core. Between 2001 and 2006, all the fields from the Southern Block (4.7 km<sup>2</sup>) were taken out of arable cultivation in stages and left fallow, being only browsed by existing roe deer (**Figure 18**) and rabbits. This allowed thorny scrub and tree saplings to establish. As explained by the owners, the minimal grazing and browsing “mimicked the impact a [zoonotic] disease like anthrax or rinderpest [cattle plague] has in the wild, where entire populations of herbivores are eradicated, allowing the vegetation a real chance to get away” (Burrell & Tree, 2015, p. 11/12).



**Figure 18:** Roe deer in the Southern Block

In 2009, when funding from Natural England became available, the block was fenced and a mix of large herbivores were introduced (**Figure 19**). This mix includes ‘hardy’ breeds of domesticated herbivores (Old English longhorn cattle, Tamworth pigs, Exmoor ponies), alongside the non-native fallow deer and the native red deer (**Figure 20**). Similar to the New Forest, this mix has played a crucial role in fostering habitat change, with each species stimulating the vegetation in different ways, resulting in “a mosaic of overgrown, encroaching hedgerows, complex water meadows, dense stands of willow, and open, grazed areas of grassland” (Burrell & Tree, 2015, p. 12).



**Figure 19:** Perimeter fence around the Wildland Project with sign warning about the existence of free-roaming large herbivores



**Figure 20:** The five large grazing animals that were introduced to the Southern Block. Clockwise from top left: Longhorn cattle, Tamworth pig, fallow deer (Copyright [Adrian Colston](#), licensed under [CC BY 4.0](#)), red deer and Exmoor ponies (Copyright [Knepp Wildland](#))

To further understand the impacts of grazing on regeneration, there are small enclosures or ‘exclusion pens’ throughout the Southern Block (**Figure 21**). These are part of an ongoing ‘experiment’ led by the Centre for Ecology and Hydrology since the beginning of the project.



**Figure 21:** Grazing enclosure or ‘exclusion pen’ in the Southern Block

As mentioned above, the driving ethos behind this project is one of minimal intervention. Besides taking the land out of intensive farming and introducing large herbivores, the beginning of the project also encompassed putting in place the conditions “that allow natural dynamism to return” (Burrell & Tree, 2015, p. 12). These included removing internal fences, leaving deadwood, and restoring floodplains, lakes and ponds. The latter encompassed, for instance, the destruction of the drainage system put into play by the Victorians to make the floodplain suitable for agricultural use, as well as the removal of weirs and the introduction of woody debris (Burrell & Tree, 2015, p. 11). To further continue with wetland restoration, there are plans to introduce beavers (*Caster fiber*) in the short-term.

Currently, the major ongoing intervention consists of managing the stocking density and welfare of the herbivores by a stockman in compliance with UK legislation. It includes culling, removal of animals, veterinary treatment and castration of ponies. Stocking densities have been kept relatively low to avoid suppressing the emergence of woody plants and to create a desirable mosaic of different habitats. In 2016, there were 113 cattle, 22 pigs, 11 ponies, 235 fallow deer and 30 red deer in the Southern Block, and around 80 roe deer in the whole estate (*pers. com.*).

All the questions concerned with the estate management and emergent issues pertaining to the rewilding project are discussed within the Knepp Wildland Advisory Board, which is constituted by over 30 eminent conservationists and naturalists.

The project has been supported by Natural England's agri-environment subsidies, as Knepp is still considered an agricultural enterprise. In 2010, it received Higher Level Stewardship (HLS) funding for 10 years. Additional sources of income include the sale of organic meat from culled animals (cattle, pigs and deer), revenues from the campsite and safari business<sup>64</sup> (Figure 22), and the rental of buildings. Many events related to rewilding have been hosted at Knepp, including 'The Knepp Vera Conference 2017 – Freeing the Landscape: grazing animals as ecosystem engineers'. During this event, a *Collaborative Rewilding Agreement* was signed between Rewilding Europe and Rewilding Britain (Charlie Burrell is Chairman of the Board of Trustees that governs the latter).



**Figure 22:** Brochures with information about the wild range meat (left) and the camping and safari business (right)

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<sup>64</sup> The Southern Block includes a camping site and glamping accommodation, available between Easter and November. Throughout the year, there are safari tours, either vehicle-based or guided on foot (<https://www.kneppsafaris.co.uk>).

Knepp is cited as an outstanding example of landscape-scale restoration in the Government's 25-Year Environment Plan (DEFRA, 2018, p. 60) and has attracted keen interest from a number of experts. It has become highly influential and praised for its successes, within and outside Britain, in terms of the return of numerous rare and endangered species since the rewilding project started, notably turtle doves (*Streptopelia turtur*), nightingales (*Luscinia megarhynchos*) and purple emperor butterflies (*Apatura iris*).

### 3.1.3 Dundreggan Conservation Estate

**Dundreggan** is a former sporting estate of over 40 km<sup>2</sup> located in the Scottish Highlands, near Loch Ness. In 2008, it was purchased by the conservation charity Trees for Life and has become its flagship forest restoration project. Like Knepp, the estate has no conservation designation sites. It is also crossed by public footpaths.

Founded in 1989 by the ecologist Alan Watson Featherstone, Trees for Life is dedicated to restoring the Caledonian Forest<sup>65</sup> at their core area (over 1550 km<sup>2</sup>) (**Figure 23**). The long-term aim is to create a contiguous native forest with the eventual return of missing keystone species. Trees for Life is considered by some to be one of the most ambitious and advanced rewilding initiatives in Britain (Monbiot, 2013; P. Taylor, 2005). Trees for Life's work is supported by corporate and individual donations, grant givers, memberships, gift aids and legacies. It also relies on volunteers, who join each year for one week or one day and take part in a range of activities (e.g., tree planting, surveying natural regeneration, rhododendron control, working at Dundreggan's tree nursery, etc.).

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<sup>65</sup> Caledonian Forest is the name given to the native old growth pine forests that once covered much of Scotland, dominated by Scots pine trees (*Pinus sylvestris*). It takes its name from the Latin *Caledonia* ('wooded heights'), which was how the area of modern-day Scotland was known in the Roman era (*pers. com.*). Today, it is largely fragmented across the Highlands of Scotland, due to many centuries of overgrazing by deer and sheep and deforestation.

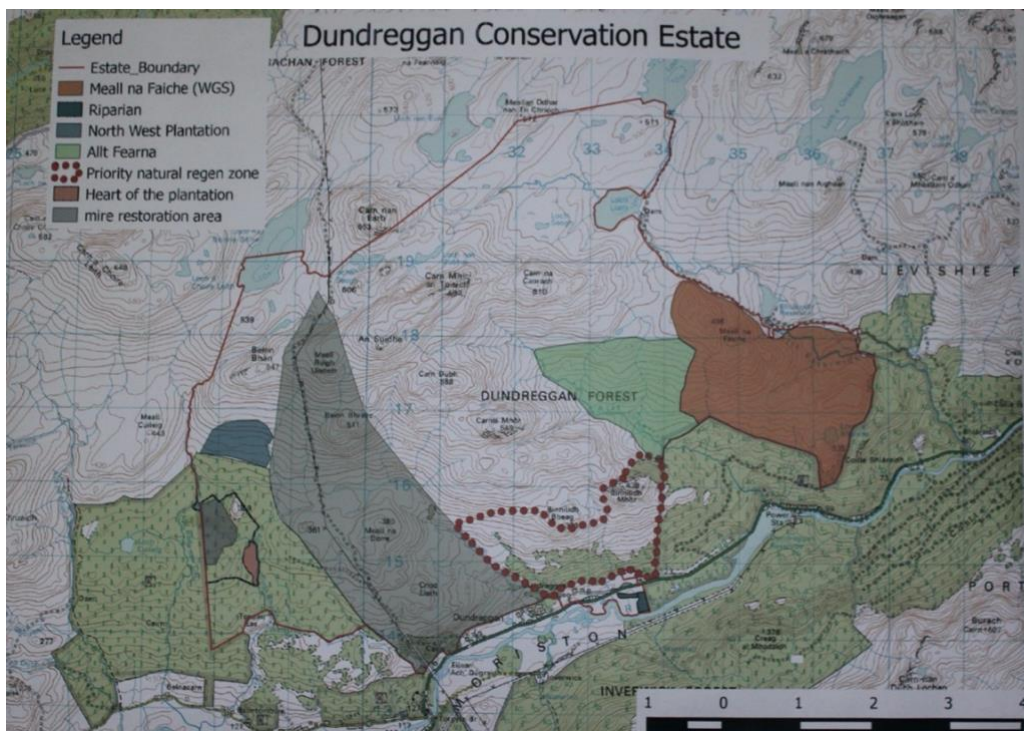


**Figure 23:** Map of Trees for Life's core area and location of Dundreggan estate (circled)  
(Copyright Trees for Life; reproduced with permission)

Until 2008, Dundreggan was primarily managed as a traditional sporting estate for deer hunting and stalking, with large densities of deer. Although the estate contains areas of semi-natural ancient woodland made up mostly of silver and downy birch (*Betula pendula* and *B. nana*) (Figure 24), much of the estate had been open treeless ground. Since 2008, Trees for Life have established a rewilding project at what is now called the Dundreggan Conservation Estate (Figure 25). The aim is to revert past land degradation caused by heavy overgrazing and large commercial plantations of non-native Sitka spruce (*Picea sitchensis*), and to restore native forest by encouraging and facilitating natural regeneration and connectivity.



**Figure 24:** Ancient woodland at Dundreggan in the winter



**Figure 25:** Map of Dundreggan Conservation Estate (Ordnance Survey, Crown Copyright)

Although rewilding projects tend not to be driven by specific targets, at Dundreggan explicit habitat targets have been set: restoring 60% of the site as a structurally diverse woodland

(Sandom & Wynne-Jones, 2019, p. 233). This entails planting native trees<sup>66</sup> where there is little chance of trees establishing on their own, and creating conditions for trees to regenerate naturally. This includes fencing (**Figure 26**) and reducing deer browsing pressure in areas where there are existing trees, through culling and/or creating disturbance. The latter is the purpose of the experiment ‘Project Wolf’, which started in 2016. It consists of a group of volunteers (called ‘wolves’) operating in teams of three, who regularly walk through the ancient woodlands during spring and early summer. As ‘Trees for Life’s founder describes:

Project Wolf is supporting our reforestation work by creating a ‘landscape of disturbance’. By walking through Dundreggan’s woodlands at unpredictable times, the volunteers mimic the effect of wolves in keeping deer on their toes and less likely to spend time leisurely eating seedlings and young trees. This will encourage new trees to flourish – giving them the chance to form the next generation of forest giants that are desperately needed if the Caledonian Forest is to survive. (Featherstone, cited in Bunting, 2017)



**Figure 26:** Fences to protect saplings from deer

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<sup>66</sup> Examples include Scots pine (*Pinus sylvestris*), rowan (*Sorbus aucuparia*), downy birch (*Betula nana*), juniper (*Juniperus communis*), hazel (*Corylus avellana*), oak (*Quercus spp.*) and others. Many of the trees planted are grown at Dundreggan’s Tree Nursery and are from locally collected seeds.

The main species of large herbivores in the estate has historically been the native red deer (*Cervus elaphus*) (**Figure 27**). In 2016, the estimated population was 386 individuals. There are also a few Sika deer (*Cervus nippon*) and sheep, which only have access to an area of common grazing within the estate held under crofting tenure (*pers. com.*).



**Figure 27:** Red deer stag (Copyright Trees for Life; reproduced with permission)

Between 2009 and 2016, a small group of female wild boar (*Sus scrofa*) was kept in a fenced area within the estate in order to monitor boar's impacts on bracken control (**Figure 28** and **Figure 29**). The results suggested that the effect of wild boars on dense stands of bracken was only temporary and not clear-cut, and thus it was decided that the project would not continue. The two remaining boars were 'humanely dispatched' (Trees for Life, 2019).



Figure 28: Wild boar enclosure sign at Dundreggan



Figure 29: Signal post at Dundreggan with information about the wild boar

## 3.2 The research journey

In place of the conventional *read-then-do-then-write* sequence of 'doing research', (...) reading, doing and writing should be thoroughly mixed up throughout its course. (Cragg & Cook, 1995, p. 4/5)

### 3.2.1 Generating materials

Fieldwork and archival research were conducted in Britain over a period of 12 months, between August 2015 and September 2016. This period was structured in three stages, making use of multiple qualitative methods that will be described in more detail below (**Table 3**).

| Phase | Duration                      | Main focus                                                                               | Methods           |            |                         |
|-------|-------------------------------|------------------------------------------------------------------------------------------|-------------------|------------|-------------------------|
|       |                               |                                                                                          | Document analysis | Interviews | Participant observation |
| I     | August – October 2015         | Ecological concepts; Conservation and forest management (national level and study sites) | X                 |            |                         |
| II    | October 2015 – September 2016 | Ecology and environmental policy (national level)                                        | X                 | X          |                         |
| III   |                               | Management of herbivory in practice (study sites)                                        | X                 | X          | X                       |

**Table 3:** Phases of fieldwork and archival research

Given my own position as an ‘outsider’, both literally and figuratively as a Portuguese social scientist working in Britain without experience of being a conservationist/forester (cf. §3.3), the **first or ‘preparatory’ phase** aimed at making the unfamiliar familiar, in terms of ecological concepts, the British context of conservation and forest management and, in the case of the study sites, their historical geographies, ecologies, local politics and cultural norms. During this phase, which lasted 2 months, I examined scientific and grey literature, policy documents, and popular materials about the management of disturbance regimes in the UK. Through this analysis I was able to map and identify the key institutions and actors responsible for managing forest disturbance regimes, both in the UK and at the study sites. During this phase, I also established the first contacts with key informants at the study sites in order to plan fieldwork.

At the New Forest, I had benefitted from one important gatekeeper from the Forestry Commission, whom I was introduced to by my supervisor. This informant had a very detailed empirical knowledge and understanding of the New Forest's complex history and management, for he had worked there for several years before retirement. For the two other sites, contacts were made directly with managers of the estates by email.

In the **second phase**, I explored the framing of disturbances, their management, and of rewilding within ecological and policy discourses, at the national level of the UK. It involved gathering and examining scientific and policy documents and conducting a series of semi-structured interviews with ecologists and policy makers. The **third phase** was focused on the study sites, where I conducted semi-structured interviews, participant observation and archival research to explore how disturbances have been and are managed in practice. During both the second and third phases, and after having received ethical approval by the Central University Research Ethics Committee (CUREC 1A), I travelled between the study sites and to urban offices spread throughout Southern England to interview ecologists and policy makers.

In the beginning of fieldwork, I tried to find accommodation in or near the New Forest to stay during some months, as it was my main study site. However, it proved to be difficult and expensive to find a place. The cheapest places were further away, not easily accessible by public transport (I had no car and using the bike was difficult during the winter months). Moreover, the management activities I wanted to follow were seasonal and sometimes dependent on meteorological conditions. Therefore, for pragmatic and economic reasons, I was based in Oxford, travelling regularly to the New Forest by train. On some occasions, I stayed in the New Forest for some consecutive days, trying to fit in and follow as many activities as possible. In the case of Dundreggan and Knepp, which are located further away, I stayed at both sites for around two weeks, in March and June 2016, respectively. These periods were agreed with the managers and coincided with the ecological assessments described in **Chapter 5**. I was kindly

offered accommodation at both sites, at the volunteers lodge at Dundreggan and at the camping site at Knepp.

Below I detail the ‘orthodox’ qualitative methods and techniques (after Crang, 2002) deployed in the three phases: document analysis, semi-structured interviews, and participant observation. Given that this thesis draws extensively on relational, ‘more-than-human’ literatures in contemporary geography and social sciences more broadly, it might seem counterintuitive to use ‘humanistic’ methods instead of more innovative, ‘more-than-human’ methodological approaches (for reviews of the latter, see Buller, 2015; Dowling et al., 2017; Hodgetts & Lorimer, 2015). This was indeed a persistent investigative frustration and challenge throughout the research, which will be addressed in the final section of this chapter.

### **Document analysis**

Gathering and analysing documents played a significant part in ‘generating materials’ with respect to the wider British conservation and forest management context and the study sites, particularly during the first phase. As mentioned above, these documents helped me to become familiar not only with key ecological concepts, but also with Britain’s environmental, forestry and conservation histories, as well as the specificities of the study sites. Following Bowen’s suggestions, I looked at documents with a “critical eye” (Bowen, 2009, p. 33), acknowledging that they are context-specific and cultural artefacts, in that they “reflect the aims and attitudes of the people and organisations that collected the data” (G. Clark, 2005, p. 58) who have their own agendas.

I began by gathering scientific documents about disturbance ecologies in temperate forests and landscape ecology, including key scientific essays, commissioned reports, position statements, and conference proceedings (Phase I). My analysis focused on understanding the main concepts and theories related to disturbances in general, and herbivory, coppicing and fire in particular

(cf. §3.1), as well as the models through which disturbance ecologies are known. Through these textual inscriptions, which were accessed and selected through text searching facilities (library catalogues and online databases), I was also able to identify ecologists working on forest disturbance regimes in the UK that I could interview. Parallel to this, I analysed general references related to the environmental and forestry histories of Britain (e.g., G. D. Holmes, 1975; Hoskins, 1960; James, 1981; Matless, 2005; Rackham, 2000, 2006; Sheail, 2002; Tsouvalis, 2000). In Phase II, I analysed key policy documents related to conservation and forestry, with which rewilding might create frictions, and institutional websites related to conservation, forest management and rewilding. These documents enabled mapping the complex structure of conservation and forest management in the United Kingdom, in terms of conservation bodies (both governmental and otherwise) and designations. Analysing these documentary materials and their authorial voices also enabled the identification of key institutional spokespeople to interview.

In addition, I collected and analysed textual inscriptions concerned with the study sites. During the first phase, I analysed historical, secondary documents, institutional and policy documents, management plans, online materials and news related to the study sites. These helped to identify the key institutions and actors involved in the management of the sites. Further archival research related to the New Forest was conducted during the third phase at the Christopher Tower New Forest Reference Library<sup>67</sup>, in Lyndhurst. My archival enquiry focused on historical accounts (mostly secondary sources), policy documents, scientific papers, and newspaper articles related to the environmental history of the New Forest, commoning, conservation and forest management. These texts proved invaluable for excavating the history of the New Forest

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<sup>67</sup> This library is located in the New Forest Heritage Centre and is stewarded by a team of volunteers. It houses a very comprehensive collection of books, maps, reports and images related to the New Forest's history, including a number of limited reports produced by the Forestry Commission.

in terms of herbivory management. Through what Hayden Lorimer terms “travel in real-time,” I encountered the “places, practices and politics of the past” (H. Lorimer, 2010, p. 257).

Document analysis consists of an iterative process that “involves skimming (superficial examination), reading (thorough examination), and interpretation” (Bowen, 2009, p. 32). In the case of the scientific, policy and historical documents not specific to the study sites, which provided general background information at the national level, the analysis involved mostly ‘superficial examination’. While reading, I identified relevant passages in relation to disturbances and their management in the UK, particularly herbivory, and took notes of key terms and narratives, repeated remarks and insightful comments. In the case of the documents related to the study sites, the analysis was also thematic, encompassing more thorough examination. To this end, I started by analysing the document’s background information (i.e., type of document, type of data, date, context and authorial voices). I then read the documents carefully to tease out key narratives and agendas, taking notes of key terms and insightful passages related to disturbance regimes, notably large herbivores, commoning (in the New Forest case), conservation, forest management and rewilding (in the case of Knepp and Dundreggan). These notes acted as ‘codes’. After reading them again, I grouped them in broader categories that were analysed together with data from interviews and participant observation, as described in §3.2.2.

I cannot claim to have uncovered all the relevant documents, and many of the textual inscriptions gathered and examined are not explicitly mentioned in the analytical chapters. However, together the inscriptions I have gathered provided a thorough introduction to crucial concepts, official discourses and some of the practices through which disturbance management takes place both at a national level and in the study sites. They also provided both context and validation of the materials generated through interviews and participant observation.

## **Semi-structured interviews**

To complement the accounts gathered from the written documents specified above, I conducted semi-structured interviews in the second and third phases of fieldwork. This type of interview is one of the most common methods of qualitative approaches utilised within human geography, often in association with other methods (Crang, 2002; McDowell, 2010). In conducting them, I regarded the interview as an interactive and reflexive exchange that is “more of a collaboration than an interrogation,” following McDowell (2010, p. 162).

During the second and third phases, a total of 50 formal interviews were conducted with three main targeted groups (see **Appendix II** for a complete list):

**Group I:** grazing and landscape ecologists conducting research in the UK;

**Group II:** policy makers and members of the institutions responsible for conservation, forest management and rewilding in the UK;

**Group III:** members of the institutions that are directly or indirectly involved in the management of the New Forest, Knepp and Dundreggan.

**Groups I and II** were selected in order to provide a broader framing of disturbance ecologies and management and of rewilding within ecological and policy discourses, at the national level of the UK. Together with the documents analysed in the first and second phases, as explained above, these interviews provided context and background information at a ‘macro’, national level. In turn, **group III** was selected to explore the specificities of management and disturbance regimes at the micro level and in practice. As these groups are specific, samples were selected through ‘purposive sampling’ combined with ‘snowballing’ techniques (Bernard, 2006). The former (also known as targeted or judgement sampling) is a type of non-probabilistic sampling that entails the intentional selection of the cases or individuals that are relevant to the study as experts or specialists in a particular field or site, without an overall sampling size. To select

individuals within each group, I used the lists prepared in the first phase. For ecologists (**group I**), I also searched for active research projects within the UK on the *Gateway to Research* website<sup>68</sup>, which has information about publicly funded research. Furthermore, I used the British Ecological Society's mailing list to request participants working on disturbance regimes and/or with an interest in rewilding. For **groups II and III**, individuals were selected on the basis of their professional involvement with the institution. This strategy was complemented with 'snowball sampling', which was used to locate other suitable interviewees that might have been missed. It involved asking at the end of each interview whether the interviewee could suggest other individuals they felt might be informative. The sample of 50 interviews was arrived at when I felt that I had reached a saturation point at which no new information or names were offered. In addition to these interviews, I spoke informally with various other actors during the course of participant observation.

The formal interviews were semi-structured, following a drafted guide with open-ended questions and general topics to be covered. This guide was tailored for each group or individual. For instance, for **groups I and II**, interviews focused on the role of natural disturbances and ecological processes, their importance for conservation and forest management, what constitutes a desirable and undesirable disturbance regime, how stochastic and emergent events are/might be dealt with, and the particular challenges and controversies that might arise with rewilding. For **group I**, attention was also paid to knowledge practices and devices (e.g., modelling and simulations). For **group II**, I also focused on the shifts proposed by rewilding, namely its focus on processes and the return of disturbance regimes, and the challenges these pose to orthodox modes of forest governance. For **group III**, interviews focused on the different types of management and interventions undertaken, attitudes and perceptions towards landscape changes and herbivory, perceptions of differing types of disturbances, how stochastic

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<sup>68</sup> <http://gtr.rcuk.ac.uk>

and emergent events are/might be dealt with, and the particular sociocultural, political, and economic challenges and controversies that might arise. These questions were used as a starting point, with responses tending to provide natural overlap and bridges between them as the conversation unfolds. To a great extent, I let the interviewees lead the discussion, giving scope for other topics to emerge. I made sure, however, to keep the conversation on track and to discuss the main topics. If necessary, I would allude to a document with a general outline of the project that I had previously sent by email, together with a description of what the participation would entail, tailored for each group or individual.

Interviews lasted between 45 minutes and 2 hours. Most of them occurred face-to-face, in the interviewees' workplace. Some interviews with ecologists and policy makers were conducted over the phone or via Skype. At the beginning of each interview, the participants were asked to sign a consent form (**Appendix III**) and agreed to be audio-recorded. The interviews were later fully transcribed from the digital recordings, using the speech recognition software package Dragon NaturallySpeaking. The names of the interviewees were kept anonymous, although the organisations and respective roles were left unchanged to aid analysis. Besides the recording, I also made annotations during the interviews and/or shortly after, including relevant observations about things mentioned when the audio recorder was off, other things happening, body language and silences, amongst others.

Similar to documents, the interviews provided a thorough understanding of the 'big picture' in terms of disturbance regimes in the UK and study sites, their management throughout time, political considerations and future challenges, beyond those written in official documents. However, I was not witnessing how disturbances are actually known and governed in practice – the unwritten and unspoken.

## **Participant observation**

To complement the materials already gathered through documents and interviews, this study also included participant observation at the study sites in the third phase. This entailed witnessing and participating in a number of activities and events concerned with knowledge and management practices related to herbivory.

Participant observation is one of the distinguishable techniques of ethnographic research. With deep roots in anthropological studies (for an overview, see Bernard, 2006, pp. 344–347), its use has expanded to other disciplines across the social sciences, including human geography (cf. Crang & Cook, 1995; Herbert, 2000; Watson & Till, 2010). It addresses “what people *do* as well as what they *say*” (Herbert, 2000, p. 552), paying attention to “the relative messiness of practice (...) the often ragged ways in which knowledge is produced in research” (Law, 2004, p. 18/9).

At the study sites, I was able to witness and participate in some of the daily routines of those responsible for managing large herbivores, as well as to attend relevant events. The aim was to understand what it is like to instigate or work with disturbances, how these are rendered manageable and are managed, and to follow the spatial and temporal dynamics and assemblages that emerge in the process. Given that the management activities occur at specific, short times of the year, attuned to the field sites’ ecological rhythms, fieldwork was consequently structured around these rhythms. Whilst conventional approaches tend to assume that ethnography and participant observation are a long-term research process, my approach aligns more with so-called ‘short-term ethnography’ (after Pink & Morgan, 2013). This has proved to be suited to a range of theoretical, methodological and empirical interests, including “theoretical turns toward practice, practical activity (what people are actually doing as they move through the world) and the nonrepresentational (the unspoken, unsaid, not seen, but sensory, tacit and known elements of everyday life)” (Pink & Morgan, 2013, p. 353).

At the New Forest, I followed the work of the Forestry Commission's teams responsible for deer management and heathland burning, both in the office and, whenever possible, in the field. Burning, for instance, is highly dependent on favourable atmospheric conditions, which are only assessed by the burning team in the morning of each day. This made it difficult to plan fieldwork in advance and, due to adverse weather, I was not able to witness the process of burning in the periods during which I stayed in the New Forest. In other cases, such as deer culling, I consciously decided not to witness it for personal reasons that will be explained in more detail in the final section of this chapter. In what concerns the Verderers, I spent some time in their office, with the person responsible for managing commoning, and was also able to witness the work of the agisters in the field. Whenever possible, I attended relevant meetings and events related to commoning, such as the Verderers' monthly Open Court meetings, the Higher Level Stewardship Annual General Meeting or pony sales, which gave me the opportunity to talk informally with some commoners and visitors. Additional conversations took place during walks in the Forest.

At Knepp, fieldwork entailed mostly observing and helping the resident ecologist to conduct two monitoring surveys, from data collection to analysis in the office: the 'available edible fodder' survey (described in §5.1.2) and a reptiles survey. These surveys took place in the Southern Block of the estate and were undertaken mostly on foot, providing me with a unique opportunity to observe all the fields and to be corporeally involved. As will be described in more detail in the last part of §5.2.2, I had to "learn to be affected" (after Despret, 2004) by the site and events I encountered, attuning to the plants I was helping to survey, the dynamic vegetation I walked through and the uneven soil due to dried animal tracks. I also attended to the animals' gaze as I was walking by them, while trying not to disturb them and keep some distance. Through this experience of 'becoming ecologist', albeit for a short period of time, I had the chance to focus on practices as they were enacted *in situ* and in the moment, not just

on how they are (selectively) recounted after the event by those enacting them. By actively engaging with the survey and helping to collect data I was also able to give something back while developing a level of trust. Moreover, as I was based at the camping site, I had the chance to have informal conversations with some of the tourists that were staying there.

Finally, at Dundreggan, ethnographic research was focused on deer management. To this end, I attended a training course on Herbivore Impact Assessment (described in §5.1.2) and followed its implementation. I also sat in on a public consultation meeting of the Glenmoriston Deer Management Group, which provided me with compelling insights into the particularities of deer management in Scotland and the different vested interests. Fieldwork included volunteer work at Dundreggan's Tree nursery, together with the group of long-term volunteers.

While in the 'field', I would make annotations in a notebook, either during or as soon as possible after the event. At the end of each day, I would use these notes as mnemonics when describing and recording into a field diary my experiences, conversations, interactions and the practices I had witnessed. I also took a series of photographs in the field to supplement my field observations, which feature throughout this thesis.

### **3.2.2 Analysing materials**

The methodological tools described in the previous section gave rise to the accumulation of a wide range of materials, including interview files and transcripts, field journal notes, a digital field diary, newspaper articles, documents, brochures, maps and photographs. How was I to make sense out of these materials?

Qualitative analysis does not simply start at the end of fieldwork, nor does it end before the final write-up of the thesis. Rather, it is the creative, iterative and non-linear process wherein "material is combined, recombined, decontextualized and recontextualized" (Crang, 2003, p.

143). It involves getting (re)immersed in the materials, bringing them into conversation with the theoretical resources mobilised by the research and refining the research foci. It is also intertwined with the writing process – what Crang defines as “thinking by writing” (2003, p. 130).

To facilitate analysis, I had organised and indexed most of the materials in thematic directories. The analysis proceeded through an iterative process of closely reading the verbatim transcripts, (descriptive and analytical) fieldnotes and notes taken when analysing documents, which were further collated and coded into broad themes using the NVivo software. At the end of coding, I allocated codes to each analytical chapter and cross-referenced other key themes. I carefully read these references before writing each chapter, in order to identify relevant empirical stories and quotes. For the coding process, I have reflexively used a grounded theory and conceptual coding approach, which consists of an iterative analytical process where categories emerge from the text (Bernard, 2006; Bowen, 2009; Holton, 2007).

While I let the texts ‘speak’, the themes were also informed by the theoretical propositions put together after spending the first year of the DPhil programme reading (more-than-)human geography and cognate disciplines, as well as ongoing reflections during the fieldwork that I would write down in the form of monthly reports. Besides systematising the main ‘tasks’ and next steps, these reports included provisional themes and concepts to consider or explore, in relation to the research questions. This process enabled me to start organising the empirical materials and bringing them into conversation with theoretical and conceptual materials. A provisional structure of the thesis gradually started to take shape. This nevertheless changed and evolved iteratively as I started writing up and continued reading additional literature. As suggested in the opening quote of this section, reading, writing and analysing go hand in hand. Writing, too, is a ‘method of enquiry’ (Richardson & St. Pierre, 2005).

### 3.3 Thinking and writing reflexively

A final methodological consideration pertains to the issue of reflexivity, which is transversal to the whole research process. In geography and other social sciences, the need to be reflexive was primarily influenced by feminist scholars (Jensen & Glasmeier, 2010; Kobayashi, 2009; G. Rose, 1997). These, in turn, were inspired by Donna Haraway's (1988) notion of 'situated knowledge', according to which all knowledge is partial, embodied and contextual. Being reflective thus demands awareness of our own situatedness and 'positionality' (e.g., gender, race, social position) within multiple assemblages, and acknowledging that research and writing are inherently political. As Beth Greenhough argues, it demands attending to the "*infectious agency*" of the academic geographer, whose role "is not so much to extract information (in the form of a conventional reply) from a given research event, but to incite response in those (human or otherwise) with whom the researcher is engaged" (Greenhough, 2012, p. 50).

Before starting fieldwork, I had anticipated that some aspects of my own positionality could affect the research process, particularly my 'outsider' position and shyness. As already mentioned in this chapter, I was an 'outsider', literally and figuratively: from another country (Portugal) and from another background (social sciences). Despite being fluent in English, there were certain aspects of the political, social, cultural and ecological contexts that were unfamiliar to me. However, this unfamiliarity also made me more attentive and sensitive to some aspects and details of the contexts I was working with that could easily go unnoticed if I was already familiar with them. It also allowed to ask for further justifications and, contrary to my anticipations, helped to develop a trustful rapport. Interestingly, many of my research subjects used examples from my own country to illustrate some of their points. In the New Forest, I was offered several times a visit to the 'Portuguese fireplace'<sup>69</sup>. I took this opportunity to have

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<sup>69</sup> The Portuguese Fireplace is a war memorial in the New Forest. As the plaque next to it explains: "This is the site of a hutted camp occupied by a Portuguese army unit during World War I. This unit assisted the depleted local labour force in producing timber for the war effort. The Forestry Commission have retained the fireplace from

informal and sometimes very telling conversations about the New Forest and its history on the way to and from the fireplace.

Another aspect that I worried could interfere with my research had to do with being shy, a topic that is almost absent from discussions about ethnography. In a sense, shyness can be an anathema of the ‘ideal researcher’: someone who is confident, assertive and talkative (cf. S. Scott et al., 2012). It can nevertheless make one develop other skills that are equally important in qualitative research, such as listening, observing and paying attention to details. Although I had previous experience of conducting interviews and ethnographic research, I still worried about approaching and talking to people, especially in a foreign language and culture. To overcome this fear, I tried to establish as far as possible previous contact by email and prepared in advance some questions and/or topics that I could use as a starting point or to prompt further discussion. In the cases when I needed to improvise on-the-spot, I was either directly introduced by a spokesperson or made sure to mention him/her in the beginning, which facilitated the interaction.

Two unexpected issues also forced me to ‘situate’ myself and the research itself. To begin with, fieldwork took place in a period when rewilding had become a highly political topic in Britain. In the New Forest, for example, I realised that the predominant view of rewilding was the one associated with George Monbiot and the reintroduction of large carnivores, which was causing some unease. I had to clarify what I meant by rewilding and was also specifically asked to avoid mentioning that word with the commoners, as they could become hostile or suspicious. In other cases, I was asked my opinion about rewilding. I avoided expressing a position on the topic as much as possible, trying to incite the respondents to mention their own views. The second issue concerned my decision not to witness culling in the course of fieldwork, for several reasons. I

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the cookhouse as a memorial to the men who lived and worked here and acknowledge the financial assistance of the Portuguese government in its renovation.”

was aware that witnessing it could provide additional and possibly interesting insights about the management of large herbivores in practice, particularly how the tensions between care and harm are played out at the individual and ecological level, which are relevant in terms of biopolitics. By not engaging with it, my understanding of this practice remains limited and reliant on others' accounts. Nevertheless, I was worried about the emotional impacts that it could induce and thus privileged my own personal ethical and psychological wellbeing.

The writing process also demands critical reflexivity. According to Nick Bingham, this entails “interrogating the relationships between what you are writing about when you are writing up and the way that you write it” (Bingham, 2003, p. 152). Soon I realised that the empirical materials gathered were more than could possibly fit into the analytical chapters. I thus had to select what to focus on, what to leave behind, and whose voices to privilege, in order to produce a coherent argument. This selection also drew on a ‘view from somewhere’ (after Haraway, 1988). It was informed by the readings of (more-than-)human geography and cognate disciplines carried out since the first year of the DPhil programme. The narratives that follow are inevitably a simplification of what I witnessed, combining my own voice with the voice of the research subjects and of other researchers.

In addition to my own positionality, it is worth mentioning some limitations and constraints. One of these pertains to the methodology deployed: this thesis uses human-centred, rather than ‘more-than-human’ methodological approaches, despite the relational understanding of disturbance developed herein and the more-than-human literatures on which it draws. The shift proposed by these literatures in recognising and acknowledging the multiple more-than-human forms of agency that animate multispecies ecologies challenges researchers to *do* geography differently (Buller, 2015; Dowling et al., 2017; Hodgetts & Lorimer, 2015; see also Swanson, 2017; van Dooren et al., 2016). This means “to perform, to engage, to embody, to image and imagine, to witness, to sense, to analyse – across, through, with and as, more-than-humans”

(Dowling et al., 2017, p. 2). Yet, as Hodgetts and Lorimer (2014) and Buller (2015) point out in their reviews of animal geographies, there is a persistent (and understandable) commitment to human-directed methods to examine nonhuman phenomena. This, they argue, runs to some extent counter to the more-than-human aspirations of the subdiscipline and is impeding progress in it, retaining a bias towards human sensings of nonhumans. Although I agree with these considerations, I opted for mostly ‘humanistic’ methods due to some challenges and frustrations during fieldwork, despite the potential epistemological tensions between theory and praxis this could bring.

One of the challenges concerns the focus of this research on disturbances and ecological processes. While large herbivores as agents of ecological processes and ‘disturbers’ were at the core of the research, I was interested in herbivory and forest management as particular modes of relation. In practice, this meant that I was trying to attend to multiple, more-than-human agencies at once (e.g., animals, vegetation, soil, fire, human beings, etc.), their entangled relations and distinct spatialities and temporalities. Soon this endeavour proved to be impossible. It would require a variety of field skills, instruments and expertise from various disciplines that only a collaborative and interdisciplinary team could have.

I am aware that experimenting, for instance, with ethological modes of inquiry could have brought additional insights to the idea of large herbivores as vital ecological actors and agents of disturbance. However, doing so in the field was not possible. For example, carrying out direct observations of deer behaviour in the New Forest would depend entirely on the forest managers’ expertise and availability and would only be possible in the spring, when they are carrying out the annual census of deer. By the time I was doing fieldwork, there was also nobody conducting any behavioural or ethological study in the New Forest about deer, whom I could join. The option of doing it by myself throughout the year was not viable either. Besides not having a car, nor sufficient knowledge of the Forest and deer behaviour, being alone in the

forest at night, which is the best time to see them, could be potentially dangerous. In order to overcome some of these specific constraints, I talked with specialists on deer behaviour and ecology to better understand some details that I had been told during fieldwork, such as why deer have become more nocturnal due to recreational pressures at the New Forest. Moreover, and as already explained in this chapter, during my ethnographic fieldwork at Knepp and Dundreggan estates, I spent some time becoming ‘attuned’ to human and nonhuman others.

Throughout the writing stage, there were also constraints. Particularly significant were the health issues I had to grapple with, having been forced to suspend my studies and to slow down. I worried that stopping would increase the distance from the ‘field’, with the possibility to distort some memories and lose some train of thought. However, it also provided me with the opportunity to re-encounter my materials and to look differently at and clarify some of the things I had previously thought and written. Having to deal with an ill, dis-abled body that demands slowing down and resting and that makes it almost impossible to plan in advance the next day, can be at times very frustrating and stressful. This is especially so, as I figured, in a ‘speedy’ academia that sometimes disregards wellbeing. It nevertheless offered me a broader perspective of the meanings of disturbance and the different rhythms it entails, not just at a macro, ecological level, but also at the micro, body level.

### **3.4 Conclusion**

In this chapter, I have explained and justified the methodology and research design used in the thesis. I introduced the study sites around which this research gravitates and outlined my methodology, detailing the multiple qualitative methods used to generate and analyse the empirical materials. Finally, I considered the issues associated with my own positionality and discussed some of the difficulties encountered, as well as my efforts to address these.

Combined with the research questions outlined in §1.3 and the literature review explained in **Chapter 2**, this methodological chapter provides the basis in which the empirical chapters are grounded. It also provides a humble contribution to existing work and ongoing discussions about “more-than-human research methodologies” (Dowling et al., 2017, p. 2) following the relational turn. Despite drawing upon more conventional techniques, I tried to re-imagine these through a more-than-human lens. This entailed attending to questions of both human control *and* non-human agencies, discourses *and* practices and of how knowledges about dynamic natures and uncertain futures are gathered and enacted. It entailed, too, noticing the “structural synchronicities between ecology (...) and the human and more-than-human histories through which uneven landscapes are made and remade” (Tsing et al., 2019). Furthermore, it adds a new ethnographic experiment to existing work on rewilding as a new mode of governing and managing (wild)life, which tend to draw exclusively on rewilding sites.

In the following three analytical chapters, I address my research questions by discussing the bio- and ontological politics (**Chapter 4**), knowledge practices (**Chapter 5**) and cultural politics (**Chapter 6**) of governing disturbance regimes.

## CHAPTER 4. More-than-human biopolitics and the histories of disturbances

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[Both] space and landscape could be imagined as provisionally intertwined simultaneities of ongoing, unfinished, stories (...) the (temporary) product of a meeting up of trajectories out of which mobile uncertainty a future is—has to be—negotiated. (Massey, 2006, p. 46)

The fluid biopolitics of rewilding encounters fixities and frictions when it runs into other modes of bovine biopolitics. (J. Lorimer & Driessen, 2013, p. 255)

Forest and woodland management in the United Kingdom have changed significantly since medieval times. Underpinning these changes are different aims, values and perceptions of forests and disturbance regimes, in particular. These in turn reflect the interests of dominant social groups, to which there were always counter-discourses (cf. §2.4.2).

It is possible to distinguish three main types of forest management in the UK up until the 21<sup>st</sup> century: Royal forests (11<sup>th</sup>–16<sup>th</sup> centuries), plantation forests (16<sup>th</sup>–mid-20<sup>th</sup> centuries), and multipurpose and sustainable forests (from mid-20<sup>th</sup> century) (**Table 4**).

|                                 | Royal Forest                                                                                                       | Plantation Forest                                                                                | Multipurpose, Sustainable Forest                                                                           |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Timeframe                       | From 11 <sup>th</sup> to 16 <sup>th</sup> centuries                                                                | From 16 <sup>th</sup> /17 <sup>th</sup> to mid-20 <sup>th</sup> centuries                        | From late-20 <sup>th</sup> century                                                                         |
| Dominant perceptions of forests | Legal institutions, not necessarily wooded, set aside as hunting grounds exclusively for the Crown and aristocracy | Spaces of production, to be enhanced according to scientific methods                             | Considered to have multiple purposes (economic, social, environmental), for present and future generations |
| Objective of management         | Preservation of game species, namely deer, and the vegetation they depend upon, for hunting                        | Timber production, through large-scale plantations of even-aged monocultures of non-native trees | Multiple (e.g., timber production, recreation, wildlife conservation)                                      |
| Focus/units of management       | Deer and other game species                                                                                        | Trees (mostly non-native conifers)                                                               | Landscape                                                                                                  |

**Table 4:** Main periods of forest management in the UK (11<sup>th</sup>–21<sup>st</sup> centuries)

In the Middle Ages, following the Norman Conquest, forests were legal institutions that were set aside as deer farms and royal hunting preserves. They were not necessarily wooded; “a place of deer, not a place of trees,” as Oliver Rackham notes (2000, p. 65). In one of the most-cited definitions, a forest is described as “a certain territory of woody grounds and fruitful pastures, privileged for wild beasts<sup>70</sup> and fowls of forest, chase, and warren, to rest and abide there in the safe protection of the King, for his delight and pleasure” (Manwood, 1717, p. 143). The aim was to protect deer and to provide hunting grounds for the exclusive use of the monarch and aristocrats, with poaching being harshly punished. By the mid/late-16<sup>th</sup> century, the interest shifted from hunting to timber production, with the first plantations of broadleaf trees for shipbuilding. However, it was only in the 19<sup>th</sup> century that plantations became the main type of forest management. Forests began to be conflated with trees (and their timber) alone (C. J. Griffin, 2010). Inspired by German scientific forestry (described in §1.2.1), they were perceived as “spaces of production” (Nail, 2008, p. 24) to be enhanced according to modern, scientific methods in the national interest (cf. C. J. Griffin, 2010; J. C. Scott, 1998). Forests became strategic reserves of timber. This idea was the basis for the Forestry Commission’s formation in 1919, at a time when forest cover in the UK had fallen to 4%, in the aftermath of the First World War. The aim was to produce trees “as quickly and economically as possible” (Tsouvalis, 2000, p. 2), privileging non-native conifer species that would bring a quick return.

To do so, the Forestry Commission transformed what were perceived to be ‘wastelands’ (e.g., moorlands, heathlands) into productive spaces, not without contestation (Tsouvalis, 2000). The resulting even-aged, even-spaced, monocultural coniferous plantations radically transformed British landscapes. By the mid-20<sup>th</sup> century, there was a shift away from these plantation forests towards ‘multipurpose’ ones. This was driven by a growing opposition to the productivist ethos, international and national agendas tuned to sustainability and biodiversity conservation, and the

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<sup>70</sup> According to this classification, ‘wild beasts’ include the *beasts of the forest* or *Silvesters* (red deer, hare, wild boar and wolf), and the *beasts of chase* or *Campestres* (fallow deer, fox, marten, and roe deer) (Manwood, 1717, p. 160/1).

growing importance of the countryside as a source of amenity (cf. **Chapter 6**). The aim was to protect the extant species, landscapes and political ecologies, while integrating different interests and uses (e.g., forestry, conservation, recreation). More recently, some scholars note the emergence of a new paradigm, the so-called Ecosystem Approach, with its emphasis on ecosystem services (Raum, 2017; Raum & Potter, 2015). However, as they further argue, “multipurpose and sustainable forestry are arguably so deeply entrenched in British forestry policy and practice as to leave little room for another paradigmatic innovation” (Raum & Potter, 2015, p. 468). To date, rewilding remains a marginal approach to forestry (Dandy & Wynne-Jones, 2019). According to a forest ecologist from the Forestry Commission, some steps have been taken in the direction of naturalistic forestry (i.e., minimal or no intervention), “but foresters still think they always have to do something.”

Within each period thus schematised, perceptions of disturbances have shifted accordingly, as have their management and governance. The New Forest deer populations, on which this chapter is focused, provide a compelling example. Their ecological, economic and social roles have changed dramatically since the designation of the New Forest as a Royal forest in 1079. From game species with socioeconomic and symbolic value, deer became a nuisance for silviculture and timber production at the height of plantation forests, to be later (re)valued as part of the landscape and ecosystem, which nevertheless need to be managed. Deer have also played an active role, complying or resisting these human orderings and understandings. Storied-places, as van Dooren and Rose (2012) argued, are multispecies achievements. And so are the processes that give rise to them – the “intertwined simultaneities of ongoing, unfinished, stories,” as the opening quotation has it (Massey, 2006; see also Tsing, 2015; Tsing et al., 2019).

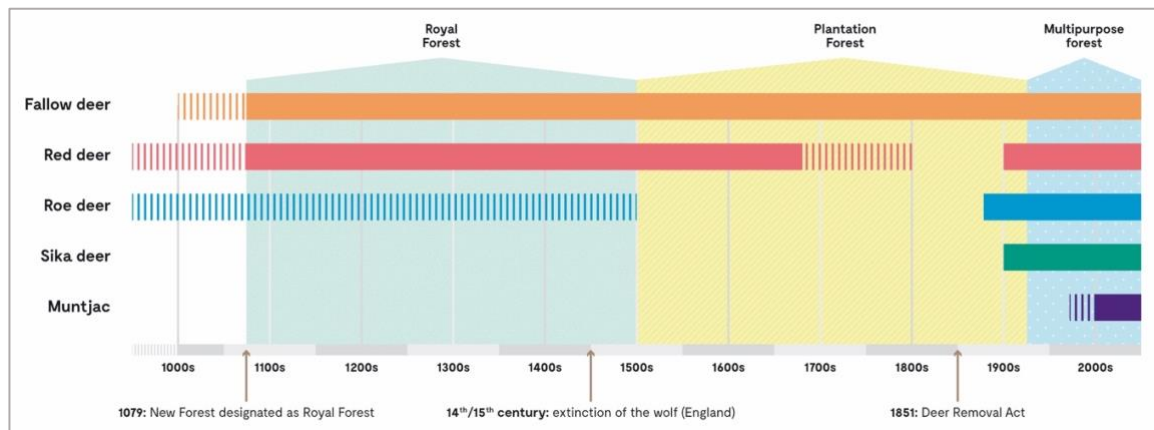
Drawing upon these various historical understandings of deer as part of the forest's disturbance regimes, this chapter aims to explore the modes of biopolitics that such understandings have come to shape. It thus responds to the first research question of the thesis, bringing a biopolitical angle to the historical geographies of forest management. As mentioned in §2.2, I draw upon a burgeoning body of research deploying more-than-human and affirmative approaches to biopolitics. These go beyond the more traditional understandings of biopolitics as merely human efforts to assert power and control over life, attuning also to the potentialities of nonhuman lives to resist, escape and unsettle human classifications and orderings. My understanding and approach to biopolitics draws in particular upon two sources. First, Lorimer and Driessen's (2013) work on 'bovine biopolitics' and competing modes of governing nonhuman lives (agriculture, conservation, welfare, biosecurity and rewilding), for whom biopolitics consists of "multiple modes of living with nonhuman life" (J. Lorimer & Driessen, 2013, p. 257). Second, the work of Crowley and collaborators on the 'modes of killing' in the context of grey squirrel management (Crowley et al., 2018). As they argue, "we approach biopolitics not only as a philosophy or strategy of governance, but also and perhaps more tellingly as the relations between a complex collective of things: humans, nonhumans, ideas, words, practices, and so on" (Crowley et al., 2018, p. 122).

The chapter starts with a brief introduction to deer, their ecological roles and management in the New Forest. I then outline four modes of understanding deer and the disturbance regimes they generate, based on the main themes distilled from archival research and interviews from fieldwork in the New Forest: deer as *game*, *spectacle*, *ecological agent* and *vermin*. To illustrate these, I select specific episodes from the history of the New Forest and concentrate on four main features related to the specificities of 'making live' and 'letting die' at the core of biopolitics, as explained in more detail below: ordering technologies, guiding logics, management practices, and killability. Through these, I analyse the impacts on the forest socio-ecologies arising from

enacting deer at the differing regimes. In the last section, I identify a fifth category, deer as *agents of rewilding*, exploring the possible obstacles and frictions with the categories previously described.

#### **4.1 The New Forest deer: an introduction**

In one of my first meetings in the New Forest, an ecologist working for the Forestry Commission told me, excitedly: “We have every single species of UK deer in the Forest. I don't think many other places in the country can claim that.” The species she was referring to were already introduced in §3.1.1: the fallow deer, red deer, roe deer, sika deer, and muntjac. However, not all of them have been present in the Forest since its designation as Royal Forest (**Figure 30**) (cf. Cadman, 1961; Insley & Clarke, 1975; Page, 2015; R. J. Putman, 1986; R. J. Putman & Langbein, 1999, 2000; Tubbs, 1986; Vesey-Fitzgerald, 1966). Red and roe deer are presumably native. However, there are no medieval references to roe deer in the New Forest and it seems to have been extinct in England by the end of the 14<sup>th</sup> century. For red deer, there is evidence of local extinctions followed by reintroductions and/or recolonization. The three other species have been deliberately released or escaped. Fallow deer were (re)introduced by the Normans in the 11<sup>th</sup> century, and have been since the dominant species in the New Forest. The population of fallow deer in the New Forest is one of the largest continuous populations in the country. Sika deer and muntjac, both introduced non-native species, have colonised the New Forest in the early and late-20<sup>th</sup> century, respectively.



**Figure 30:** Timeline showing the presence of the five species of deer in the New Forest (N.B. the symbols || refer to the likely presence of the species in or near the Forest)

As an agent of disturbance, deer are what the ecologist Rory Putman defines as “natural agents in woodland dynamics” (1996b, p. 209). This is due to their impacts on forest ecologies, which can be summarised as follows: i) direct impacts upon the vegetation (species composition, diversity and productivity); ii) physical changes in woodland structure (e.g., reduction in shrub layer cover and diversity, restriction of regeneration); iii) impacts on nutrient cycles, through patterns of foraging, trampling and seed dispersal; and iv) impacts on ground invertebrates and small mammals that depend on the vegetation for food, shelter and cover from predators – the so-called “knock-on” effects of vegetation changes (R. Gill & Beardall, 2001; K. J. Kirby, 2001; Peterken & Tubbs, 1965; R. J. Putman, 1986, 1996b, 2010a; R. J. Putman et al., 1989; Tubbs, 1986). However, deer can also have negative impacts upon ground flora and tree regeneration, notably when in high densities (e.g., Fuller & Gill, 2001; R. Gill & Beardall, 2001; K. J. Kirby, 2001). Deer populations are managed, mostly through culling, to control population numbers and composition (age and sex) and/or damages caused by browsing on younger established trees, bark stripping, or damage to stems by antlers (fraying) (Cadman, 1961, 1969; Fuller & Gill, 2001; R. J. Putman, 1996b, 2010b; R. J. Putman & Langbein, 1999, 2000; R. J. Putman & Moore, 1998).

Under current British legislation, deer belong to no one – they are *res nullius* (Fletcher, 2014, p. 171). Without state regulation, unlike other European countries, deer management is the responsibility of the owner of the land where deer occur. In Public Forest Estates like the New Forest, it is the responsibility of the Forestry Commission, whose aim is to maintain “a well-managed and healthy deer population, which presents no threat to long term environmental, social or economic sustainability, and to limit as far as is practical, the further spread of recently introduced species” (Page, 2015, p. 5). As will be mentioned below, deer carcasses derived from hunting, poaching or culling have been removed from the Forest since medieval times, to be processed for human consumption. Nevertheless, deer entrails have been removed and left behind (a process known as gralloching or evisceration) (**Figure 31**). Currently, deer are gralloched at point of shot, within an hour of shooting. After visual inspection, gralloch is left in the field, except when there is a suspicion of notifiable diseases (e.g., Bovine Tuberculosis) (*pers. com.*). The carcass is then removed and taken to deer larders. In the case of deer carcasses resulting from road traffic accidents, which will not be processed for human consumption, the Forestry Commission does not have any legal obligation to remove them. They are generally “dragged out of sight into thick cover where [they] may remain to provide a food source for scavengers within the forest ecosystem” (Page, 2015, p. 8).



**Figure 31:** Gralloching of deer in the New Forest (left) and the gralloch that is left in the field (right)  
(Copyright Sally Fear; reproduced with permission. Source: Fear, 2016, p. 130/1)

## 4.2 Deer biopolitics

As mentioned above, the ecological, economic and social roles and values of deer in the New Forest have changed significantly since medieval times: from game species, to nuisance for silviculture, to being part of the landscape. In this section, I focus on these different categories and modes of understanding deer throughout history, as ecological components of the forest disturbance regimes, and the associated biopolitical regimes. The analysis is based on a typology of four dominant, but not discrete regimes: deer as *game*, deer as *spectacle*, deer as *ecological agent*, and deer as *vermin*. I analyse how these categories are mobilised in management through the deliberate control or engineering of nonhuman agencies, which in turn can disrupt such efforts. For each regime, I explore four main features that together provide a broad understanding of which lives to be fostered or killed, why, and how: a) “ordering technologies” (after Whatmore, 2002; cf. Law, 1994), which correspond to the dominant social orderings of animal life; b) guiding logics or motives underlying the (de)valuation of lives, determined by the dominant social orderings; c) management practices through which deer-as-disturbances are governed; and d) their ‘killability’<sup>71</sup> (after Haraway, 2008; cf. Crowley et al., 2018; Despret, 2016, pp. 81–87; Schrader et al., 2017), which pertains to how killing, death and dead bodies are rendered. These features are summarised in **Table 5**. The narrative does not intend to be chronological. Rather, I select specific episodes of the New Forest’s history and explore the material, socio-ecological effects arising from enacting deer at the different regimes. On this note, it is important to stress that these regimes do not follow a linear progression, nor are they mutually exclusive. Rather, they can coexist and coalesce in particular situations, similar to the governmental logics analysed by Foucault (see §2.2.1).

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<sup>71</sup> For Donna Haraway, there is a moral distinction between killing (which Haraway considers as an integral part of life) and killability, which pertains to “the categorization of nonhuman animals in such a way that makes their killing automatically permissible” (Schrader et al., 2017, p. 3).

|                       | Game                                                                                                                                         | Spectacle                                                                                     | Ecological agent                                                                                         | Vermin                                                                                            |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Description           | Deer as resource for recreation (hunting) and food                                                                                           | Deer as resource for amenity and recreation                                                   | Deer as desirable disturbance agents, valued for their ecological impacts                                | Deer as undesirable disturbance agents, deemed harmful to some human interests                    |
| Ordering technologies | Hunting                                                                                                                                      | Recreation                                                                                    | Forestry and conservation                                                                                | Forestry and biosecurity                                                                          |
| Guiding logics        | Utilitarian, recreational value                                                                                                              | Aesthetics, recreational value                                                                | Ecological composition and historicity value                                                             | Utilitarian and symbolic values (native/invasive)                                                 |
| Management practices  | Regulation (Forest law); manipulation of landscape                                                                                           | Manipulation of nonhuman rhythms and landscape; culling                                       | Control of population and damages (culling)                                                              | Extermination or control of deer and damages                                                      |
| Killability           | Killable and visible death (hunting), unkillable and invisible death (poaching)<br>Non-selective killing<br>Gralloching; dead bodies removed | Killable, but invisible/hidden death<br>Selective killing<br>Gralloching; dead bodies removed | Unkillable (but killed); invisible/hidden death<br>Selective killing<br>Gralloching; dead bodies removed | Killable and visible death<br>Non-selective/selective killing<br>Gralloching; dead bodies removed |

**Table 5:** Four dominant modes of deer biopolitics in the New Forest

#### 4.2.1 Deer as game

In his analysis of the natural and cultural histories of deer, John Fletcher considers that “in the long history of human interactions with deer, it is hunting that has been the principal point of connection” (Fletcher, 2014, p. 84). This is very evident in Britain, in general<sup>72</sup>, and in the New Forest, in particular.

It could be argued that the New Forest owes its existence to deer hunting (Lascelles, 1915; R. J. Putman, 1986; Sumner, 1999). Of particular importance were fallow and red deer, which William the Conqueror is said to have loved “as if he were their father” (Thorpe, 1861, p. 190). By the time it was designated as a Royal Forest, a forest was an area of special jurisdiction set aside as a hunting preserve, in which the Forest Law was superimposed on Common Law. This punitive legal code established the right of hunting as an exclusive privilege of an élite – the

<sup>72</sup> Deer hunting in England (e.g., Cooper, 1997; Cox, Hallett, & Winter, 1994; Woods, 1998) and deer stalking in Scotland (e.g., H. Lorimer, 2000; Wightman et al., 2002) are the foci of most social sciences analysis of deer.

King, aristocrats or other privileged persons, at the expense of local inhabitants (Birrell, 1992; Cartmill, 1993; J. Cox, 1905; Fletcher, 2014; C. J. Griffin, 2010; E. Griffin, 2008; Hook, 1969; Hooke, 2011; Lascelles, 1915; Manwood, 1717; Rackham, 2006; Schama, 1995; C. R. Young, 1979). It was enacted to protect game species (known as *venison*) and the trees and undergrowth upon which they depended to flourish and survive, known as *vert* (Cartmill, 1993; Griffin, 2011; Hook, 1969; Hooke, 2011; James, 1981; Langton, 2015; Schama, 1995; Stover, 1985; Tubbs, 1986; Young, 1979; Young, 1969b). The ultimate goal was to have “Plenty and Increase of Deer, as well for the Provision of Venison for his Table, as for his Recreation in hunting” (Manwood, 1717, p. 152).

Although there is not much information about deer management in medieval times, it is nevertheless known that deer and *vert* were actively managed in deer parks and royal forests (Birrell, 1992). At the New Forest, deer were supplementary fed around keepers’ lodges and in the few deer parks within the Forest (e.g., Fiennes, 1949, p. 50), and populations were managed to maximise the number of trophy animals. This encompassed, for instance, the (re)introduction of fallow deer to England in the 11<sup>th</sup> century, and of red deer in the New Forest from France in the 17<sup>th</sup> century to increase the herd size and to improve the perceived ‘quality’ of antlers (Insley & Clarke, 1975, p. 376; Lascelles, 1915, p. 80; R. J. Putman, 1996a, p. 23). Contrary to other areas in England, red deer did not thrive in the New Forest and “did not attain great size or carry good heads,” contrary to the fallow deer, which “often run to big dimensions” and had bigger antlers (Lascelles, 1915, p. 90).

The ideal deer to hunt was not any deer, but a mature stag or buck in good condition, with at least 7 years old and a “hart of 10” or more (i.e., with ten points on its antlers, which multiply as the deer ages). This was not only for the extra meat, but also, and perhaps more importantly, for prestige and for the contest – “the harder it was to win, the better” (Judkins, 2013, p. 76; cf. Edward, 2nd Duke of York, 2005). Contrary to deer parks, especially in the high medieval

period (cf. Sykes et al., 2016), in royal forests such as the New Forest deer were presumably more valuable alive than dead. This would determine their management: not for venison production (deer as livestock), but mostly for the ‘thrill of the chase’ (deer as game) by maintaining older animals. The control and management of deer (‘made live’) also entailed the eradication of competing nonhuman predators – wolves, in this case. Following a sustained campaign of extermination, the wolf became extinct in England around the 14<sup>th</sup>/early 15<sup>th</sup> century, with profound ecological consequences (Harting, 1880, p. 150/1; Pluskowski, 2010; Rackham, 2000, p. 35).

The protection of vegetation also had important ecological consequences. Whilst regulations towards vegetation were a corollary of the protection of deer, to provide them with forage and cover (‘making live’), they restrained the clearance of woodland (G. D. Holmes, 1975; Langton, 2015; C. R. Young, 1978). For instance, severe penalties were applied for offenses against timber or underwood, such as cutting wood, land clearances or illegal pasturing (Cartmill, 1993; Cox, 1905; Hanawalt, 1988; Hooke, 2011; Insley & Clarke, 1975; Langton, 2015; Lascelles, 1915; Schama, 1995; Tubbs, 1986; Turner, 1901; Young, 1979). Enclosures were also illegal, to avoid interfering with the “free run of the deer” and hunting (Hook, 1969, p. 50/1; Langton, 2015, p. 222; D. W. Young, 1969b, p. 35, 1969a, p. 64). Moreover, the forest was kept open through coppicing and timber management, being “platted with many laundes [glades] and plaines whereon groweth no timber nor underwood” (Strutt and Cox 1903, cited in Langton, 2015, p. 225). This would have been an ideal habitat for deer, besides facilitating hunting. Although the preservation of such an open landscape can be considered a by-product of hunting, it nonetheless contributed to the maintenance of the traditional parklike landscape that is currently favoured for aesthetic and ecological reasons.

Besides being the main reason behind deer management and protection, royal hunting was also the only (permitted) way for deer to be killed (Birrell, 1992, p. 115), especially following the

extinction of the wolf in England. However, deer were also killed through poaching by local inhabitants, for whom deer were nevertheless made legally unkillable. After being shot, deer were galloched, the carcass was disjoint, and specific pieces, from flesh to head and skin, were distributed (cf. Cartmill, 1993, p. 64; Hanawalt, 1988, p. 184; Judkins, 2013; Schama, 1995, p. 146). Furthermore, forester-keepers would confiscate any carcass found, derived from poaching, and distribute the flesh to the local poor and sick, even if already rotting (Great Britain, 1810, p. 244; G. J. Turner, 1901, p. xxxvii/i). While the social and symbolic dimensions of this distribution deviate from the core of this chapter, the removal of deer carcasses is nevertheless relevant from an ecological perspective, as will be further explored in §4.3. However, there are some anecdotes of “waiting ravens<sup>73</sup>” (Cartmill, 1993, p. 64) benefitting from the galloching and distribution (Cartmill, 1993; Hanawalt, 1988). They were given the cartilaginous tip of the breast bone, “as an offering of good luck and peace” (Hanawalt, 1988, p. 184), or “would fly down at the kill and pester the stag breaker until he gave them their handout” (Cartmill, 1993, p. 64). In this sense, nutrients and minerals were inserted back to the ‘circle of life’ (cf. Beekers et al., 2017).

From what has been described, the key features of this biopolitical regime can be summarised as follows: i) enacted as game, deer are subject to the biopolitics of hunting, which deems them a desirable resource, for food and entertainment, similar to spectacle; ii) the aim is to protect and increase the number of deer and the vegetation they depend upon, which has ecological consequences; iii) this regime is geared around a utilitarian and symbolic logic, which renders deer both killable, for an élite, and unkillable, for the majority and nonhuman predators; iv) it requires an active protection and management of deer populations and vegetation, as well as the manipulation of the landscape; v) management is mainly regulatory (Forest Law), which

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<sup>73</sup> Ravens (*Corvus corax*) are seasonal scavenger birds.

indirectly contributed to woodland conservation; vi) death is made visible and encouraged through hunting, invisible and hidden in the case of poaching.

#### 4.2.2 Deer as spectacle

From the Middle Ages towards the mid-20<sup>th</sup> century, two often conflicting land uses predominated in the New Forest: silviculture and grazing (Stover, 1985; Tubbs, 1986). Since the 1950s/60s, there have been growing demands of yet another form of land use: recreation (explored in more detail in §6.1.1).

For visitors looking for an “aesthetic experience” of nature (Woods, 1998), deer, and wildlife in general, “provide a visual and recreation amenity” (R. J. Putman & Langbein, 1999, p. 3). The Bolderwood Deer Sanctuary (hereafter Bolderwood)<sup>74</sup>, an erstwhile hunting lodge until the 1830s (Lascelles, 1915, p. 119), provides a good example. It consists of a large meadow, mostly enclosed, where a herd of fallow deer regularly gather (**Figure 32**). It is currently one of the most popular attractions at the New Forest (*pers. com.*). Overlooking it is a viewing platform from which deer can be seen, with information boards about deer species and management. It also includes three circular walking trails, one of which is called *Deer Watch Trail*.



**Figure 32:** Fallow deer at the Bolderwood Deer Sanctuary (Crown Copyright, courtesy Forestry Commission (2019), licensed under the [Open Government Licence](#))

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<sup>74</sup> In the New Forest, there is another deer park: Burley Park. It is a privately-owned estate with a herd of red deer, where Deer Safari tours are run by tractor (<http://www.newforestsafari.co.uk>).

Bolderwood illustrates how deer are enacted and governed under a regime of (lively) spectacle, as a particular mode of nonhuman biopolitics. Whereas hunting in the Royal Forest can also be regarded as a form of recreation and spectacle, for the ‘thrill of the chase’, the type of recreation illustrated by Bolderwood consists of a different mode of consumption: non-lethal and non-elitist. It nevertheless follows similar logics. As suggested by some scholars, wildlife tourism inherits some of the practices, aesthetics and technologies of hunting (cf. J. Lorimer & Whatmore, 2009; Ryan, 2000). For instance, cameras have replaced guns, but the same predatory logic applies (S. Rutherford, 2011, Chapter 3; Ryan, 2000; Sontag, 1979, p. 14/5). The fact that Bolderwood used to be a hunting lodge is interesting here. As has been described in the previous section, the enactment of deer as game involved the creation and maintenance of an open landscape in the interests of hunting visibility. Under this second regime, the manipulation and maintenance of this desirable landscape persists, but rather for touristic ‘hypervisibility’ and spectacularisation (after Probyn-Rapsey, 2013).

Governing deer as spectacle also involves the manipulation of nonhuman rhythms. Similar to hunting lodges and deer parks on medieval forests, around which deer were fed by the keepers (e.g., Insley & Clarke, 1975, p. 378; Lascelles, 1915, p. 63; Tubbs, 1986, p. 133), the forest keepers seasonally feed the deer at Bolderwood to attract them to the public viewing area. Although deer do not depend on this supplementary food and can leave the semi-enclosed area, over the years they became used to finding it. As a member of the Forestry Commission’s wildlife management team explains, it is “easily available, [so] they stay in the area and they come easily to be viewed by the public.” This supplementary feeding can be seen as a form of disciplining animals’ bodies and behaviours (anatomy-politics), rendering them easily amenable to control.

Although there are no studies of this specific site and population that I am aware of, these practices have impacts upon deer behaviour, spatiotemporal uses of the landscape, and

ultimately the socio-ecologies of the forest (R. J. Putman & Staines, 2004). Recreational infrastructures have indeed been suggested to indirectly impact species distributions, behaviour and interactions, with cascading ecological effects. For instance, prey have been seen using human infrastructure as protection against predators (e.g., Berger, 2007; Hebblewhite et al., 2005). Elsewhere in the forest, deer have shifted their spatio-temporal activity patterns in response to recreational pressures. These behavioural adaptations, or attunement to human disturbances, encompass, for example, deer becoming increasingly nocturnal and using wooded areas as “areas of solitude” rather than open habitats, as a member of the wildlife management team explained. Moreover, recreational infrastructures can have ecological impacts on the broader landscape. To illustrate these, an ecologist from Natural England gave the example of the public car parks in the Forest, such as the one near Bolderwood, which is one of the most used (*pers. com.*):

[I]f you look around car parks they are always species-poor, and it gets better and better as you go away from a car park. (...) You can see compacted bare ground that nothing grows on (...) I think it is undoubted that recreation does have an impact, but it is very difficult to prove that or to quantify it.

With extra food at their disposal, the ‘semi-tame’ deer extensively graze and trample around the same area, without dispersing to other areas that might be less grazed. The high concentration of animals at artificially elevated densities can create local areas of overgrazing, with adverse impacts on the landscape. To avoid this, deer from this population are still culled and carefully managed, in line with the overall aim of a forest-wide reduction of fallow deer numbers (Page, 2015, p. 14). Whilst this might seem contradictory, it illustrates the multiple objectives behind (multipurpose) forest management. As a member of the Forestry Commission’s wildlife management team explained:

[T]he forest is many things (...) There is a huge amount of people visiting this forest, and they like to see the deer. In my view, I'd rather [prefer that] they went out and walk the woods and caught a fleeting glimpse of a wild deer, but it does serve purposes from an educational point of view... to be able to take the coach party, school children to that site, showing them the deer and explain to them about the management, why they are here, and about the processes of the forest. So, it is a tool to educate people.

At Bolderwood, the 'aesthetic charisma' (after Lorimer, 2007) of deer draws mostly on their morphology: an unusual annual colour change and "abnormally coloured deer" (Insley & Clarke, 1975, p. 378), notably black and white variations (Cadman, 1961, p. 96; Hook, 1969, p. 52; Insley & Clarke, 1975, p. 1975; Lascelles, 1915; Tubbs, 1986, p. 136). It excludes their killing and dead bodies. Under this logic, deer are rendered killable, but unlike the (royal) game regime, their death is made invisible by culling in specific periods of time where not many visitors are in the Forest. It is kept hidden, like in zoos, where the politics of 'let live' and 'make die', *bios* and *thanatopolitics*, go hand in hand through biopolitical technologies of care and harm (Chrulew, 2011; Srinivasan, 2017). Such technologies are geared towards governing life at the scale of population. Not only is killing hidden, but so are dead bodies. This biopolitical apparatus renders death and decay undesirable in the aesthetic valued tidiness and control within forest management practices and ideologies (Butler et al., 2002; Humphrey & Bailey, 2012; Niklasson, 2014; Schnitzler, 2014). In fact, dead animal bodies and deadwood have historically been considered negative elements of woodlands to be removed for aesthetic and welfare reasons, with crucial ecological impacts that rewilding aims to address (cf. §4.3).

In brief, under a regime of spectacle: i) deer are subject to the biopolitics of recreation, where they are considered a desirable resource for aesthetic and pedagogical purposes, and as an element of the traditional landscape (like under regime of ecology); ii) the aim and ideal is to have a controlled population within a controlled and bounded space, similar to biopolitics of biosecurity (deer as vermin); iii) this regime is geared around an aesthetic, recreation value, where they are targets of biopolitical technologies of both care and harm; iv) it requires a

manipulation of nonhuman ecologies, behaviours and rhythms; v) deer are rendered killable, but both their killing and dead bodies are invisible and hidden.

### **4.2.3 Deer as ecological agent**

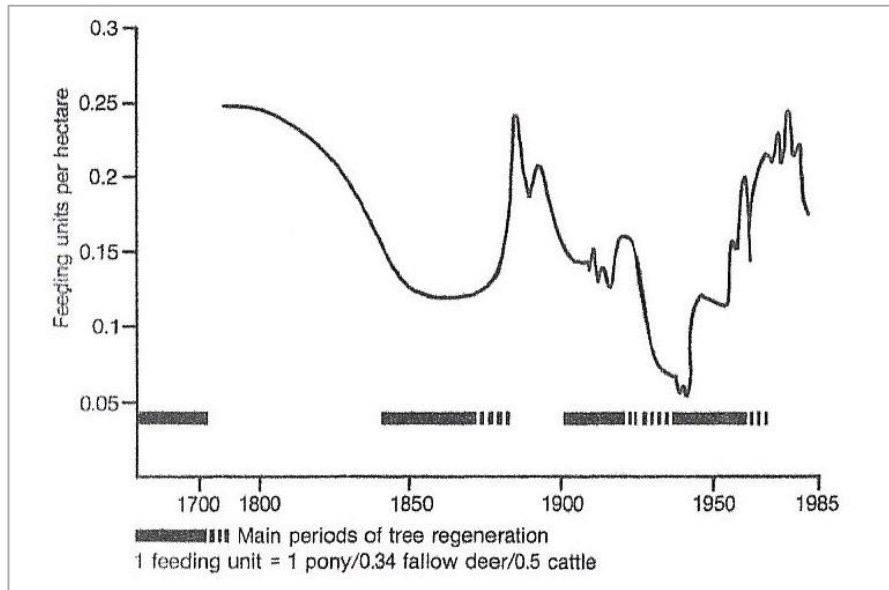
Under the two previous disturbance regimes, deer are enacted and governed primarily as a desirable resource for consumption – to be hunted and eaten (as game) or to be seen (as spectacle). In this third regime, deer are understood and targeted as desirable agents of disturbance. Their ecological impacts are at the core of their governance, similar to the regime to be explored in the next section. In this case, such impacts are deemed valuable and desirable for two modes of biopolitics: forestry and conservation.

As explained in §3.1.1, grazing pressure from deer populations, together with the commoners' animals, has been crucial for the maintenance of the New Forest's traditional, semi-natural landscape they helped to shape. According to an ecologist working for the Forestry Commission, "grazing pressure has always been waxed and waned through forest history, and that's what has given the forest, I think, its diversity and its interest, its uniqueness." Deer, in particular, especially the native species, are considered "an important and valued component of the woodland ecosystem and are a valued part of our natural heritage. (...) some habitats are improved and maintained by deer activity" (New Forest District, 2007, p. 3). They are what Keith Kirby defines as "management tools to produce desired habitat" (2004, p. 59). To illustrate the impacts of deer, the same ecologist compared the New Forest to the Isle of Wight, where there are no resident wild deer:

[I]f you compare the ground flora of the New Forest woodland to certain woodlands further across in Hampshire it would be completely different. (...) if you look at the ground flora at the Isle of Wight and compare to the New Forest, you'll see a significant difference. And that's not all down to ponies, because ponies are quite selective grazers and deer are, to a certain extent, too.

An interesting example of deer's ecological role in the New Forest history concerns the period following the Deer Removal Act of 1851. As will be explained in detail in the following section, this Act advocated for the total removal of deer from the Forest within two years. In his ecological history of the New Forest, Colin Tubbs noted that by then there were probably between 8,000-9,000 deer (Tubbs, 1986, p. 133), although other accounts mention 3,000-5,000 deer (Insley & Clarke, 1975, p. 378; Lascelles, 1915, p. 82). Despite this inconsistency, within two years the population had been reduced to around 100 or 200. As deer were by then the most abundant of the large herbivores (cf. **Figure 6**), the grazing pressure considerably decreased. This had unanticipated impacts on vegetation, leading to a subsequent acknowledgement by forest managers of the role of deer as disturbance agents or what in ecological jargon would be considered 'ecological engineers' (cf. §4.1).

One of the main consequences of the drastic decline in deer numbers following the Deer Removal Act was the increase of natural regeneration. Although it is not consensual amongst scholars that have studied the New Forest's ecological history whether there were waves of regeneration (e.g., Flower, 1977, 1980; Peterken & Tubbs, 1965; Tubbs, 1986), evidence suggests that there was a period of tree regeneration after 1851, coincident with the deliberate removal of almost all deer (**Figure 33**) (Peterken & Tubbs, 1965, p. 166/7; Tubbs, 1986, p. 137).



**Figure 33:** Main periods of tree regeneration in relation to grazing/browsing pressure in the New Forest<sup>75</sup> (Source: Tubbs, 1986, p. 137)

The regeneration triggered by the removal of deer had unforeseen consequences. For instance, Sumner described that, as years went on, “it was found that the removal of the deer had not benefitted the feed, as was expected; rough herbage & young holly, on which the deer fed in winter were now invading the lawns” (Sumner, 1999, p. 77). There was a perceived disruption of the “old balance between [number and type of] livestock and vegetation” (Kenchington, 1944, p. 126). It was realised that the presence of deer favoured certain desirable ecological conditions, as summarised by Gerald Lascelles, Deputy Surveyor of the New Forest from 1880 to 1914:

[Instead] of the pasturage being increased by the removal of the deer, the contrary was the case. The deer had been invaluable in keeping down the growth of holly, more particularly, and of other rough undergrowth, which after their removal began to encroach upon the lawns, where alone the best pasturage grows. It is indeed an actual fact that there is less pasturage in the Open Forest now, when 6000 deer have been taken off it, than there was when they were alive, grazing alongside the cattle, because their valuable aid in keeping back the rough growth from the pasture has been lost. This result was foreseen by neither side [Crown and commoners] at the time. (Lascelles, 1915, p. 15)

<sup>75</sup> Feeding units reflect differences in diet, size and feeding strategies of deer, cattle and ponies.

Under this logic, deer are rendered unkillable due to their ecological agencies. However, to achieve the desirable conditions, the size of deer populations has to be controlled (as mentioned before, there are no wild predators in the New Forest since the 14<sup>th</sup>/15<sup>th</sup> centuries). Since the 1880s, deer populations have been controlled to suppress and control the increase in deer numbers, which could render them a nuisance (cf. §4.2.4). As Lascelles noted, “I soon found that the deer had a tendency to increase very rapidly, and that I must bestir myself if they were to be kept from overwhelming me” (Lascelles, 1915, p. 84). Population control, which took the form of culling, was carried out by the keepers through unselective methods: “all we could do was to peg away at all the deer we could find, and kill as many as we could in the time that could be spared for such work” (Lascelles, 1915, p. 92).

Since the 1960s, culling has been done through selective methods, in accordance with a management plan<sup>76</sup> (Cadman, 1961, 1969; Insley & Clarke, 1975), which will be further described in **Chapter 5**. The aim has been to prevent deer from “becom[ing] a nuisance to forestry or to agriculture” (Hook, 1969, p. 51/2) and to avoid deaths through starvation (Cadman, 1969; Page, 2015). As explained by one of the members of the wildlife team, it encompasses culling “good and healthy deer,” mostly females, “because statistically they form the biggest part of the population,” and a “good proportion of the fawns that are born in that year.”

As a biopolitical technology, culling for population control determines the individual and collective lives to be fostered and the ones to be ‘let die’ or killed. It is geared towards governing and ordering life at the scale of population, to which the individual is subverted (biopolitics). Ultimately, it has at its core not a concern for deer (as species or individuals), but particular desirable ecological processes that deer disturbance enables or prevents (e.g., natural

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<sup>76</sup> Furthermore, in 1963 the Deer Act (England and Wales) was adopted. It established who could shoot deer, when, and how, and gave deer legal protection for the first time.

regeneration), depending on their densities. As explained by a member of the Forestry Commission's wildlife management team:

[D]eer are part of the wildlife and the landscape, the same as the ponies are, and everything else. We're just trying to find that balance in managing the deer herd to an acceptable level where they are not adversely impacting on our other aims and objectives for woodlands and for the rest of the SSSI [Site of Special Scientific Interest<sup>77</sup>] and the heathlands. And also, to sustain those deer species here, because they are part of the wildlife.

As has been described in the previous regime, and suggested by other studies addressing conservation biopolitics, this practice of bio-control is an example of the enmeshment of care and harm that often underlies conservation measures (e.g., Biermann & Anderson, 2017; Braverman, 2015; Chrulew, 2011; Hodgetts, 2017; Srinivasan, 2017). Care towards the collectivity (population, species, ecology) has non-benign impacts on individual living entities (Srinivasan, 2017, p. 1461). This has also been suggested, for instance, for the reintroduction of pine martens in Wales. It targets particular ecological processes to achieve desirable system properties: pine martens would drive out grey squirrels, leading to the flourishing of the desirable plantation forest (Hodgetts, 2017). Likewise, Crowley and collaborators explain how grey squirrel control is often led by a “stewardship killing” (Crowley et al., 2018). Underlying it is the motivation to avoid damaging disturbances to broadleaved woodlands and to allow them to flourish in the long-term. Squirrels are killed for trees to live.

In some ways, what has been described above echoes the model of environmental biopolitics suggested by Jamie Lorimer in relation to rewilding of natural reserves and reworming of the human microbiome. This environmental mode pertains to deliberate efforts to engineer ecologies through the reintroduction of keystone species (e.g., wolves, cattle, worms), whose absence is considered problematic from an ecological point of view. These species are valued

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<sup>77</sup> A Site of Special Scientific Interest (SSSI) is any area of land which is “of special interest by reason of any of its flora, fauna, or geological or physiographical features” (Wildlife and Countryside Act 1981, as amended). They form the basic unit of UK protected area legislation.

for their ecological and functional roles, which allow to achieve desirable system properties, similar to the New Forest deer. They are “disciplined as individuals and governed as species (biopolitics), [but] those concerned with their reintroduction are primarily interested in their ecological or ‘environmental’ agencies” (J. Lorimer, 2017, p. 36). However, in the case of deer-as-disturbance in the New Forest, it can be argued that there are also traces of the ‘antibiotic’ and reactive practices that have prevailed in wildlife conservation. It seeks to reverse change (caused either by their absence, in which case they are ‘made live’, or excessive presence, being ‘let die’) to preserve some sort of ecological equilibrium, valuing medieval or early modern baselines.

As an ecological and disturbance agent, then: i) deer are subject to the biopolitics of forestry and conservation, wherein they are valued for their ecological role (e.g., preventing natural regeneration), as ‘management tools’; ii) the underlying logic of this regime is to maintain and preserve the extant ecological diversity, while valorising historicity value; iii) management is done at a landscape scale, controlling both population densities and damages; iv) this logic renders deer unkillable, but they are still killed (death is invisible) either unselectively or selectively, when in high densities.

#### **4.2.4 Deer as vermin**

While under the previous regimes deer are valued and enacted as a desirable resource (for hunting and recreation) or disturbance agent, they are deemed a nuisance when both what they *do* (damages) and what they *are* (e.g., ‘invasive’) is perceived to generate undesirable economic and ecologic outcomes for forestry and conservation. This relates to biopolitical logics of biosecurity and invasion.

According to the anthropologist John Knight, “wildlife is defined as a *resource* to be exploited when it can contribute to human livelihoods, and defined as a *pest* to be eradicated when it

harms or interferes with human livelihoods” (J. Knight, 2006, p. 14). While mostly utilitarian, this category is also symbolic: a pest or vermin transgresses or disrupts established spatial or ontological boundaries (Fissell, 1999; J. Knight, 2000, 2006; Marvin, 2000; Milton, 2000). To use Philo and Wilbert’s (2000) terminology, their beastly places surpass the animal spaces allocated to them. They become, to use Mary Douglas’ (2002) phrase, “out of place,” which renders them killable and thus legitimises their culling (cf. Fissell, 1999; Marvin, 2000). This is also mentioned in the ecological literature. For instance, Putman argues that the pest status often results from a perceived imbalance in the “natural order,” “when in inappropriate numbers or in the wrong context” (R. J. Putman, 1989, p. 2).

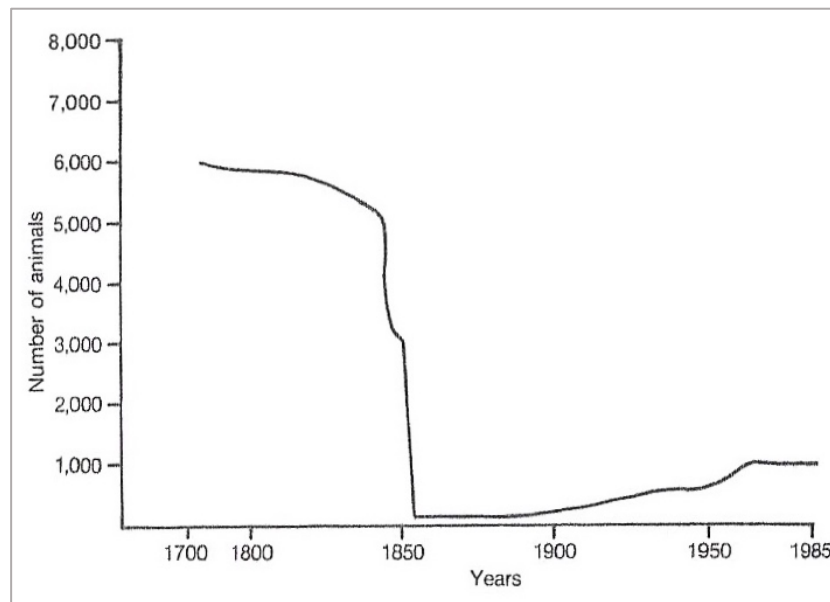
The period of Plantation Forests provides a compelling example. It marks the shift of interest from the royal deer to timber and underwood resources, with a consequent change in the emphasis in management (James, 1981, p. 189; Tubbs, 1986, p. 73). By then, vast silvicultural plantations were created and laws made provision for enclosure to promote regeneration of timber trees (C. J. Griffin, 2010; Stover, 1985). Disturbance by deer was perceived to prevent “the underwood to shoot again or the seedling beech and oak to grow” (D. W. Young, 1969b, p. 35). Left unmanaged until the 19<sup>th</sup> century, fallow deer populations had reached levels that threatened the highly-valued timber crops, besides competing with the Commoners’ stock for food (Lascelles, 1915, p. 11). This gave rise to conflicts between the Crown and the Commoners that would eventually culminate in the Deer Removal Act of 1851. This Act is unanimously considered by ecologists and historians as the most significant event in the Forest’s history in modern times, having shaped its future socio-ecologies (Cook, 2017; Newton, 2011; Pasmore, 1976; R. J. Putman, 1986; Tubbs, 1986). As previously mentioned, it advocated for the total removal of deer within two years, as well as the extinguishment of the Crown’s right to stock deer. In compensation, the Crown was empowered to enclose an area not exceeding 40 km<sup>2</sup> of ‘wasteland’ for timber production, in addition to any land already enclosed or enclosable under

earlier Acts. Once browsing was no longer a threat to the planted trees, the area could be thrown open and other lands of equal extent could be enclosed in lieu thereof (Hook, 1969; James, 1981; Lascelles, 1915; Pasmore, 1976; Sumner, 1999; Tubbs, 1986; D. W. Young, 1969a, 1969b). This would also prevent commoners' animals from grazing the enclosed areas, thus enabling regeneration.

For the total removal of deer to take place, "its practical effect was to make the deer fair game for everyone, by whatever means possible" (Insley & Clarke, 1975, p. 378). While the number of deer considerably decreased (**Figure 34**), total extinguishment was not achieved. This is partly due to some sort of resistance and 'opposition' from the deer<sup>78</sup>, due to their high mobility or "motility agency" (Buller, 2012, p. 144). Some managed to break through the fences that were used to manipulate them, eating the saplings (Tsouvalis, 2000, p. 67); others escaped and sought refuge on neighbouring estates, where they were tolerated, or in large woodlands on the northern and western sides of the Forest (Hook, 1969, p. 51; Insley & Clarke, 1975, p. 378; Lascelles, 1915, p. 83; Tubbs, 1986, p. 133). Nevertheless, the drastic reduction had important, albeit unexpected, ecological consequences, which were explored in the previous section.

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<sup>78</sup> This 'resistance' was not restricted to deer alone. In his account of the impacts of government attempts in the New Forest to shift the focus from medieval hunting spaces to silvicultural plantations in the 18<sup>th</sup> and early 19<sup>th</sup> century, Griffin (2010) argues that the British state's narrow focus on timber failed to account for the actions of both local commoners and non-human others, who resisted their schemes. Such is the case of mice and rabbits, which could easily transpose the fences originally designed to provide a barrier to deer and commoners' stock.



**Figure 34:** Evolution of the fallow deer population, 1669-1984  
(Source: Tubbs, 1986, p. 132)

Besides forestry and biosecurity, the enactment of deer as vermin also follows an interconnected logic: that of nativeness and invasion. Deer are also deemed a ‘symbolic’ disturbance by transgressing established spatial and ontological boundaries, with ecological consequences. The non-native sika deer and muntjac are particularly interesting here, namely their labelling as ‘undesirable exotics’ in the consultation report upon which the current Deer Management Strategy of the New Forest draws<sup>79</sup> (R. J. Putman & Langbein, 1999). This term effaces their belonging from the forest and renders them ‘out of place’, based on their origins and historical geographies. In transgressing the geopolitical order and threatening native species and habitats, some of which of important conservation value, they also disrupt the biopolitical order. The muntjac, for example, is linked to the decline of some protected species, as explained by one of the Verderers:

<sup>79</sup> Sika deer are native to much of East Asia and were introduced to Britain in the mid-19<sup>th</sup> century. The subspecies found in the New Forest is the Japanese sika deer (*Cervus nippon nippon*), which originated from two pairs that escaped in 1904/05. Reeves’ muntjacs are native to southeast China and were introduced to Britain in the early 20<sup>th</sup> century. They have been reported irregularly in the Forest and adjacent areas since the early 1970s and increasingly since 2000s (Fawcett, 2016a, 2016b; Page, 2015; R. J. Putman & Langbein, 1999, 2000) (**Figure 30**).

[Muntjac] take out a lot of the low vegetation and the scrub, the smaller sort of trees. There has been some suggestion that they are linked to the loss of some species, such as the nightingale<sup>80</sup>. (...) We are losing nightingales. So few now! We have had them in the forest in the past, but I don't know of any in the forest right now. The muntjac deer, and maybe some of the other deer as well, have been sort of identified as the reason why we are losing them.

Due to this threat to native species, alongside damages to forestry, the expansion of muntjacs is to be controlled. According to the current Deer Management Plan, they should be “shot on sight whenever it is safe to do so, taking every opportunity to resist and reverse increases in both distribution and abundance of this alien and damaging species” (Page, 2015, p. 28). This classification of muntjac as alien and invasive is akin to the “categorical killing” of squirrels described by Crowley and collaborators. It renders them killable and “subject to being killed always and everywhere” (Crowley et al., 2018, p. 132). The biosecurity practice of imposing death on some species through culling or extermination (i.e., ‘making die’) to secure the lives of ‘native’ and ‘pure’ ones, at the population level, is at the core of contemporary biodiversity conservation (Biermann & Anderson, 2017; Biermann & Mansfield, 2014; Buller, 2013; Fredriksen, 2016; Hodgetts, 2017; J. Lorimer, 2017; Marris, 2011; Milton, 2000; Pearce, 2015). It is in a sense akin to what Achille Mbembe (2003) terms necropolitics. More than the right to ‘make live’ or ‘let die’ that is at the core of Foucault’s biopolitics, it is a form of subjugating or exposing certain lives to the power of death.

As suggested by Hodgetts (2017) for grey squirrels (*Sciurus carolinensis*), an invasive species in England and Wales that threatens the native red squirrel (*Sciurus vulgaris*) with local extinction, their lives are devalued through framings of ‘invasive’ and ‘alien’. These labels render them objects rather than subjects, to be left to die or actively eliminated. Similarly, Fredriksen (2016) argues that feral cats (*Felis catus*) are deemed ‘out of place’ and their lives devalued in the areas

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<sup>80</sup> The nightingale (*Luscinia megarhynchos*) is a woodland bird which has recently been placed on the UK red list of conservation concern (Eaton et al., 2015).

where they cohabite with the ‘native’ Scottish wildcats (*Felis silvestris*), which they threaten with extinction through hybridisation. Hybridisation, the “unruly, muddled mixings” (Fredriksen, 2016, p. 692), troubles attempts at purity. The same applies to Sika deer, which can interbreed with the native red deer, thus “threatening the genetic integrity of both species” (Page, 2015, p. 23). As some authors suggest, the categorisation of species as ‘invasive’ is replacing ‘vermin’ as a label that designates certain animals as ‘out of place’, troublesome and, ultimately, killable (Crowley et al., 2018; Smout, 2003).

There are nevertheless some voices defending the incorporation of these ‘invasive’ species as part of the ecosystem. As a member of the Forestry Commission’s wildlife management team explained,

If it's not [feasible for us to remove that species from the country], then we have to accept it is (...) a parcel of our native fauna. No matter what you do with grey squirrel, you won't eradicate it. And you won't eradicate the deer species either. So, we have to accept that (...) even though they're introduced species, they are part and parcel of the wildlife fauna that we have in this country, and they will influence and affect the other species that are native here. (...) It's an evolving world, we (...) can't turn the world back and start again...

This resonates with Marris’ (2011) suggestion of “learning to love exotic species,” or Pearce’s (2015) consideration of invasive species as “nature’s salvation,” to be embraced rather than demonised. Similarly, some authors like Nigel Clark advocate a reconceptualization of the role of these ‘weedy opportunists’ within the “broader rethinking of life’s interplay with its physical environment” (N. Clark, 2002, p. 112). This is relevant in the context of uncertain and unpredictable future ecologies. Anna Tsing (2015, 2017b), in turn, opens up the definition of weeds to include organisms that take over after human disturbance. Unplanned, these weeds “may be good or bad to the humans amidst whom they thrive” (Bubandt & Tsing, 2018b, p. 2). For Tsing, “every feral landscape dynamic layers forms of weediness brought into being at varied historical moments” (Tsing, 2017b, p. 9). This reconceptualization requires nonetheless

a shift of focus of governing life, from bodies and populations to the environment. It will be further explored in the next section.

When deemed as vermin: i) deer are subject to the biopolitics of forestry and biosecurity, where what they *are* and *do* is deemed harmful to some human interests and native ecologies; ii) the aim and ideal is to maintain the extant ecologies, within fixed and stable geographies; iii) this regime follows a utilitarian and symbolic logic, where some species are considered ‘out of place’ and/or a threat to the present ecological diversity, and thus killable; iv) management requires intervention, to control (and sometimes exterminate) populations and damages; v) death is visible, unselective/selective, and sometimes encouraged, similar to hunting.

### **4.3 Rewilding the deer**

Thus far, I have explored how deer have been conceived and governed throughout the New Forest history under four biopolitical regimes which are not mutually exclusive and can operate simultaneously. I termed these: *game*, *spectacle*, *ecological agent*, and *vermin*. In this final section, I propose a fifth regime: deer as *agents of rewilding*.

Although deer are not enacted as agents of rewilding in the New Forest, some of the underlying logics and practices of this regime can tentatively be applied, also using examples from the other case studies. Moreover, future management plans at the New Forest include, according to an ecologist working for the Forestry Commission, “trying to move towards a much more natural woodland structure and return to semi-native woodland (...) over the next, say, 300-350 years or so.” As she further explained, “rather than clear-fell and restock [i.e., plant trees] we just want to thin out and let natural processes take over. And allow trees to naturally regenerate rather than us planting them [in the Inclosures] (...) a bit like rewilding.” In other words, these plans include working *with* and ‘slowing down’ natural processes, to allow natural succession to woodlands, with minimum intervention. This focus on natural regeneration as one of the key ecological and woodland management drivers might

render deer a ‘vermin’ (cf. §4.2.4), as their grazing and browsing can suppress this ecological process at a landscape-scale, thus undermining the aim of “getting the trees away.” At Dundreggan estate, the managers have responded to this interference through infrastructural interventions such as temporary fences to allow the natural regeneration of trees. However, at Dundreggan planting is privileged. When I asked one of the managers why that was the case and whether it could be considered rewilding, he told me that “for Rewilding Britain, what we are doing [at Trees for Life] is not rewilding, but planting (...) [but] it would take too long to wait for proper natural regeneration and people would not see it in their lifetime (...) Re-connecting people with nature is also part of our project.”

Outside of the Inclosures, on the contrary, deer-as-disturbances, together with the commoners’ animals, play an important role in the heathland restoration efforts currently under way. In line with longer aspirations that date back to the New Forest Design Plan of 1999 (*pers. com.*), conifer plantations on former heathland sites are being reverted to open habitat and fences are being taken down. For an ecologist from Natural England, this restoration, and the management of the New Forest in general, does not aim to recreate the past. It is future-oriented: “we can’t say: ‘well, that was such and such back then, so therefore we are going to make it that now’, because actually the New Forest is a functional system and everything is moving in a big mosaic. (...) We need the forest to adapt, we need the forest to change.”

Under this fifth regime: i) deer are considered an integral part of the ecosystem and desirable disturbance agents, similar to deer as ecological agent; ii) they are valued for their ecological and functional roles (e.g., as grazers/browsers, as prey and as dead body); iii) and are (ideally) subject to *laissez-faire* management; iv) wherein their death is part of natural selection, dictated by trophic networks. These characteristics are outlined in **Table 6**, which draws on the biopolitical characteristics of the four dominant regimes summarised in **Table 5**. They are akin to the concept of environmental modes of biopolitics, or ‘probiotic environmentalities’, introduced in §4.2.3. As suggested by Jamie Lorimer (2017, 2020), these pertain to deliberate efforts to

modulate the ecological ‘milieu’ through the strategic use of keystone species, which are valued for their ecological roles. They are geared towards managing the circulation of life and working *with* natural processes within nonequilibrium ecologies that are animated by discordant spatio-temporal rhythms. Below, I explore the possible synergies and frictions between the ‘transgressive’ (Buller, 2013) or ‘fluid’ (J. Lorimer & Driessen, 2013) biopolitics of rewilding and the regimes outlined above. These frictions are due to “differing ontologies of life [as form or process]” (J. Lorimer & Driessen, 2013, p. 254) or “competing philosophies of nature” (Buller, 2008, 2013). As Henry Buller asks, “How might an aesthetic or a politics of stability and security be reconciled to a reinvigorated wild?” (Buller, 2013, p. 184).

|                       | Game                                                                                                                                   | Spectacle                                                                               | Ecological agent                                                                                   | Vermin                                                                                      | Agent of Rewilding                                                                           |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Description           | Deer as resource for recreation (hunting) and food                                                                                     | Deer as resource for amenity and recreation                                             | Deer as desirable disturbance agents, valued for their ecological impacts                          | Deer as undesirable disturbance agents, deemed harmful to some human interests              | Deer as integral part of the ecosystem and drivers of ecological change                      |
| Ordering technologies | Hunting                                                                                                                                | Recreation                                                                              | Forestry and conservation                                                                          | Forestry and biosecurity                                                                    | Rewilding                                                                                    |
| Guiding logics        | Utilitarian, recreational value                                                                                                        | Aesthetics, recreational value                                                          | Ecological composition and historicity value                                                       | Utilitarian and symbolic values (native/ invasive)                                          | Ecological function                                                                          |
| Management practices  | Regulation (Forest law); manipulation of landscape                                                                                     | Manipulation of nonhuman rhythms and landscape; culling                                 | Control of population and damages (culling)                                                        | Extermination or control of deer and damages                                                | Laissez-faire management ‘Replaceability’                                                    |
| Killability           | Killable and visible death (hunting), unkillable and invisible death (poaching) Non-selective killing Gralloching; Dead bodies removed | Killable, but invisible/hidden death Selective killing Gralloching; Dead bodies removed | Unkillable (but killed); invisible/hidden death Selective killing Gralloching; Dead bodies removed | Killable and visible death Non-selective/selective killing Gralloching; Dead bodies removed | Death by natural selection; Carcasses left to rot on the landscape, as a source of nutrients |

**Table 6:** The four dominant modes of deer biopolitics and the biopolitics of rewilding

An important characteristic of the rewilding regime consists of its focus on functionality. Deer-as-disturbance are here targeted in relation to what they *do*, notably their ecological roles within trophic networks, both alive and dead: as living grazers/browsers, as dead bodies of nutrients and as prey. The former role shares similarities with what was already explored in the case of ecological and vermin regimes (§4.2.3 and §4.2.4), despite important differences (e.g., distinct temporalities, preservation of equilibrium vs instigation of transformative events) (cf. J. Lorimer, 2017). Below, I focus on the two other roles, which pertain to the natural processes of decomposition and predation.

#### **4.3.1 Deer carcasses and decay**

A consistent characteristic of all four modes identified above is that dead bodies are always removed, for utilitarian, welfare and/or aesthetic reasons. There is a deliberate intervention into the disturbance regime, although there are also very few circumstances where that does not happen (e.g., road traffic accidents (cf. §4.1), natural death or dog predation in ‘hidden’, out of sight places). From an ecological perspective, this has important consequences. The removal of dead deer bodies, for instance, disrupts the ecosystem’s energy and nutrient cycles, so vital for what van Dooren terms the “ongoing life of multispecies communities” (2014, p. 48). In fact, large herbivore carcasses are “miniature ecosystems that supply large amounts of minerals, energy, water and materials over relatively long timeframes” (Beekers et al., 2017, p. 8). Although the gralloch is left to rot in all regimes, this process does not simulate what would happen with carrion. Gralloch is very concentrated in time and space, rather than being more widely scattered through the forest and throughout the year, like carcasses (Puplett, 2018).

The restoration and re-establishment of such cycles of life and death is at the core of rewilding itself (Navarro & Pereira, 2012), contrary to the other four regimes. Death and decomposition are considered by rewilders to be part of natural selection, dictated by trophic networks. The

return of carcasses and decay to future landscapes is therefore valued as generative of particular ecologies. At Knepp, for instance, Tree argues that “one day, we hope to (...) be able to leave carcasses out on the land, providing a source of food for neglected scavengers that would also return minerals to the soil” (Tree, 2018a, p. 292). This is nevertheless controversial when it rubs up against prevalent modes of biopolitics more concerned with security, fixity, control, and based on individuals and populations, rather than ecologies, such as in the four regimes previously outlined. These controversies impose constraints and require compromises.

The regime of spectacle (and to some extent vermin) provides a good example to compare and contrast with the biopolitics of rewilding. As described in §4.2.2, a biopolitics of spectacle or recreation renders decay undesirable in the aesthetic valued tidiness. It is deemed ‘out of place’. In a British context, this “obsession with tidying up” dates back to the Victorians, since when “we have become as intolerant of natural processes of decline and decay (...) as we are of our own ageing and dying” (Tree, 2018a, p. 47). Dead animal bodies (and deadwood) have been historically removed, not only for aesthetic reasons (e.g., a tourist told me at Knepp that rotting carcasses are “disgusting (...) it’s like seeing our body rotting”), but also for welfare and biosecurity reasons (e.g., potential pathogenic transmission), with important ecological consequences. As Tree further explained, in relation to Knepp,

We were particularly keen to leave carcasses on the land rather than carting them off to be incinerated – though this, owing to UK health and safety legislation similar to that in the rest of Europe, would require a special dispensation. The absence of carcasses in the landscape is another lost aspect of natural processes. As a consequence, populations of an entire community of necrophagous insect species such as clown beetles and blowfly maggots, as well as fungi and bacteria, have collapsed. The dead donkey fly, which gets its name from the site of its last British sighting, used to lay its eggs on decaying carcasses at the advanced skin-and-bone stage. It died out completely in Britain once carcasses were no longer left lying around. (Tree, 2018a, p. 73/4)

Elsewhere, some compromises have been met. At the Oostvaardersplassen (OVP), for instance, tensions around removing cadavers (in this case, of cattle and horses) or leaving them to decay led to a compromise solution, as explored by J. Lorimer & Driessen (2013). Initially, site managers at OVP were granted exemption from an act that required the removal of cadavers, embracing infectious and unpredictable ecologies. However, after objections from farmers and public health officials, concerned with the biosecurity risks posed by decay, the exemption was rescinded. Carcasses are to be removed and destroyed. Nevertheless, “the bodies of cattle and ponies that die unplanned and out of sight are left to decay (...) hidden in thickets, away from the gaze and nostrils of passing ecotourists” (J. Lorimer & Driessen, 2013, p. 256). From what was described in relation to a regime of spectacle, the aesthetics of this would be similarly problematic for the New Forest. When talking about deadwood, for example, which shares some similarities with dead bodies in terms of public perceptions about decay, despite the different attitudes towards plants and animals, an ecologist from the Forestry Commission noted that the policy of leaving deadwood in the Open Forest had to be adjusted due to pressures from many people that “just thought it made the woods look untidy (...) [They] would only talk about the mess the woods are in, but ecologically it is extremely beneficial.”

#### **4.3.2 Deer as prey**

In all four modes previously identified, death is induced by human agents through hunting and/or culling, even when rendered unkillable. There are, however, few circumstances that were mentioned, in which it is induced by nonhumans (e.g., dogs) or when deer die naturally. Under a regime of rewilding, on the contrary, the return of predation and of ‘natural death’ to future landscapes is desirable, ideally induced by nonhuman agents. This “ecological conception of life” (after J. Lorimer, 2017) subverts, for instance, the utilitarian logics of a regime of game, which entailed the eradication of nonhuman predators (wolves) as competitors (cf. §4.2.1), or

the logics of a regime of ecology that seek to maintain the essential character and composition of the landscape (cf. §4.2.3).

Similar to leaving carcasses to decay, ‘natural death’ is also controversial. In the UK, as there are currently no wild predators or “natural managers,” as an ecologist working at the New Forest called them, the return of animals like the lynx and wolf has been advocated, albeit very controversially (C. Brown et al., 2011; Monbiot, 2013; P. Taylor, 2005). An ecologist from Natural England told me that the predation of deer, including non-native deer, could even offer “a glimpse of what ecosystems used to be like” and “what the new wild could be like.” As he further explained, “In the UK there are now six deer species as opposed to the two native ones from the mid Holocene. Chinese water deer, muntjac and fallow deer have never been natural prey for the European lynx except perhaps in prehistory (...) but they could be these days!”

As argued by Lorimer, the strategic use of keystone species such as wild predators is the primary political technology underlying environmental or probiotic modes of biopolitics (J. Lorimer, 2017, p. 36). These species might control deer populations and perceived damages (cf. deer as vermin). An ecologist from the Forestry Commission explained that “from a woodland point of view, it [the return of predators to the New Forest] could actually be very beneficial, because predators would keep deer numbers in check and allow trees to get away.” They could act as “human allies,” similar to what John Knight (2006) describes for the uplands of western Japan, in the context of a possible reintroduction of wolves. Knight explains that one of the arguments underlying the proposal for reintroduction by the Tokyo-based Japan Wolf Association is that wolves would benefit farmers and foresters in remote areas as “benign agents of pest control” (J. Knight, 2006, p. 17). They would prey upon and control various animals considered ‘pests’, from wild boar and monkeys that destroy crops to the native Sika deer which damages the timber plantations that dominate the landscapes of upland Japan (J. Knight, 2006, p. 31).

There are, however, important differences between Japan and the European context, notably the distinct roles of livestock in rural economies. Whereas livestock occupies a minor place in Japanese farming, it plays an important role in European mixed farming, wherein wolves are perceived as ‘threats.’ This perception is at the basis of many of the controversies around the conservation and reintroduction of this large predator, perceived as a ‘biosecurity threat’ to agricultural communities (e.g., Buller, 2008, 2013; Drenthen, 2015; Nilsen et al., 2007). For the Forestry Commission’s ecologist mentioned above, this perception would be one of the biggest challenges to the hypothetical return of predators, “particularly if you still have commoning, because the commoners would be worried that predators would interfere with their stock and they would be scared.” The presence of rewilded predators and their “autonomous character” (Ward, 2019, p. 50) has the potential to bring “the monsters closer to our door” (Buller, 2013, p. 189), thereby interfering with a politics of security. It would also be problematic for hunting communities, notably deerstalkers in Scottish Highlands, for whom deer are “an individual asset”, as I was told at Dundreggan estate (cf. §4.2.1).

Besides the direct impacts of predation, proponents of a possible return of the lynx and wolf to the UK for rewilding purposes also mention the resulting restoration of the so-called ‘landscape of fear’: the presence of apex predators would induce changes in the prey’s behaviour, with impacts on the vegetation they feed upon, and ultimately on the whole ecosystem (Cromsigt et al., 2013; Eisenberg, 2010; Forssman & Root-Bernstein, 2018; Laundré et al., 2010). This is what has been described as ‘trophic cascades’, supported by evidence from Yellowstone (Beschta & Ripple, 2016; Ripple & Beschta, 2012), which is nevertheless not consensual (see Marris, 2018). As alternative to these large predators, the use of their domesticated analogues has been proposed. Dogs could be the disturbance agent and keystone species that wolves have not yet been allowed to perform due to their (epi)genetic relation, although “dogs can never become wolves through rewilding: evolution is a forward moving

process” (M. Hall, 2014, p. 32). Dogs-as-wolves would be ‘made live’ as generative of desirable ecologies – ‘ecologies of fear’, in this case<sup>81</sup>. As I was told by an ecologist from the National Trust, when explaining the use of dogs to generate these ecologies: “There is no situation where deer are not afraid of dogs because they are effectively like wolves and other big predators. And that can be life-threatening, but also involves huge energy loss, potentially.” In fact, dogs seem already to be creating disturbance and/or predating in the New Forest, although not deliberately<sup>82</sup>, as noted by a member of the Forestry Commission’s wildlife management team:

you’d be surprised that (...) people’s pet dogs kill an awful lot of deer every year, much more than we know about, but they are probably killing young fawns or very young deer [probably 30% of the youngsters]. (...) they are probably taking over the role of what wolves and other predators would have done in a natural environment.

However, using dogs deliberately for this end would be controversial. It raises tensions with biopolitics of conservation, welfare, biosecurity, or even hunting and spectacle, which tend to privilege fixity and form rather than processes. At the New Forest, for example, dogs are at the core of heated tensions between dog owners/walkers and the Forestry Commission, Verderers and conservationists. Whereas dog owners advocate for their dogs to ‘run freely’, without leads, ecologists consider that dogs can have detrimental impacts on wildlife if not kept under control (cf. K. M. Brown, 2015; Tree, 2018a, p. 292/3). As I was told by a member of the Hampshire & Isle of Wight Wildlife Trust,

[P]eople with dogs are interfering with the life cycles of wildlife to a point where they can't complete their life cycle. So a ground-nesting bird is disturbed on the nest, and it prejudices its ability to rear healthily; or wintering birds, something like Hen harriers (...) by disturbing them you reduce their ability to enter the breeding season in a fit condition.

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<sup>81</sup> On this note, some ecologists have suggested novel approaches to deer management beyond ‘hunting to kill’, such as ‘hunting for fear’ (Cromsigt et al., 2013). This would include, for example, training domestic dogs to simulate the behaviour of wolves.

<sup>82</sup> The last fallow buck hunted in the New Forest with buckhounds dates back to 1997 (Fear, 2016, p. 152).

The fact that hunting with dogs has been banned after pressures from many UK conservation organisations can raise additional problems. The aforementioned ecologist from the National Trust, who was involved in those pressures for banning, summarised this issue as follows: “Whether or not we can actually make use of dogs to generate that landscape of fear is a hugely sensitive issue.”

Elsewhere, compromise solutions have been proposed. For example, at the OVP, animals began dying of starvation following a quick increase in the populations of the large herbivores in an enclosed area, which raised protests from animal welfare organisations. Whilst a biopolitics of welfare privileges individuality, under a biopolitics of rewilding “the welfare of an individual animal (...) [is] secondary to their role as an ecological and evolutionary force” (J. Lorimer & Driessen, 2013, p. 256). A partial solution between these two forms of biopolitics was arrived at: a ranger, armed with a silenced rifle, examines the animals with the ‘eye of the wolf’ and kills those that will not survive the winter (J. Lorimer & Driessen, 2013). This simulation, however, does not replicate “the multispecies affective landscapes—of fear and calm—associated with predator-prey dynamics” (J. Lorimer, 2020).

At the New Forest, an ecologist from Natural England told me that deer are culled and managed to “re-create what the top predators would do, which is shoot the deer, basically.” Contrary to the ‘eye of the wolf’, however, most of the deer that are culled in the New Forest are healthy ones (cf. §4.2.3), as explained by a member of the wildlife team:

It is a common misconception that there is a lot of sick and injured animals. In our population out there, sick or injured deer would form less than 1 in 200. So it is a very, very insignificant number. Nearly all the deer we cull are good, healthy deer. If we saw a sick or injured one, obviously we would cull that one first, but as I was saying, generally the population is fine and healthy.

Although culling does not replicate ‘natural death’ nor ‘landscapes of fear’, it can nevertheless induce changes in the behaviour of deer that can, in turn, interfere with their management (cf. §4.2.2). A member of the Verderers told me, for instance, that during the culling season deer are seen more often in people’s gardens (e.g., muntjac) or in fields closer to houses:

When the shooting is going on in particular, the deer would go into there [a field near the house] to be safe. They come back onto the forest on occasion, probably do it daily in fact, but in the case where I am, the keeper lives just down the road from me and I could say to him: "Oh, I can see the deer coming onto the forest." But, you see, (...) it is not a place where he can shoot very easily, because there are houses [around] (...) and there is a road pass the house, and, you know, there are going to be people about. It is not a place where he can easily shoot. And so it is very difficult to shoot those deer. They know that if they stood back over there they are safe.

At Dundreggan estate, my fieldwork coincided with the onset of an experiment aimed precisely at simulating ‘landscapes of fear’ with human volunteers (*Project Wolf*, described in §3.1.3). Like in England, the use of dogs for hunting is illegal in Scotland. Moreover, as I was told by one of the estate managers, “even if we use dogs not for hunting but only to scare deer, we would need to keep dogs with leash. They are not easy to control. People are much easier.” One of the main objectives of this project is to minimise the conflicts with neighbouring estate owners. For the latter, less culling means larger populations of red deer and thus more profit. In these deerstalking estates, as was the case of Dundreggan until 2008, deer receive supplementary food to encourage large populations to linger on their land. Similar to the regime of game described above (§4.2.1), the owners defend the idea of an open landscape (of calmness) to ease hunting. On the contrary, Dundreggan managers want more culling, or at least less deer, to protect tree seedlings and allow regeneration – death to summon life, similar to deer as ecological agent (§4.2.3).

The emphasis is not on deer, as individual or population, but on the woodlands. Culling, I was told, aims to mimic, as far as possible, natural predation “by selecting the weakest animals,”

contrary to the four regimes previously explored for the New Forest case. *Project Wolf*, in turn, seeks to induce changes in deer behaviour and use of space. It entails regular walks by a group of volunteers through the woodlands at night, at different times and following different circuits, to push deer further away from the area where trees have been/are being planted ('regeneration area') and to scare them, for instance with little explosives or sounds. Through *Project Wolf* during the close season, combined with culling, the managers hope to "put fear [back] on the hill" (**Figure 35**), allowing not only the rewilding of the landscape, but also of red deer, which are now "too domesticated," according to one of Dundreggan's managers, speaking about their behaviour. One of the main difficulties of the project has been the 'resistance' of deer, which "don't seem to be scared of anything," one of the volunteers told me. In the beginning, the volunteers were using torches to scare them, but soon realised that, as torches are also used for hunting, deer were already used to them and their sole reaction was to 'freeze' and then "go back to nibbling."



**Figure 35:** 'A manifesto for humandwolves' (Risograph poster by Alec Finlay, photograph by Mhairi Law; reproduced with permission)

Interestingly, the use of dogs and humans instead of wolves to mimic their ecological impacts is illustrative of something that is at the core of environmental modes of biopolitics. This is what Lorimer terms an “ecological concept of life,” which is “concerned more with processes of movement, circulation and interaction than with the essential character and composition of its constituent forms. Nonhuman species are secondary to the functions and services they deliver through their systemic effects” (J. Lorimer, 2017, p. 32). In this case, although wolves would be preferred, notably for their perceived wildness and as a symbol of what Henry Buller terms “revitalized naturalism” (2013, p. 194), it is their ecological role that matters. This gives scope to ‘replaceability’, wherein dog and human agencies replace the functions that would be delivered by wolves, under controlled conditions.

The examples mentioned in this section illustrate some of the possible ontological politics at the interface of multiple modes of understanding disturbances. Of particular importance are the tensions between ‘securing’ and controlling the forms and lives of individual organisms and/or populations, and deliberate efforts to engineer ecologies through the introduction of keystone species or disturbances that could initiate (missing) ecological processes, as advocated in rewilding (cf. Biermann & Anderson, 2017; Buller, 2013; J. Lorimer, 2015, 2017; J. Lorimer & Driessen, 2013).

#### **4.4 Conclusion**

Throughout this chapter, I have concentrated on the ontological politics of governing deer as part of different disturbance regimes, using examples from the New Forest’s history, since the 11<sup>th</sup> century. To this end, I outlined four distinct, sometimes overlapping disturbance regimes, based on the ways through which deer have been enacted: deer as *game*, *spectacle*, *ecological agent*, and *vermin*. These regimes are not sequential, but can exist simultaneously. For instance, deer

are currently governed as a lively spectacle, ecological agent and vermin, albeit guided by distinct, or at times similar, logics and practices. Although the regime of game corresponds, in the case of the New Forest, to a specific historical geography, it nevertheless still occurs in other geographies, such as in Scotland, together with the other regimes. These regimes can also ontologically ‘disturb’ one another. For example, during the period of Plantation Forests, the regime of vermin rendered all deer killable, to be exterminated (‘let die’) but this logic ran counter to ecological logics (deer as ecological agents, as suppressors of natural regeneration), which deems their unkillable (§4.2.3).

For each of these regimes, I explored the spaces and roles historically allocated to deer (‘control over life’) and how these are sometimes disrupted by their unruly agencies and rhythms, considering the intertwined and complex human and nonhuman histories (Tsing, 2015, 2017b). As vermin, for instance, deer have resisted and unsettled this mode of ordering throughout history by breaking through fences, seeking refuge in safe places during the culling season or even increasing their population despite efforts to eradicate them (e.g., muntjac). Drawing on contemporary and historical materials, I then analysed the impacts of such biopolitical modes on the forest socio-ecologies, either desirable or undesirable, predictable or unpredictable – the *ideals* or *monsters*, respectively, following J. Lorimer and Driessen’s (2013) teratological approach to bovine modes of biopolitics.

Considering the four dominant regimes, there are some comparisons worth noting. For instance, under the regimes of spectacle and ecology, deer are deemed desirable and thus unkillable for particular human orderings within a controlled and pre-defined set of objectives: deer as spectacle, where their aesthetic and recreational values render them tame and therefore amenable to control; deer as ecological agent, as a living grazing tool, in forestry and conservation forms of biopolitics that aim to maintain the present *status quo*. When deer disrupt these objectives, they become a threat and are thus rendered killable and disposable, to be ‘let

die', as analysed in the last category (deer as vermin). Likewise, under a regime of game, deer are also made killable and killed, but as a resource.

As game and spectacle, deer are enacted primarily as a resource, to be consumed, and this mode of governance has important ecological implications on the landscape and species distribution. They are not targeted primarily as disturbance agents, as happens in the two other regimes. However, whereas in the case of deer as ecological agent their disturbances are deemed valuable and desirable, as vermin they are devalued because they generate undesirable outcomes for some. In all four regimes, death is induced by human agents, with few exceptions, and dead bodies are removed, for utilitarian and/or aesthetic reasons. In the final section, I proposed a fifth disturbance regime: deer as *agents of rewilding*. Under a regime of rewilding, both alive and dead deer are valued as an integral part of the ecosystem due to their ecological roles and functions in reorganising dysfunctional political ecologies. Herein, nonhuman individuals and species are secondary to their functions and ecological effects, which gives scope to their 'replaceability'. I tentatively explored the possible connections, tensions and compromises between the four main regimes and the biopolitics of rewilding in relation to two missing processes from British landscapes: decay and predation.

Attending to the multiple, sometimes conflicting ways in which disturbances have been and are biopolitically classified throughout history, their ecological effects and needed compromises, and their disruptive agencies, enables noticing the various processes through which landscapes are made and remade, and what might be possible in the future. It enables noticing what Bubandt and Tsing call 'feral dynamics' – "anthropogenic landscapes set in motion not just by the intentions of human engineers but also by the cascading effects of more-than-human negotiations" (Bubandt & Tsing, 2018b, p. 1). Likewise, as Forssman and Root-Bernstein (2018) suggest in their analysis of the management of a Danish landscape for deer hunting, it is not just anthropogenic forces (i.e., land management or lack thereof) that shape the landscapes and

affects dominating other species' lives. 'Weedy species' like deer co-create the structure of the landscape and "the aesthetics and goals of landscape management" (Forssman & Root-Bernstein, 2018, p. 73). This opens up the scope of biopolitics, beyond more traditional, anthropocentric understandings of it as merely human efforts to control life, providing useful resources to grasp contemporary modes of wildlife management and rewilding practices. It also attends to the synergies between bio-, geo- and socio-political regimes, the latter of which has been missing from biopolitical analysis, thus contributing to some of the literatures mentioned in §2.2.

Underlying the multiple biopolitical regimes or 'modes of relating' (J. Lorimer & Driessen, 2013) are not only competing and overlapping valuations of life (to foster or to let die), as explored here, but also competing visions of how 'life' is known. It is to these modes of knowing that I turn in the next chapter.

## CHAPTER 5. Knowing disturbances

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[We] need to pay attention to the assessments through which we know disturbance. Disturbance is never a matter of “yes” or “no”; disturbance refers to an open-ended range of unsettling phenomena. (Tsing, 2015, p. 161)

We don't know the future but everybody acts into the future. (...) What actually happens is entirely contingent, and contingency is indeed one of the biggest factors in all history. (Arendt, 1978)

Disturbance, as Anna Tsing argues in the quote in the epigraph, is never a matter of *yes* or *no*. It “matters in relation to how we live” and, in this sense, “no single standard for assessing disturbance is possible” (Tsing, 2015, p. 161). Different ‘ways of life’ are therefore related to distinct ways of knowing and assessing disturbances.

In wildlife conservation and forest management, the ways through which disturbances are and have been known and enacted sit on a continuum between two ‘philosophies’. These are, to use Callicott et al.’s (1999) terminology: compositionism and functionalism. Conventional, and still widespread, approaches (‘command and control’) tend to be positioned on the compositionist end of the continuum. The aim is to preserve and control the present composition of ecological assemblages, drawing on the equilibrium ecology model described in the introductory chapter of the thesis (§1.2.1) and the authority of ecologists. In fact, ecology, and more recently economics, have played a central role as a tool for understanding what nature *is* and for determining what it *ought to be* (Adams, 1997; Martin, 2015). These approaches rely upon positivistic modes of knowing that render disturbances calculable, predictable and, therefore, amenable to control (Adams, 1997; Wagner et al., 2014). The shift towards ‘nonequilibrium ecology’ that was explained in **Chapter 1** has challenged these compositionist approaches. So has the rise of an increasingly volatile, uncertain and “biogeographically promiscuous” conception of the nature of the world (Hinchliffe & Lavau, 2013, p. 259), which

creates space for less desirable disturbance regimes that might pose biosecurity and economic risks (e.g., predators, zoonotic and tree diseases, invasive species). Such challenges call for more speculative and open-ended approaches to knowing, monitoring and governing disturbances that are closer to the functionalist end of the continuum – what Lorimer and Driessen (2014) call ‘wild experiments’ (explained in §2.3.1). Rewilding initiatives provide an example of these, at least in theory (cf. J. Lorimer & Driessen, 2016). According to Bruce Braun, rewilding is “a journey into the unknown, a wager on what might work, for how long, and with which effects” (2015a, p. 108). Functionalist approaches tend to embrace the uncertainty and contingency of nonlinear ecologies and demand new and multiple ways of knowing, not all of which are scientific or even human (J. Lorimer, 2015; J. Lorimer & Driessen, 2014). In practice, however, I will demonstrate that this sharp distinction between compositionalist and processual logics is not as clear-cut<sup>83</sup>.

Notwithstanding their differences, both epistemologies are geared towards governing present ecologies in the name of speculative futures – acting into the unknown future, to borrow from Hannah Arendt (1978) in the opening quotation. They are based on particular ways of imagining future ecologies, which then determine how futures are anticipated, acted upon (or not) and ultimately enacted. Whereas in a compositionalist approach the aim is to ensure that there are no undesirable and *dystopian* surprises, in a functionalist model the aim is to be “taken by surprise” (Braun, 2015a), which raises specific epistemic (and political) challenges.

With these considerations as background, this chapter aims to explore the knowledge practices through which disturbance regimes (large herbivores) are known and acted upon by ecologists and forest managers, in their multiple spatiotemporal dynamics. In so doing, it responds to the

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<sup>83</sup> For instance, the so-called adaptive management or ‘learning-by-doing’ (e.g., Holling, 1978; Walters & Holling, 1990) is often compositionalist, with fixed species or habitat targets to be achieved by prescribed restoration activities or through natural processes, but relies on open-ended, uncertain and flexible approaches.

second research question of the thesis. The chapter draws together disparate insights from the geographies and sociologies of knowledge, and the burgeoning fields of future and biosecurity studies, in relation to risk and uncertainty. It engages in particular with: Jamie Lorimer and Clemens Driessen's (2014) concept of 'wild experiments', further developed by Bruce Braun (2015a); Steve Hinchliffe and Stephanie Lavau's (2013) analysis of the geographies of knowing and the practices involved in securing life; Ben Anderson's (2010) concept of 'anticipatory action' in relation to governing the future; and Vinciane Despret's (2013, 2015) analysis of different 'ways of doing fieldwork' within ethology.

The analysis is empirically grounded in interviews, secondary data and participant observations related to three methods deployed in the case studies to assess large herbivores' populations and/or impacts: the New Forest Deer Management Plan, the Herbivore Impact Assessment method at Dundreggan estate, and the Available Edible Fodder survey at Knepp estate. For the purposes of this chapter, the first one is considered an archetype of the mainstream compositionalist approach to nature conservation and forest management, while the other two are combined and treated together as examples of the functionalist approach to knowing of rewilding practices, notwithstanding some differences between them.

The chapter first introduces two sets of knowledge practices that are enacted in the case studies: *calculating disturbances* (New Forest) and *experimenting with disturbances* (Knepp and Dundreggan estates). I then compare and contrast these based on two analytical axes: *deduction–induction* and *objective–subjective*. They concern the modes of reasoning which ecologists and forest managers rely upon and draw together in the two sets of knowledge practices. These modes of reasoning determine the methodologies followed and inform how emergent and unanticipated ecological properties are conceived. Rather than binaries, these axes list variables that are differently conjoined in the practices here analysed (cf. J. Lorimer & Driessen, 2014).

## 5.1 Knowledge practices

In this section, I describe two sets of knowledge practices through which ecological disturbances, large herbivores in this case, are known in order to be acted upon. I term these *calculating* and *experimenting with* disturbances. The first term derives from Ben Anderson's (2010) concept of "calculating futures" as a form of anticipating uncertain and contingent futures. For Anderson, ubiquitous calculative practices occur through a range of techniques that "take a measure of the world, (...) [i.e.,] statements about the indeterminacy of the future are combined with non-linear, or stochastic, calculations of relations, associations or links" (B. Anderson, 2010, p. 784). To illustrate the characteristics of calculative practices, I use the example of the New Forest Deer Management Plan. Herein, measurements and calculations are used to understand, manipulate and control deer as part of the forest's disturbance regimes, in order to deliver desired ecological conditions. Deer are statistically framed as a dynamic disturbance to be counted and scientifically modelled and calculated. This is similar to the corncrake census traced by J. Lorimer (2008, 2015) or the red wolf recovery program explored by Braverman (2014a), both of which are nevertheless focused on the population level and not on disturbance regimes. In turn, the term *experimenting with disturbances* draws on the concepts of "wild experiments" developed by Lorimer and Driessen (2014) and "experimental turn" explored by Braun (2015a) (see §2.3.1). My description of these experimental practices draws on the surveys undertaken in the rewilding sites, based on a speculative and adaptive 'learning-by-doing' approach.

Below, I describe how these practices are enacted in the case studies. At the New Forest the focus is on assessing and monitoring deer populations, while at the two rewilding sites the focus is on monitoring their impacts on vegetation and natural regeneration. This difference is relevant as it illustrates the distinct and contrasting foci of conventional and rewilding

approaches to forest management, as mentioned above: on present ecological composition or ecological processes, respectively.

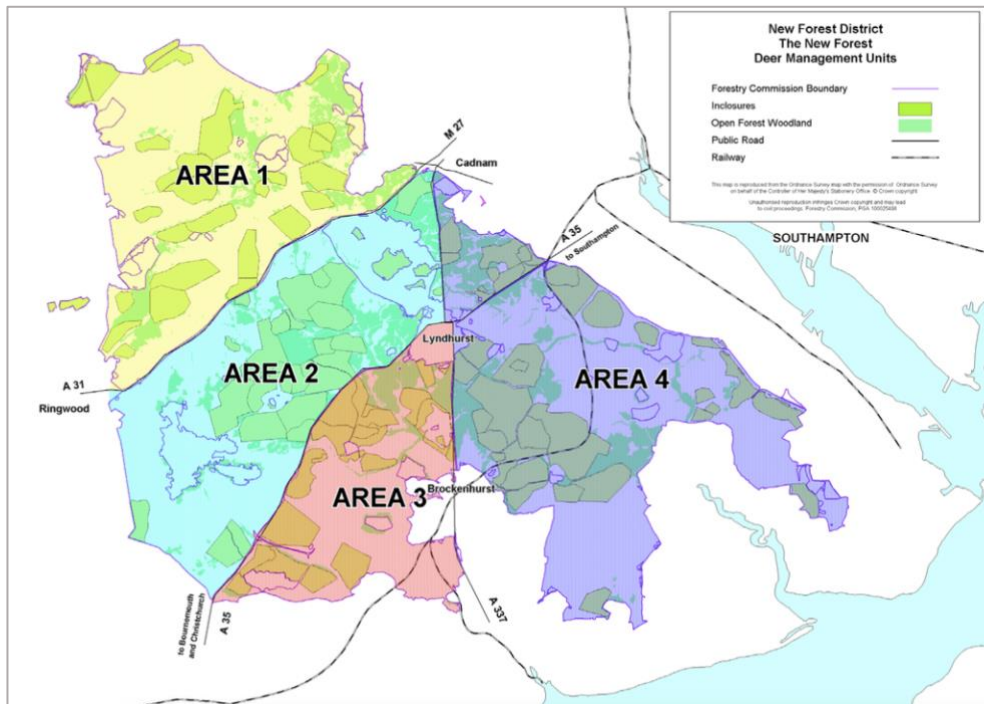
### 5.1.1 Calculating disturbances

Calculative practices have been central to *modern* ways of governing life, as explained in §2.2.1 and §2.3.1. According to Ben Anderson (2010), they are one of the three “anticipatory actions” through which futures are known and made present. Calculative practices encompass a “numericalization of a reality to come” (B. Anderson, 2010, p. 784). They draw on standardized monitoring and assessment methods, in the form of statistics, which, following Foucault (2007), have played an important role as biopolitical, regulatory technologies to manage and regulate the state’s population (cf. §2.2.1). Futures are rendered actionable and controlled through the domain of number.

The **New Forest Deer Management Plan** provides a compelling example. At the New Forest, deer management has been primarily approached through culling, underlying which there is an annual population assessment of the five deer species (fallow, red, roe, sika and muntjac deer). The overall aim is “to maintain numbers of each species at levels judged to be compatible with maintaining healthy populations of the animals themselves, yet at levels consistent with other demands upon the area” (R. J. Putman & Langbein, 2000, p. 290/1). Recalling the typology of disturbance regimes presented in the previous chapter, the aim is to manage deer (as ecological agent/spectacle) to a pre-set level that is considered acceptable by forest managers and other stakeholders. Beyond this, they would become ‘vermin’, a term that extends to the non-native species.

Management also aims to curb the further spread and expansion of deer populations in the New Forest (Page, 2015). To this end, the Crown land is divided into four deer management areas, along major physical boundaries (**Figure 36**). These areas are further broken down into

10 management units – or beats – to aid “in the effective recording and reporting of deer deaths through culling, road traffic collisions or other deaths” (Page, 2015, p. 3/4). Each keeper is responsible for an individual beat.



**Figure 36:** Map of the Crown land showing the four deer management areas (Source: New Forest District, 2007)

The population assessment encompasses two practices through which deer, as part of the New Forest’s disturbance regimes, are rendered *visible* and *manageable*: counting and calculation. As will be described in more detail in §5.2.1, the first comprises collecting quantitative information about deer numbers through an annual visual census. Information for each beat is then translated into a number, which provides an estimate of the current population size, per area (Table 7). To predict the population in the following year, these numbers are further inserted into a computer database, where the second practice takes place: calculation of population size in the autumn (post-breeding) and culling levels, based on the difference between the former and the target population (Table 7, in grey). This population assessment is complemented by an annual assessment of deer damages to trees. It is carried out in the spring, particularly on the

restock sites<sup>84</sup> that had been planted in the last 5 years. However, as I was told by a member of the Forestry Commission’s wildlife team, “they just tell you that you’ve got deer that are moving through and browsing on that particular restock site, (...) they don’t tell you anything [else]. From my point, it doesn’t help me to assess the population, really.”

|                                           | Area 1       | Area 2       | Area 3       | Area 4       | Total                       |
|-------------------------------------------|--------------|--------------|--------------|--------------|-----------------------------|
| <b>Fallow deer</b><br>(Target population) | 244<br>(210) | 238<br>(210) | 256<br>(170) | 309<br>(210) | <b>1047</b><br><b>(800)</b> |
| <b>Roe deer</b><br>(Target population)    | N/A          |              |              |              | <b>394</b><br><b>(400)</b>  |
| <b>Red deer</b><br>(Target population)    | 0<br>(0)     | 24<br>(50)   | 81<br>(75)   | 0<br>(0)     | <b>105</b><br><b>(125)</b>  |
| <b>Sika deer</b><br>(Target population)   | 0<br>(0)     | 0<br>(0)     | 0<br>(0)     | 87<br>(70)   | <b>87</b><br><b>(70)</b>    |
| <b>Muntjac</b><br>(Target population)     | N/A          |              |              |              | <b>50</b><br><b>(0)</b>     |

**Table 7:** Number of individuals of all deer species counted in the 2013 visual census and target population levels, in grey, for the period 2014-2020 (Data retrieved from: Page, 2015)<sup>85</sup>

In brief, calculative practices underlying deer management at the New Forest are associated with modes of knowing that combine past and present knowledges to anticipate and govern future ecologies. The numbers generated by counts and population modelling dictate a desired number of animals to be culled, based on a prediction of the effect of culling on future populations. Life and death, in this case, become the products of calculations – a “calculated management of life,” in Foucault’s words (1984, p. 261).

### 5.1.2 Experimenting with disturbances

Experimental practices draw on more speculative, exploratory and performative practices. At Knepp and Dundreggan estates, the aim is to revert the depleted landscape from previous

<sup>84</sup> These are areas where new trees had been established, mostly through planting or allowing/facilitating natural regeneration, following the felling of grown ones.

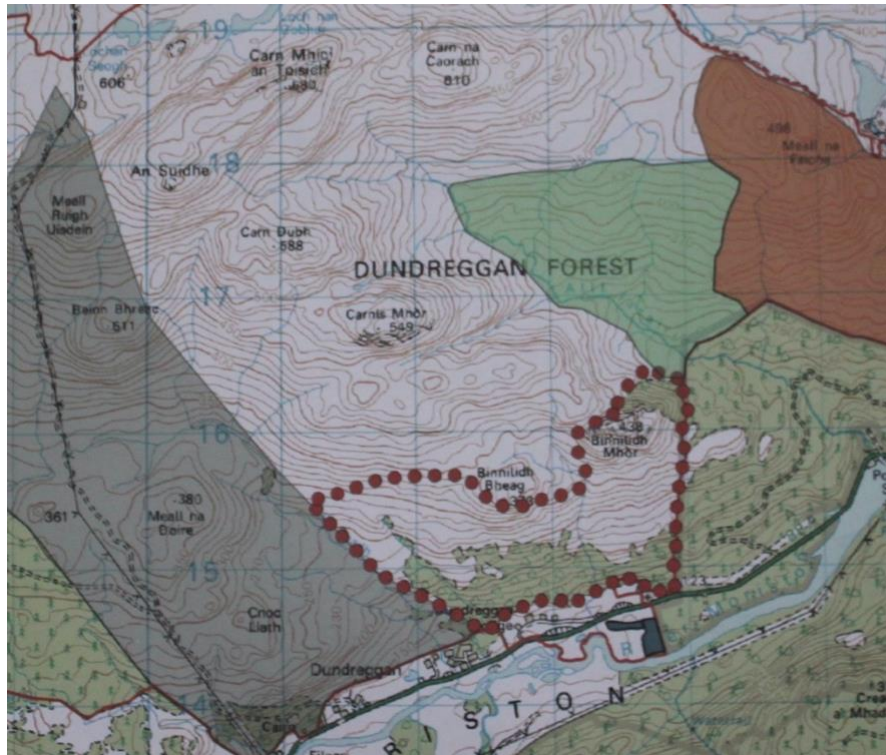
<sup>85</sup> The numbers per area for roe deer and muntjac were missing in the original source.

management<sup>86</sup> and allow nature “to express herself,” as an ecologist told me. Although they are not goal-oriented, these experiments are nevertheless geared towards desired systemic properties, notably a more dynamic, biodiverse and healthy ecosystem. For instance, at Knepp, the owners, resident ecologist and members of the Advisory Board speculate that the restoration of vegetation communities through grazing, browsing and rootling will contribute to the (re-)establishment of a greater variety of species of flora and fauna and, consequently, a dynamic and rich *mosaic* or *kaleidoscope* of habitats. Crucial to both projects is getting the ‘right’ balance between animal disturbance and vegetation succession. It is here that the surveys that I followed play a role. Both focus on vegetation to monitor the progress and development of the open-ended projects. Besides the underlying openness, these experimental practices draw on detailed observations, rather than measurements and calculations. They are multi-sensorial, as will be explored later in the chapter.

At Dundreggan, the **Woodland Herbivore Impact Assessment method** has been applied since 2015 to assess and monitor the impacts of red deer at the so-called priority natural regeneration zone (**Figure 37**). This is geared towards an adaptive, flexible management of these herbivores, while tracking the consequences of changes in land use and management. This observational technique focuses on two indicators: woodland structure and current herbivore impact. The former is broad in scope, while the latter is more specific. Woodland structure reflects current and past impacts of management and browsing on the woodland, indicating the current habitat condition (Armstrong et al., 2014). Current herbivore impacts, in turn, refer to the impacts since the last growing season, “play[ing] a major role in determining how the woodland is going to change in the future” (Armstrong et al., 2014). The assessment of these impacts will be described in the next section.

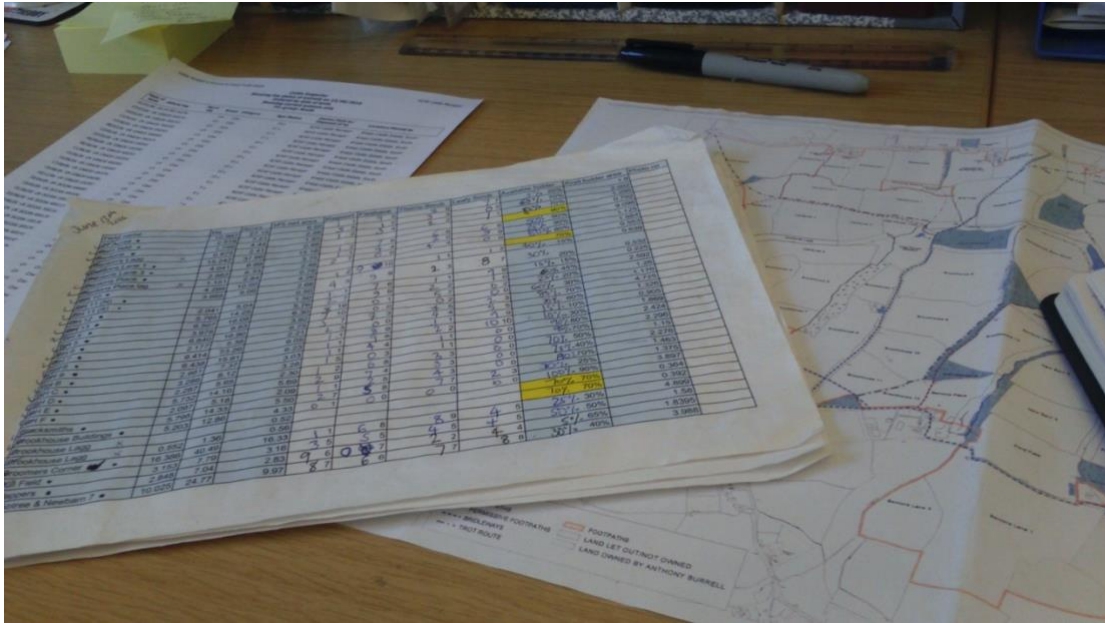
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<sup>86</sup> As already mentioned, Dundreggan was a deerstalking area until 2008 and Knepp was a dairy farm until 2004.



**Figure 37:** Map of Dundreggan, with dotted area where the impact assessment is carried out

At Knepp, the **Available Edible Fodder survey** has been undertaken since 2013 and conducted thrice a year (June, August and October). It is part of the ecological monitoring strategy for the Southern Block of the estate (i.e., the rewilding site; cf. §3.1.2). The aim is to understand the impacts of the disturbances generated by grazing animals on vegetation, while assessing the available coverage of edible fodder for the animals. The survey involves assessing and recording in a spreadsheet (**Figure 38**) the abundance of non-edible fodder (common ragwort (*Senecio jacobaea*), common fleabane (*Pulicaria dysenterica*) and thorny scrub) and edible fodder (leafy scrub), for each of the 76 unfenced fields in the Southern Block. It is further complemented by fixed-point photography. As Knepp’s resident ecologist explained, it is a “sort of qualitative method that allows monitoring how vegetation changes over time.” It entails taking a series of photographs in the same direction, ideally at the exact same points (cf. Howorth, 2011). A GPS is used to identify these when needed.



**Figure 38:** Spreadsheet and map that were used during the available fodder survey, at Knepp

Both cases are examples of what Bruce Braun calls “experiment[s] in procedure,” which he describes as “iterative and pragmatic [processes], starting in the middle of things and learning from moment to moment,” in situations of ecological and political uncertainty (Braun, 2015a, p. 109). Future ecologies are enacted through an adaptive ‘learning-by-doing’ approach, as I was told by one of Dundreggan’s managers. This involves, according to Knepp’s resident ecologist, “continually assessing and tweaking our approach, learning as we go.”

## 5.2 Calculative and experimental practices: a comparison

This final section is focused on a comparison between the two knowledge practices previously described (*calculating* and *experimenting with* disturbances). This comparison is structured around two axes, which I tentatively call: *deductive-inductive* and *objective-subjective* (**Table 8**). As explained in the introduction, these concern the modes of knowing that ecologists, conservationists and forest managers rely upon and draw together.

|                        | Calculating disturbances                                                                | Experimenting with disturbances                                                               |
|------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Deduction - Induction  | Deductive<br>Target-led, prescriptive<br>Measurements<br>Estimates<br>Predictable/Order | Inductive<br>Open-ended, speculative<br>Observations<br>Guestimates<br>Unpredictable/Surprise |
| Objective - Subjective | Objective<br>'Knowledge of'<br>Building<br>Visual perception, abstraction               | Subjective<br>'Knowing around'<br>Dwelling<br>Multi-sensorial                                 |

**Table 8:** Comparative summary of the two sets of knowledge practices

Aware of how weighty these terms are, namely in the framework of philosophy of sciences, it is worth mentioning that the focus here is solely on how they are enacted within conservation and forest management, particularly in the assessment methods previously described. I therefore align with an STS-type of approach to knowledge as practice, drawing on the concept of enactment, with its emphasis on multiplicity (see §2.3).

Whereas the knowledge practices in the New Forest example are closer to what I describe as deductive and objective, the rewilding experiments are more aligned with what I describe as inductive and subjective. However, neither conforms entirely to one end of the continuum, as explained below.

### 5.2.1 Deduction–Induction

One of the main differences between calculative and experimental practices concerns the modes of reasoning scientists and managers rely upon. These concern not only “any process of drawing a conclusion from a set of premises” (Blackburn, 2008), but also a “method of doing science” (Godfrey-Smith, 2009, p. 236) and views about the “credibility of scientific hypotheses” (Audi, 1999, p. 700). They range from deductive to inductive modes, which then inform methodologies and how unpredictable and uncertain future ecologies are acted upon.

Before explaining what deduction and induction mean in practice, it is important to briefly explain how they are understood within the philosophy of science. Whilst deduction is a “process of reasoning in which a conclusion is drawn from a set of premises” (Blackburn, 2008), in induction “particular cases are used to argue for a generalization that goes beyond the cases observed” (Godfrey-Smith, 2009, p. 236/7). In terms of ‘models of science’, in the hypothetico-deductive model “theories are first arrived at as creative hypotheses of the scientist’s imagination and only then confronted, for justificatory purposes, with the observational predictions deduced from them”; in an inductive model, “the very discovery of hypotheses is somehow ‘generated’ out of accumulated observational data” (Audi, 1999, p. 700). What this means when it comes to assessing disturbances is that in a deductive mode, the scientist draws on a set of predictable habitat and species targets set *a priori*, against which outcomes are evaluated. This is the case of deer population assessment in the New Forest. In turn, inductive modes rely on a ‘learning-by-doing’ type of knowing in which the scientist draws upon open-ended and more flexible approaches that work with unpredictable ecological trajectories.

The continuum of “ways of doing fieldwork” proposed by Despret (2015) in her ethnographic analysis of ethologists studying Arabian babblers (*Argya squamiceps*) is useful here. This continuum has at its poles what she terms *a prioristic* and *a posterioristic* methodologies. When using the former, the researcher goes into the field with a hypothesis, derived from previous research and theories, that is to be tested empirically. In the latter, on the contrary, without an explicitly formulated hypothesis before going into the field, the researcher collects anecdotal facts and tries to make sense of them by creating links. The latter gives scope to surprises, to what has not been anticipated, similar to the concept of “wild experiments” (J. Lorimer & Driessen, 2014) explained in §2.3.1. Below, I compare and contrast the characteristics of deductive and inductive modes of reasoning as practiced in the case studies. I focus on the

assessment of deer populations and their impacts, as well as on how unpredictable and emergent ecological properties are conceived in calculative and experimental practices.

### **Counting disturbances**

In the New Forest, one of the main components of the Deer Management Plan is the assessment of deer populations, through counting and calculating. Both processes draw upon standard, repeatable and statistical methods to assess the abundance and densities of deer populations over the years. Counting and calculating enable populations to be modelled, providing a “good relative index of deer numbers and trends over time” (R. J. Putman & Langbein, 1999, p. 84). To this end, they also rely on data from previous assessments<sup>87</sup>, which are stored in a database that allows comparing results and analysing trends. Databases such as these play a particularly important role as knowledge technologies or “epistemic objects” (B. Anderson, 2010). They are a “working archive of knowledge” that orders and connects information and action, the conceptual and material (Bowker, 2000, p. 644).

Population assessments start with the keepers collecting data in their respective beats (number of deer of each species, sex and approximate age-class). This is done through two complementary censuses or population estimation methods that are attuned to deer daily and annual cycle of life, both of which involve direct counts: an annual visual census in the spring (pre-breeding season), backed up by thermal image counts. As most species of deer are increasingly becoming nocturnal animals due to pressures from recreational disturbances in the New Forest (*pers. com.*), the use of thermal imaging cameras allows counting at night, complementing what the keepers count in the early morning or late evening. The need to use these cameras as a response to deer behavioural adaptations to recreation provides an interesting example of “dextrous synchronisation” (Brice, 2014, p. 947) between human and

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<sup>87</sup> The earliest census of deer dates from the 17<sup>th</sup> century and there have been regular annual censuses since 1960s (Insley & Clarke, 1975).

nonhuman bodies and activities. Cultural and ecological disturbances jointly participate in enacting and knowing landscapes: recreational encounters disrupt deer behaviour which in turn disrupts how they are known. In this ‘multispecies attunement’, deer agencies become perceptible when a behavioural change demands a change in human conduct (cf. Brice, 2014).

The numbers arising from these censuses are nevertheless an estimate. As a member of the Forestry Commission’s wildlife team pointed out,

We try to find an exact figure as we possibly can. (...) Once you’ve got the census of what we visually have seen on the ground, we know that it is the minimum. It’s never going to be all of the deer, so we know it’s only a proportion of the deer that are out there, the ones that are seen.

The Head Keeper aggregates and enters the data collected by the keepers into a computer database (Excel spreadsheet). The main input data corresponds to the censused deer numbers in spring, broken down by sex and age-class (<1 year, 12-24 months and  $\geq 2$  years). These are then combined with culling records from the previous season. Recruitment rates (i.e., projected natural increase) and natural/unrecorded mortality rates are then calculated using predefined parameters which vary according to species (**Figure 39**). Using basic interlinked formulae within the spreadsheet, the likely population size in the autumn (post-breeding) is calculated and predicted. Drawing on this computer modelling, the number of animals to be culled next year is then calculated “to deliver a desired change in population size and structure” (R. J. Putman & Langbein, 1999, p. 4). The target cull levels correspond to the difference between the estimated post-breeding population sizes and a ‘desirable’ population density. The latter is based on the levels judged to be compatible with maintaining healthy populations of each species of deer, yet at levels that are anticipated to allow tree regeneration. This level is agreed between the Forestry Commission, neighbouring landowners and other stakeholders.

|                                                                                                                                                                                                                                                            |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <u>ii) Reproductive success:</u>                                                                                                                                                                                                                           |            |
| Calving rate for Does which are 2 year or older at rut :                                                                                                                                                                                                   | <b>85%</b> |
| Calving rate for Does which are 16-18 month old at rut :                                                                                                                                                                                                   | <b>65%</b> |
| <u>iii) Unrecorded mortality:</u>                                                                                                                                                                                                                          |            |
| Natural/unrecorded' fawn mortality during first year:                                                                                                                                                                                                      | <b>15%</b> |
| Natural/unrecorded' mortality of Does 1 year and older :                                                                                                                                                                                                   | <b>5%</b>  |
| Natural/unrecorded' mortality of Prickets and Bucks :                                                                                                                                                                                                      | <b>10%</b> |
| <u>iv) Cull scenario (may be varied to test likely outcomes):</u>                                                                                                                                                                                          |            |
| (Cull figures taken to include 'known' loss to RTAs, poaching, etc. as well as legal shooting cull; and entered here as a set percentage of the predicted (autumn) population likely to be available after allowing for 'natural' losses as entered above) |            |
| Cull of remaining Hinds:                                                                                                                                                                                                                                   | <b>35%</b> |
| Cull of remaining Calves :                                                                                                                                                                                                                                 | <b>30%</b> |
| Cull of remaining Stags & Prickets :                                                                                                                                                                                                                       | <b>25%</b> |

**Figure 39:** Example of predefined parameters for the calculation of recruitment rates and modelling of population (Source: R. J. Putman & Langbein, 1999, p. 103)

These calculative technologies play an important role as management tools. By predicting and anticipating future populations and the effect of culling on these, they act into the future in the form of prescriptive management measures (cull targets set *a priori*). These aim to deliver future desirable ecological conditions and control undesirable disturbances. In this sense, they dictate which lives and future ecologies to foster, becoming biopolitical technologies. As Braverman contends, “surveillance (...) works hand-in-hand with biopower” (Braverman, 2014a, p. 17).

Counting also takes place in experimental practices. For instance, at Dundreggan red deer populations are also assessed. The census combines annual ground counts, carried out in April since 2010, and occasional helicopter counts, carried out on behalf of the Glenmoriston Deer Management Group (DMG), to which the estate belongs. Until recently, cull targets were set based on a model established by the DMG in their management plan. However, they are now determined “as a reaction to the monitoring of the tree regeneration in the target area” (Glenmoriston Deer Management Group, 2016, p. 51). What this means in practice is that a tentative target is set and adjusted according to the results of the herbivore impact assessment. This is due to the fact that red deer found at Dundreggan are largely transient, not resident, and more importantly, due to the primary objectives of the rewilding project: expanding native woodland through natural regeneration, which requires decreasing browsing pressure.

To this end, and contrary to the New Forest, the monitoring privileges inductively assessing deer impacts and disturbances, rather than deer populations. The assessment of these impacts, which is explored in detail later in the chapter, also entails counting. The impacts are assessed at ten random stops within a chosen area, based on seven indicators (**Figure 40**, Box 2). These are ranked from absent to very high, based on guestimates, and the number of the stop is annotated in the respective box. After all stops are completed, the surveyor counts the number of stops at each box (e.g., how many stops were ranked very high for basal shoots). The sum of these is calculated for each impact level (column). As for each indicator (rows), the ‘Overall impact’ corresponds to the most representative impact level. An overall result is then derived by summarising the results for all indicators and all locations, which can then be mapped, allowing comparison and the search for spatial patterns.

| Herbivore Impact Assessment - Field Sheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |           |           |        |     |           |                |                        |   | Woodland name: |                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|-----------|--------|-----|-----------|----------------|------------------------|---|----------------|-----------------------------|
| Date:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |           | Surveyor: |        |     |           |                |                        |   | Habitat type:  |                             |
| Box 1: Woodland structure class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |           |           |        |     |           |                |                        |   |                |                             |
| Stop                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1              | 2         | 3         | 4      | 5   | 6         | 7              | 8                      | 9 | 10             | Most common structure class |
| Structure class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |           |           |        |     |           |                |                        |   |                |                             |
| Grid reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |           |           |        |     |           |                |                        |   |                |                             |
| Box 2: Current herbivore impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |           |           |        |     |           |                |                        |   | Notes:         |                             |
| Impact Indicator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Not applicable | Very high | High      | Medium | Low | No impact | Overall impact |                        |   |                |                             |
| Basal shoots                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |           |           |        |     |           |                |                        |   |                |                             |
| Epicormic/lower shoots                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |           |           |        |     |           |                |                        |   |                |                             |
| Bark stripping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |           |           |        |     |           |                |                        |   |                |                             |
| Seedlings/Saplings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |           |           |        |     |           |                |                        |   |                |                             |
| Preferentially browsed species                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |           |           |        |     |           |                |                        |   |                |                             |
| Sward                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |           |           |        |     |           |                |                        |   |                |                             |
| Ground disturbance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |           |           |        |     |           |                | Overall habitat impact |   |                |                             |
| Total for each impact level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |           |           |        |     |           |                |                        |   |                |                             |
| <p>Complete this field sheet for each habitat type in your wood for which you need to assess impact. For each of 10 stops within the habitat type:</p> <ol style="list-style-type: none"> <li>1. Enter the structure class (1-10) and grid reference of the stop in <b>Box 1: Woodland Structure Class</b>.</li> <li>2. For each of the seven browsing indicators listed in the left hand column of <b>Box 2: Current Herbivore Impact</b>, rate the current herbivore impact on a scale between ‘No impact’ and ‘Very high’. Enter the number of the stop in the appropriate cell of the box.</li> </ol> <p>When all stops have been completed:</p> <ol style="list-style-type: none"> <li>1. In <b>Box 1</b> enter the most common structure class in the right hand column.</li> <li>2. In <b>Box 2</b>, ignoring the ‘Not applicable’ column, enter the most representative impact for each indicator in the right hand column and the most representative overall impact in the bottom right hand box.</li> </ol> |                |           |           |        |     |           |                |                        |   |                |                             |

**Figure 40:** Field sheet used for the Herbivore Impact Assessment (Source: Armstrong et al., 2014)

The objective underlying counting is nevertheless different. Whereas at the New Forest counting is used to predict future changes and to set *a priori* targets (i.e., it is deductive), the

assessment of herbivores impact at Dundreggan is inductive. It is directed towards an adaptive and non-deterministic management. The culling targets are adjusted accordingly, similar to Despret's (2015) *a posterioristic* methodologies. For instance, during the training session that I followed on this method of impact assessment, we split into groups to assess a particular area and then discussed the results. We agreed that, overall, there were signs of regeneration. One of Dundreggan's estate managers told us that in the previous year that specific area had been heavily browsed. As he further explained, "we tried an experiment last year and increased the cull quota (...) These signs [of regeneration] might indicate that we have the right quota now and don't need to increase. But we also have to consider for example the effects of weather." If the results of the assessment evidenced, on the contrary, heavy pressure, the cull quota would tentatively be increased.

### **'Unforeseen issues'**

Deductive and inductive modes of reasoning also inform how unpredictable and emergent ecological properties are conceived in calculative and experimental practices. This is evident, for instance, where "New Forest census and cull records show obvious but unintentional discrepancies" (Page, 2015, p. 6), or in terms of emergent and "unforeseen issues" (Greenaway, 2006, 2013) in the two rewilding cases. In the case of deer management at the New Forest, such discrepancies are overcome by adjusting cull targets through the calculation of a census correction factor. This is based on the differences between two consecutive censuses and the intervening cull, as explained by a member of the Forestry Commission's wildlife management team:

[The correction factor] basically looks at what we've seen in one year, what we shot the following winter, and what was seen in the spring again following that. So, if you can imagine, if I had 100 female deer now that I'd censused, and 80% of those produced a fawn, by the end of the summer there would be 180 deer. If I then shot 120 of those, there should only be 60 deer left. But I'd encountered another 80 or 90 deer the following spring. I must have been

wrong with my original census. So I can work back using some maths to say: well, if I've shot so many young deer, there must have been this amount of adult deer to produce them, and therefore my census was 1% out, or 2% out of where it might be, and I can apply that in the following year to give me a better idea of the true number of deer that are on the ground.

The aim is to predict as accurately as possible population densities and trends based on modelling, to get the 'right' number. Moreover, the population assessment also allows the ecologists to understand if culling has prevented the establishment of non-native species, like the muntjac. This species has been officially censused since 2010 and all muntjac have been culled on site thenceforth to prevent colonisation (Page, 2015). Censuses show that numbers have nevertheless increased. As explained by another member of the wildlife management team:

[Muntjac are] very resourceful, they're very difficult to control, they're able to live in people's gardens, and stuff like that. So, I can't see ourselves getting the muntjac population under control. We've only really had muntjac here for the last 12 years or so and each year we are seeing more and more. So, I think they're here to stay. Whether they'll be here in big numbers, I don't know. But they are here, and we won't stop that. We can only try to maintain a decent level.

Despite the prescriptive and anticipatory character of calculative practices and technologies, life exceeds attempts to order and control it. As Foucault reminds us, "It is not that life has been totally integrated into techniques that govern and administer it; it constantly escapes them" (Foucault, 1984, p. 265; cf. B. Anderson, 2012).

On the contrary, the assessments undertaken in the two rewilding sites are open-ended and adaptive to what is being encountered in the process. They embrace the uncertainty and contingency of nonlinear ecologies. To illustrate this, I use Knepp's Available Edible Fodder Survey. While its main objective is to assess the coverage of edible fodder available for the grazing animals, it also monitors the abundance of ragwort and fleabane. The combined increase in these two unpalatable plants was one of the "unforeseen issues" of the project (Greenaway, 2013). It was noticed in the results of annual monitoring of vegetation conditions, which is

compared against a baseline survey. While the increase was considered by the consulted ecologists as a positive outcome of changes in land use and ground disturbances caused by pigs' rooting (**Figure 41**), which is interesting and relevant from an ecological perspective, it however "present[ed] a dilemma for the owner" (Greenaway, 2013)<sup>88</sup>. Concerns were raised about the risk to grazing animals' welfare (ragwort is a poisonous plant) or of the displacement of palatable plants. This could compromise the Higher Level Stewardship (HLS) agreement, in terms of "the livestock carrying capacity (...) with implications for planning stocking levels of different grazers and browsers" (Greenaway, 2013). However, as I was told by the resident ecologist, "they can smell and learned how to avoid ragwort; they have their ways to nibble around without eating it."



**Figure 41:** Ragwort thriving in soil that had been disturbed by pigs

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<sup>88</sup> It has also raised controversies with neighbouring landowners, as described by Tree (2018a, Chapter 8). Despite the non-interventionist ethos of the rewilding project, ragwort is pulled out by hand next to the boundaries with other estates, in a buffer zone, as a compromise.

In compliance with the law<sup>89</sup>, ragwort has been annually monitored since 2009. This monitoring aims to understand “whether it will decline as a more established vegetation develops following arable reversion” (Greenaway, 2009). It is not intended to be prescriptive or to eradicate the species. In fact, Isabella Tree argues that ragwort is “one of the most sustaining hosts to insects we have” and an important source of nectar for butterflies, bees, moths, flies and other invertebrates (Tree, 2018a, p. 142/3; cf. Buglife, 2018). Rather, it exemplifies an open-ended and inductive type of ‘learning-by-doing’.

However, although ragwort is acknowledged as part of the process and allowed to flourish, there are some constraints to this non-interventionist approach. When I asked what would happen if future assessments showed an exponential increase of non-edible plants, I was told that the stockman would have to assess whether to give grazing animals supplementary food or reduce stock levels, in compliance with the HLS agreement. Furthermore, they would also have to consult with the members of the Advisory Board. As the resident ecologist noted, “rewilding is really starting, so nobody knows exactly what will happen.” When the increase of ragwort and fleabane was first noticed in 2008, the joint opinion of the Board members was that it was part of a post-agricultural “transient successional change,” speculating that it “will be a short-lived phase and in time, a grass-dominated vegetation will prevail (...) there is little alternative to waiting it out: any intervention will be hugely costly and probably only lead to some other unexpected outcome” (Greenaway, 2013). Despite an openness to surprises and emergent properties, there are political challenges undermining how to respond to those surprises in rewilding projects. As J. Lorimer and co-authors argue, there is “a trade-off between practicality and the rewilding ideal” (J. Lorimer et al., 2015, p. 48/9).

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<sup>89</sup> Weeds Act 1959 (common ragwort is one of the five ‘injurious weeds’ specified) and Ragwort Control Act 2003. DEFRA also published in 2004 a *Code of Practice on How to Prevent the Spread of Ragwort*. However, there is no legal obligation to eradicate it.

### 5.2.2 Objective–Subjective

In the first part of the training session that I followed at Dundreggan, the participants were given a field guide entitled *Assessing Herbivore Impact in Woodlands: A subjective method* (Armstrong et al., 2014). The subtitle immediately caught my attention. It seemed an antithesis to the positivistic scientific endeavours to pursue objectivity, where scientific claims, methods and results are deemed to be value-free. The explanation was on the first page of the field guide: it is considered subjective as “it is based on observations, not detailed measurements” (Armstrong et al., 2014, p. 1). Objectivity and subjectivity inhabit the extremes of a continuum of modes of knowing underlying calculative and experimental practices, as well as the roles of scientists’ and managers’ bodies and senses (i.e., sensory organs or nerves). Before analysing these knowledge practices, and similar to the first axis, I offer a definition of both terms from the philosophy of science. Godfrey-Smith argues that “[objectivity is] often used in a vague way to refer to beliefs or belief-forming procedures that avoid prejudice, caprice, and bias. The contrast is usually with ‘subjective’ beliefs or procedures, which bear the influence of a particular point of view” (Godfrey-Smith, 2009, p. 238). These two terms are also related to phenomenological understandings of the body: “the subjective experience of one's own body is different from the objective or scientific picture of a body in physiological terms. The specific ways we experience ourselves as embodied thus become prime data for theorizing about knowledge and experience” (Blackburn, 2008).

### Knowledge of, knowing around (and with)

In their work on urban conservation and the practices of biosecurity, Steve Hinchliffe and collaborators propose a distinction between two modes of knowing: *knowledge of* and *knowing around* (Hinchliffe et al., 2005; Hinchliffe & Lavau, 2013). The former suggests “watching from beyond,” from the outside, and is more theoretical and abstract (Hinchliffe & Lavau, 2013, p. 653). The latter is an experiential “watching amongst or amidst” that allows others, “of all

shapes and sizes, to make a difference to the process of knowing” (Hinchliffe & Lavau, 2013, p. 653). *Knowing around* is an embodied practice, a form of knowing *with* (after Despret, 2004; Haraway, 2008). The researcher or manager ‘learns to be affected’ (after Despret, 2004) by nonhuman agencies, carefully coordinating their activities with annual ecological cycles and rhythms or with changes in the nonhuman bodies or movements amid which their own activities take place (cf. Brice, 2014). This distinction could be extended to Tim Ingold’s (2000) phenomenological contrast between ‘building’ and ‘dwelling’. Whilst in the former the world is perceived to be ‘out there’, in the latter the individual is a ‘being-in-the-world’, wherein “acting in the world is the skilled practitioner’s way of knowing *it*” (Ingold, 2000, p. 316). Both types of knowledge are evident in calculative and experimental practices.

At the New Forest, the current deer management draws upon a commissioned scientific report, which aimed to develop an integrated, landscape-based and long-term approach to managing deer populations. To this end, the Forestry Commission contracted two external ecologists, whose expertise was deeply rooted in their scientific knowledge and long-term research experience on the population dynamics of New Forest’s large herbivores. Based on an extensive technical review of published and unpublished materials, together with consultations with interested individuals and groups, the report draws together what the authors call ‘specialist knowledge’ of deer populations (R. J. Putman & Langbein, 1999, p. 3). It provides a review and assessment of: a) ‘what is known’ about the biology of the species; b) the perceived—and actual—impacts on conservation, silviculture and agriculture; and c) past deer management practices and their effectiveness (R. J. Putman & Langbein, 1999, p. 1, 2000, p. 291). This report provides a form of *knowledge of*: an objective, highly technical and theoretical mode of knowing built upon secondary ecological and biological data. The Deer Management Strategy which evolved from this report has been revised and rewritten twice since it was commissioned (New Forest District,

2007; Page, 2015). It was further reviewed and updated in 2007 following an interim report.

According to a member of the Forestry Commission's wildlife management team:

[A]lthough still based on much of the original report, there are some significant differences due to our ever-increasing knowledge of the Forest's deer. This has strengthened our management position with stakeholders, and although we still work closely with local deer enthusiasts and experts, we are now able to manage from a position of strength with population and cull figures to prove the need for sustained high culls.

There is an interesting idea underlying this passage, which bears some close examination. The original report that serves as baseline drew upon the knowledge of recognised deer experts, which legitimised the management plan. However, this expertise and authority was gradually transferred to the local foresters, who have an "ever increasing knowledge of the Forest's deer." This knowledge is situated and practical. It derives from the various encounters between the keepers and the landscape and inhabitants of their respective beat, where they work nearly every day, all through the year. These expert practitioners 'inhabit the landscape' they work in (and *with*), which provides them with a deep knowledge and understanding of deer, in terms of abundance, distribution, habits, and ecological impacts (cf. Hinchliffe & Lavau, 2013). Understood in this way, the landscape is rather what Ingold defines as a 'taskscape': an ensemble of tasks or "practical operation[s], carried out by a skilled agent in an environment, as part of his or her normal business of life" (Ingold, 2000, p. 195). In this sense, managing is a knowledge practice.

There was thus a shift from *knowledge of* to *knowing around* within the same case, bridged by the Head Keeper, who occupies an intermediate position between the external experts and the local foresters. More than claims to objectivity, his authority is derived from a vast experience in the field that gave him the needed skills and knowledge. As he told me: "I've done the job for a long time now and I know when we need to increase the cull, or reduce the cull." Rather than undermining the centrality of measurements and calculations (a form of *knowledge of*), this

consideration illustrates that *knowing around* is complementary to the assessment. It enables an adjustment of the resulting figures, if needed, considering also the practicalities of a day-to-day management, the multifaceted and integrated management interests, legal requirements, or place- and species-specific factors (e.g., weather, daylight hours, mobility of deer) that are beyond the control of practitioners *in the field* (cf. J. Lorimer, 2008). As the Head Keeper explained:

There is a short legal season to control the deer (...) At the time of year where the weather is at its worst, daylight hours are at their shortest, the deer have got all night to feed (...) You can only shoot them in the legal daylight, one hour before sunset and one hour after. The time that we can shoot is quite limited, the legal season is quite restricted, and the weather is against us. So, everything is stacked against us achieving a high cull [the determined quota]. (...) I really need to push hard at that time of the year when we do it.

In this sense, the assessment incorporates a certain degree of subjectivity, in the form of estimates and judgements in its final stages, that depend on the material arrangements and contingencies in which they are produced. This resonates with the concept of ‘qualculation’<sup>90</sup>, which means a combination of (quantitative) calculations and (qualitative) judgements that allows the manipulation of objects within a single spatiotemporal frame (Callon & Law, 2005; Cochoy, 2008; Thrift, 2004; cf. Paxson, 2013, p. 78/9).

Likewise, experimental practices also entail an interplay between different types of knowledge that are practice-based. Whilst external ‘expert advice’ (*knowledge of*) was sought in the beginning of the projects, a more speculative *knowing around* of local managers tends to prevail as the projects unfold, based on what is found *in situ*. At Knepp, for instance, the available edible fodder survey is part of the Southern Block’s ecological monitoring program, in accordance

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<sup>90</sup> The term ‘qualculation’ was coined by the economic sociologist Franck Cochoy in his analysis of consumption and how competing products are chosen through evaluation devices and processes based on product qualities, beyond price considerations. It was further adopted by Michel Callon and John Law (2005) to speak about the qualitative character of calculation.

with the project's baseline ecological survey and monitoring strategy that were undertaken by external consultants. The strategy has nevertheless been adjusted over time as 'unforeseen issues' emerged, such as the aforementioned increase of ragwort. This increase was noticed not only by the external ecologists conducting the annual monitoring, but also by the head ecologist, who conducts regular safaris and ecological surveys throughout the Southern Block, and the stockman, who goes through the fields every day to check the animals' condition. They have a deeply situated and experiential *knowing around* of the landscape they work in and with (i.e., Ingold's taskscape), which ultimately informs their decisions to intervene. This *knowing around*, as suggested by Hinchliffe et al. (2005), also includes nonhumans and ecological processes. According to the resident ecologist, when explaining the heterogeneity of vegetation in the fields,

[I]t could have been a wet May which would have promoted the growth of the wind dispersed seeds of the sallow or it could have been a particularly good mast year, so for example you may have had a lot of acorns, jays and wood mice bury these as food stores, and then forget where they put them or die. Then these turn into saplings. Some fields have a lot of wild rose in, probably due to rosehip seeds in bird droppings, so you get areas of wild rose, and this is self-perpetuating. I imagine that what the fields were growing and the fertilisers/pesticides that were put on each field will have had an impact on what happens in them afterwards. Earthworms will have recovered in some fields, and not others. No doubt, the herbivores will have areas that they feel safer in and are more happy to spend time/feed in those areas over other areas, so this may well affect the vegetation structure too.

Similarly, the impact assessment method at Dundreggan aims to provide a *knowing around*, a "story of what is going on," as an ecologist described. This method was developed by four external ecologists with a deep *knowledge of* Scottish native woodlands and deer. Their expertise was in fact behind the estate managers' choice of the method, together with the fact that it is focused on woodland and regeneration, rather than deer population densities. The assessment is nevertheless to be conducted by the managers and volunteers *in the field*. They play a crucial role as both spectator and participant, being asked to look carefully at all the relevant indicators

of impact, which can also involve other senses and more ‘subjective’ forms of assessment. It is to these forms of assessment, and the senses they rely upon, that I now turn.

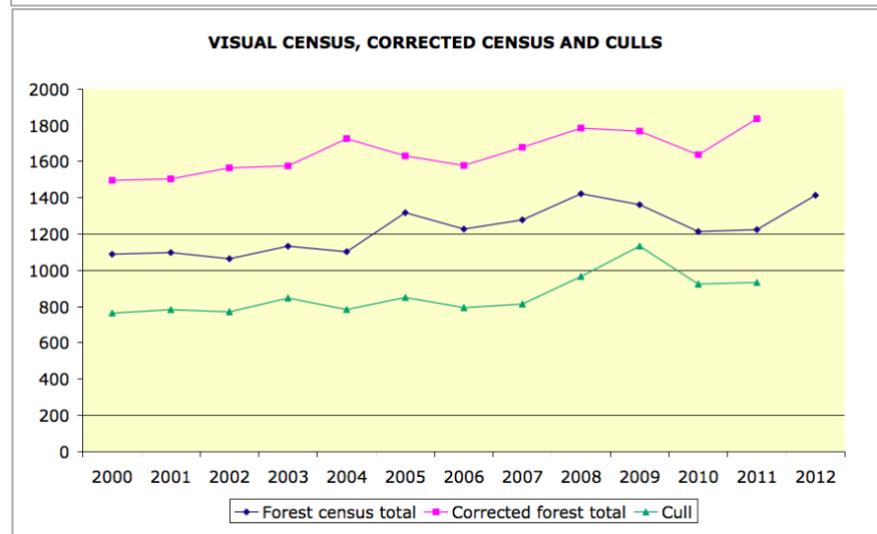
### **“Thinking with eyes and hands”<sup>91</sup>**

Calculative practices tend to rely mostly on sight, either as means to count or to visualise the results of calculations. As already explained, the assessment of deer populations in the New Forest is based on visual census and thermal imaging. Equipped with binoculars or a thermal imaging camera, the assessor conducts the census by distancing him/herself from the deer. This gives a broader overview, while avoiding being noticed or minimising disturbance to the deer. As Haraway argues, visual perception is a way to “distance the knowing subject from everybody and everything,” providing the illusion of a view from everywhere, a ‘god-trick’ (Haraway, 1988, p. 581). Sight and seeing are also crucial in terms of the resulting databases and models. They provide a simplified and narrow vision of the forest, which becomes more legible and hence more susceptible to calculations and ‘efficient’ management (cf. J. C. Scott, 1998). Visualisations such as tables or graphs (**Figure 42**) are indeed a crucial aspect of the “scientific seeing” (Martin, 2015, p. 77), or visual storytelling, in line with the scientifically and politically valued “cultures of objectivity” (Porter, 1995).

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<sup>91</sup> After Latour (1986, p. 1).

|      | NF visual census by area |        |        |        |       | NF corrected area figures |        |        |        |       |
|------|--------------------------|--------|--------|--------|-------|---------------------------|--------|--------|--------|-------|
|      | Area 1                   | Area 2 | Area 3 | Area 4 | Total | Area 1                    | Area 2 | Area 3 | Area 4 | Total |
| 2000 | 269                      | 296    | 264    | 260    | 1089  | 412                       | 408    | 317    | 359    | 1496  |
| 2001 | 324                      | 295    | 238    | 242    | 1098  | 434                       | 450    | 251    | 369    | 1504  |
| 2002 | 301                      | 328    | 185    | 250    | 1064  | 496                       | 462    | 269    | 338    | 1565  |
| 2003 | 351                      | 323    | 222    | 237    | 1133  | 468                       | 449    | 296    | 363    | 1576  |
| 2004 | 294                      | 292    | 231    | 286    | 1103  | 582                       | 477    | 304    | 363    | 1726  |
| 2005 | 464                      | 325    | 256    | 283    | 1318  | 545                       | 452    | 313    | 321    | 1631  |
| 2006 | 405                      | 313    | 260    | 249    | 1227  | 540                       | 368    | 359    | 311    | 1578  |
| 2007 | 415                      | 291    | 310    | 262    | 1278  | 558                       | 413    | 385    | 333    | 1678  |
| 2008 | 452                      | 345    | 347    | 278    | 1422  | 528                       | 431    | 393    | 332    | 1784  |
| 2009 | 381                      | 307    | 343    | 331    | 1362  | 543                       | 434    | 423    | 360    | 1767  |
| 2010 | 354                      | 307    | 282    | 271    | 1214  | 498                       | 390    | 352    | 400    | 1637  |
| 2011 | 343                      | 276    | 270    | 335    | 1224  | 543                       | 335    | 359    | 599    | 1836  |
| 2012 | 385                      | 265    | 309    | 455    | 1414  |                           |        |        |        |       |
| 2013 | 244                      | 238    | 256    | 309    | 1047  |                           |        |        |        |       |



**Figure 42:** Visualisation of data resulting from the visual and corrected censuses for fallow deer, between 2000 and 2013, in the form of table (top) and graph (bottom) (Source: Page, 2015, pp. 12–13)

This “disembodied thinking” (Despret, 2013, p. 59) is also present in experimental practices. For instance, at Knepp, data collected in the field is inserted into an Excel spreadsheet and is then imported into ArcGIS. The resulting maps are compared to those from previous years or from the other assessments carried out in the same year (**Figure 43**). They allow a visual monitoring of how vegetation changes over time. Based on this monitoring, the stockman then assesses whether to intervene (e.g., supplementary feeding, removal of animals). This decision is based on the percentage and distribution of available fodder illustrated by the map.



**Figure 43:** Map with percentage of available fodder for all fields in June 2013 (top) and August 2013 (bottom) (Source: Nightingale, 2013)

To understand the different implications of the two modes of knowing and ‘seeing’ disturbances, the distinction between surveillance and observation provided by Hinchliffe and Lavau (2013) in relation to birds and biosecurity is useful here. Although seemingly equivalent (“observing does in some sense evoke a rather ocular, disembodied science”), they draw on Michel Serres to argue that they differ: observing is “watching with wonder and care, whereas

surveillance watches with suspicion” (Hinchliffe & Lavau, 2013, p. 267). In this sense, calculative practices are closer to surveillance, while experimental ones are closer to observation.

Moreover, the knowledge practices deployed at the rewilding sites require the assessor to look carefully and to pay attention to detail, which can involve other senses beyond sight. As the following passage from my fieldwork notebook exemplifies, related to the assessment method at Dundreggan, as observed during the training session,

They called it a “structured way of looking carefully and paying attention to details.” This careful way of looking, nevertheless, goes beyond mere observation. While it privileges sight over other senses, the impacts on the most recent season’s plant growth are also surveyed through touch. It is a multi-sensory assessment. In the first stop we made, H. said that the first thing to look at for this assessment are the basal shoots, which sprout from tree bases. They are the main sign of regeneration, if left un-browsed or lightly browsed. To feel their growth or how much has been nibbled, it is important to observe very closely and be meticulous, which can also include touching the shoots by the base. I heard during the exercise someone saying that “the shoots from the last growing season feel differently.” And they did, indeed: they were softer.

This attention to detail requires attuning to nonhuman ecologies and rhythms. In my case, with a background in social sciences and coming from the Mediterranean area, the practice required attuning myself both to the ecologists’ modes of knowing and terminologies, and to the Scottish Highlands’ trees and plants, which I was now interacting with and *feeling* while learning their names. The same happened at Knepp, where I initially had to learn to distinguish ragwort and fleabane, while walking in the fields to undertake the survey, as illustrated by another passage from my notebook:

When we got into the fields [Southern Block], P. stopped a few meters later and pointed to the vegetation: “Look, here is the fleabane and ragwort that we will be looking for.” I took a photo [Figure 44]. At first blush, they looked the same to me: green stems with leaves [not flowering season]. But as I bent down closer to the plants and looked attentively, they actually started to look differently. Ragwort leaves are dark green and have irregular lobes [jagged-edged]; fleabane leaves are brighter and ‘pointy’ [lanceolate]. The texture is also different: ragwort

leaves are tough; fleabane has hairy stems and leaves that felt very soft when I touched them. (...)

In bigger fields, fields with very heterogeneous and tall vegetation, or when in doubt, we walked off the track to assess different parts of the fields or to assess more closely. (...) While walking off the tracks, we had to attune to the vegetation we were walking through, as well as to the soil textures, stepping in uneven soil due to dried animal tracks, while avoiding twisted ankles.



**Figure 44:** My first encounter with fleabane and ragwort

The surveys require thus embodied skills and multi-sensory forms of knowledge. They are in this sense “wild performatives” (after Overend & Lorimer, 2018): “affective encounters with wildlife” or “experimental and unruly acts” where nonhuman actors are involved and that are not wholly reliant on learned or shared languages (Overend & Lorimer, 2018, p. 528/9).

### **5.3 Conclusion**

This chapter has explored the knowledge practices through which ecologists and forest managers assess and monitor large herbivores as part of the forest’s disturbance regimes. In so

doing, it aimed to respond to the second research question of the thesis. I outlined two sets of knowledge practices that are enacted in the case studies, which I termed *calculating* and *experimenting with* disturbances. Neither of these practices is here prioritized at the expense of the other. They are both deemed valuable, depending on the situations and contexts under which they are enacted.

Within calculative practices, here illustrated by the New Forest Deer Management Plan, deer are statistically framed as dynamic disturbances to be counted and modelled, in order to deliver desired ecological conditions. Experimental practices involve more exploratory and open-ended practices, adapted to how the ecological processes unfold. They privilege a multi-sensory and more qualitative approach that involves humans and nonhumans and is open to unpredictable rhythms and trajectories. My description of these practices drew on the surveys undertaken at Dundreggan and Knepp estates, based on a speculative and adaptive ‘learning-by-doing’ approach. I then compared and contrasted these two sets of knowledge practices based on two axes: *deductive-inductive* and *objective-subjective*. These concern the different modes of knowing that ecologists and managers rely upon and draw together for disturbances to be enacted within forest management and conservation. I explored how these determine the methodologies followed, the roles of bodies and senses, and how they inform understandings of emergent ecological properties. Whereas a deductive mode draws on a set of predictable habitat and species targets set *a priori*, against which outcomes are evaluated, inductive modes rely on open-ended and more flexible approaches that work with unpredictable ecological trajectories. The knowledge practices in the New Forest example are closer to what I describe as deductive and objective and the rewilding experiments are more aligned with what I describe as inductive and subjective. However, neither conforms entirely to one end of the continuum.

On this note, and going back to the distinction between compositionalist and functionalist approaches with which this chapter opened, the analysis provided here shows that in practice

they are more nuanced than their extreme caricatures might suggest. While discourses around rewilding tend to position it on the functionalist, processual end of the continuum (process-led, non-goal-orientated, hands-off), in practice rewilding is multiple (cf. Jørgensen, 2015; J. Lorimer & Driessen, 2016). So are the ways of knowing and enacting disturbances. In important ways, rewilding is akin to “open-ended restoration” (Hughes et al., 2012, 2011). Contrary to the traditional target-led, prescriptive approaches to restoration, monitoring in open-ended projects is focused not on the state of a habitat or species, but on the re-establishment of biophysical processes and the way habitat mosaics change over time (Hughes et al., 2011). It is an ecological “journey rather than a destination” (Hughes et al., 2011). This consideration has implications for any analysis or literatures that see rewilding as a radically distinctive practice from more conventional conservation modes, notably restoration, without dismissing the heuristic value of rewilding as a concept and practice (see R. M. Anderson et al., 2019; cf. Hayward et al., 2019). It also has implications for more general discussions about the challenges of monitoring the progress, success and ‘ecological benefits’ of rewilding projects, contributing in particular to calls to better integrate the science and practice of rewilding (cf. Ockendon et al., 2018; Pettorelli et al., 2018; Torres et al., 2018). Given the blurriness of the compositionalist/functionalist continuum as well as the multiplicity of conservation and rewilding in practice, there might be scope for productive co-learning when it comes to knowing and assessing disturbances and dealing with the uncertainty and surprises inherent to the nonlinear ecologies that characterise the Anthropocene.

Besides ecological factors, the ‘success’ of any rewilding initiative is also determined by the social and political context. For instance, the multiplicity and open-endedness of rewilding has political implications, as there are multiple groups of actors with a stake in which future ecologies are accepted, including ecologists, local residents, farmers, hunters, tourists (cf. J. Lorimer et al., 2015). These will be the focus of the next chapter.

## CHAPTER 6. The cultural politics of governing disturbances

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A wheel turns because of its encounter with the surface of the road; spinning in the air it goes nowhere. Rubbing two sticks together produces heat and light; one stick alone is just a stick. As a metaphorical image, friction reminds us that heterogeneous and unequal encounters can lead to new arrangements of culture and power. (Tsing, 2005, p. 5)

Since its designation as a Royal Forest in the 11<sup>th</sup> century, the New Forest has had a conflict-ridden history. In his study of the main uses of the New Forest until the 1980s (grazing, silviculture and recreation) Stover argues that:

The Crown's deer versus commoners' livestock. Commoners' livestock versus the Crown's trees. The Crown's trees versus commoners' livestock versus weekend campers. Over the centuries a spirited tug of war has persisted in England's New Forest. The basic, complex question continues: how is the land to be used? (Stover, 1985, p. 32)

For most of its history, the main sources of tension were between the interests of the commoners in grazing and of the Crown (later the Forestry Commission) in deer and timber (for overviews, see Edwards, 1995, 2011; Pasmore, 1976; Tubbs, 1986). These conflicts over land use and management became more complicated in the post-war period as a result of radical shifts in the social, economic, and political fabric of the New Forest, with implications for the landscape and its management. New actors came into play, with new and sometimes competing demands, uses, and values, which sparked new conflicts. These are the focus of this chapter.

By the mid-20<sup>th</sup> century, the New Forest had moved from being an area that supported an eminently pastoral economy to being “a major recreational and natural-heritage target for the jaded urbanite” (Garner, 2001, p. 135). Three main changes played a particularly important role,

as will be further explained: i) rural restructuring, motivated by counterurbanisation and gentrification processes; ii) increasing recreational demands and pressures; and iii) a rise in the New Forest's nature conservation importance. These shifts are part of the broader transition towards what has been termed in rural geography literatures as post-productivism or multifunctionality (reviewed in §2.4.1). Rural areas are reimagined as places not only of production (represented by the traditional land uses of agriculture and forestry), but also of consumption and protection, used “for the achievement of lifestyle choices and leisure practice” (Holloway, 2000, p. 308). On these ‘post-pastoral’ landscapes, to use Heather Paxson’s concept (2013), urban and non-farming interests, perceptions and lifestyles exert an increasing influence. Counterurbanisation is not “a simple movement of people, but involves a re-creation of the rural via material transformations and the ideals and imperatives that drive them,” as Abrams et al. (2012, p. 271) contend.

Drawing on these considerations, this chapter explores the implications of the post-productivist shift for the management of large herbivores in the New Forest. Through a cultural political lens, it traces the shifting values and power of the commoners and “local-amenity users” (Edwards, 2011, p. 131) in discussions about forest management, and the controversies generated. It thus responds to the third research question of the thesis, on the conflicting values associated with governing disturbances, notably large herbivores. To address these issues, I engage with wider literatures in rural geographies and rural studies addressing rural change, representations of rurality, and the shifting roles of non-humans in the countryside (see §2.4.1). I engage in particular with the concepts of the ‘post-pastoral’ and the ‘working landscape’ proposed by Paxson (2013) in her ethnographic research on the American artisan cheesemaking revival in the 2000s. They describe the revised pastoral imagery of (sub)urban migrants, who “relocate to the countryside not merely to observe and contemplate the natural beauty of its landscapes, but to work and to steward the land” (Paxson, 2013, p. 17). I draw these literatures

and concepts into conversation with work on the political ecology of conservation conflicts and on the socio-political dimensions of disturbance management (reviewed in §2.4.2).

The chapter starts with a brief outline of the main socioeconomic and political changes in the New Forest that occurred since the 1950s/60s. It then moves to the consequences of these changes for the forest's disturbance regimes and their management, through the example of the commoners' ponies. These provide a clear example of the aforementioned reconfiguration of the countryside and the perceived role of grazing animals. While the prime reason to turn out ponies used to be economic, since the mid-20<sup>th</sup> century cultural and social factors have been predominant. In the 19<sup>th</sup> and early 20<sup>th</sup> centuries ponies found a market as working pack, saddle and harness animals, in the collieries, and as light road transport (R. J. Putman, 1986, p. 28/9; Tubbs, 1986, p. 110/1). During both wars, when meat was in short supply, horseflesh trade re-emerged (Kenchington, 1944; Otter, 2011; R. J. Putman, 1986; Roodhouse, 2013). Their (cheap) meat was sold for the pet-food trade and human consumption, mostly for "alien refugees" (Kenchington, 1944, p. 150; R. J. Putman, 1986, p. 29). By the mid-20<sup>th</sup> century, the riding industry had become the main market for ponies, mostly for children in Britain and continental Europe (Macnair, 2006, p. 73). By the late 1970s/early 1980s, though, exports fell off as the importing countries started to breed their own ponies (Macnair, 2006, p. 74). Prices declined as "too many of the better animals had been sold off the Forest and there were altogether too many in circulation" (Tubbs, 1986, p. 110). Yet the numbers of ponies turned out did not decline, for reasons that will be later explained. In the 1970s, the ponies' "vital conservation service" (Commoners Defence Association, 2018, p. 3) was also acknowledged by conservationists.

The last part of the chapter is focused on how disturbances are contested, based on two examples of management *of* and *for* ponies. To a great extent, such frictions concern disagreements over how the land should be used, how it should be managed, and what it should

look like. They are grounded in contrasting perceptions of the ‘working landscape’, as well as distinct vested interests. In the conclusion, I address the pertinence of these themes in discussions around rewilding.

## **6.1 The ‘post-pastoral’ New Forest**

As part of the post-war trend throughout the English countryside, the mid-20<sup>th</sup> century marked a turning point in the history of the New Forest. It brought about significant changes to its socioeconomic and political structure. A conservationist that has been working in the New Forest for three decades summarised these as “a shift from pastoral or low-grade agriculture, fairly un-intensive agriculture, to leisure uses.” As he explains, underlying this shift are increasing pressures on the commons, from within and outside the New Forest:

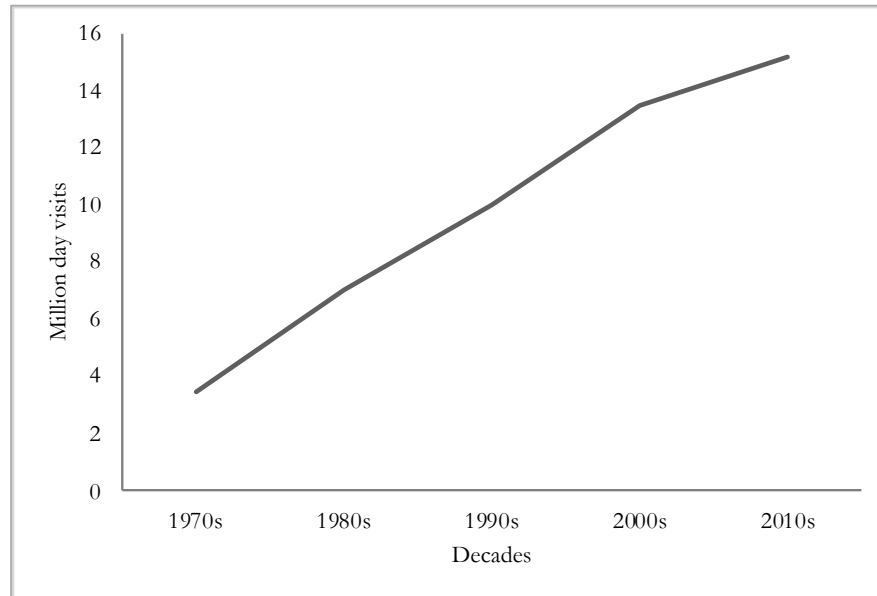
[If] you stand on the edge of the Forest and look outwards, the cities around it are growing very fast and they put immense demands on the Forest, as a green space, as a place for fresh air, a place for exercise (...) On the inside of the Forest, the Forest works because it still has a functioning pastoral economy. (...) But that system is economically marginal. In many ways, the majority of the landscape is a landscape of poverty. And when you put in huge amounts of money from outside, house prices go up beyond the ability of local people to have a home (...) Now, if you want to run 50 cows, have a few fields and a little farm, because that is who you are and what you do as a commoner, you now have to be multimillionaire to be able to do it!

Two main changes stand out from this statement, related to the rising urban growth and industrial development around the New Forest since the 1950s: the increasing importance of the New Forest as a recreational and amenity resource, and the decline of the pastoral economy. These will be explored below. A third, interrelated change might be added: the rise in the New Forest’s nature conservation importance by the 1960s, in terms of site designations and local legislation to protect it from the increasing recreational and development demands and needs of the densely populated South East England.

### 6.1.1 Recreational disturbances

The popularity of the New Forest as a visitor destination dates back to Victorian times (Kenchington, 1944; Lascelles, 1915) and the management of recreation was already evident in policy documents such as the New Forest Act 1949. However, by the 1950s/60s it became widely accessible and used for recreation on a scale never seen before, both by people living directly within the Forest's perimeter and those from further afield. Visitors were motivated by an interest to "escape the pressures of urbanization, in search of fresh air and solitude; a few to enjoy the beauties of unusual animal and plant life" (Vesey-Fitzgerald, 1966, p. 192). This rise in recreation and tourism, driven by improved rail and road networks in Southern England, brought new and damaging pressures to the Forest, such as the erosion of grazing land by uncontrollable vehicle access and camping. By the 1970s, the management of such pressures and demands became a new statutory duty of the Forestry Commission (Forestry Commission, 2008, pt. B7).

Estimated day visits have risen from around 3.5 million in 1970s to over 15 million in 2017 (**Figure 45**). The increasing recreational use of the New Forest, particularly following its designation as national park in 2005, was considered as one of the main undesirable *disturbances* and challenges to the New Forest by most of those responsible for its management, whom I interviewed. Nowadays, the New Forest is mostly used for walking, dog-walking, cycling and horse-riding.



**Figure 45:** Evolution of the number (estimate) of day visits to the New Forest per year, 1970s-2010s (Data retrieved from: Forestry Commission, 2008, pt. B7; New Forest National Park Authority, 2016; RJS Associates Ltd, 2018; Sharp et al., 2008)

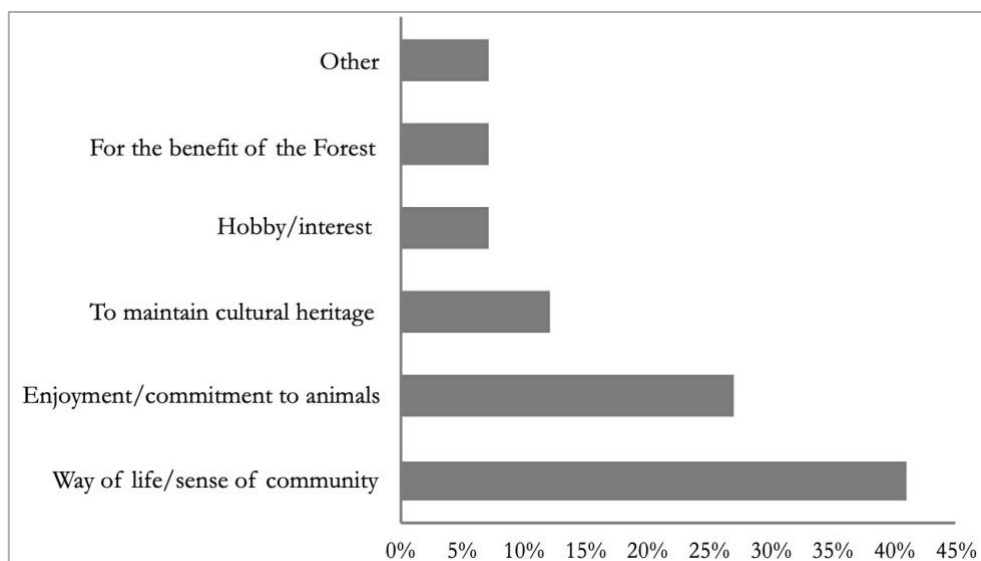
### 6.1.2 A declining pastoral economy

Besides visitors, there has also been a significant influx of urban middle-class, high-salaried new residents to the New Forest since the 1960s. According to Tubbs, this was a consequence of “spin-offs from increased national affluence and new perceptions of living,” namely the desire to live in the countryside (Tubbs, 1986, p. 104). The newcomers were commuters, retired people and second-home owners who bought commoners’ holdings for residential properties and “hobby farms” (Edwards, 1995, p. 182). This counterurbanisation process radically changed the social composition and wealth of the communities living in and around the New Forest. It led in particular to the decline of the pastoral economy, which had shaped the whole landscape for centuries (R. J. Putman, 1986; Tubbs, 1986, 1997). The New Forest became more a ‘place to live’ than a site of agricultural production.

The declining pastoral economy is in fact testament to the changing role of farming (and commoning) in the post-productive countryside. Until the mid-20<sup>th</sup> century, commoning was the primary source of income and livelihood of the less affluent community of smallholders

and cottage stock-keepers (Tubbs, 1965, 1986, 1997). Since then, and following the influx of urban migrants, it became “what a lot of people’s hobby is here,” as an agister put it. As more secure and higher sources of income were sought outside the local rural economy<sup>92</sup>, commoning became a source of supplementary income. It persists nowadays not for economic reasons, but due to social and cultural motives. Indeed, reasons such as being a ‘way of life’ or a means of conserving family traditions and cultural identity prevail in the commoners’ decision to turn out animals (**Figure 46**), particularly amongst the younger commoners (cf. Ivey, 2011). According to one commoner:

My whole family commoned, and their parents, and probably theirs before, so it’s quite a generation thing going on. (...) it’s a family tradition that’s going on and on, and I think it’s quite a healthy one, with forest gatherings through certain parts of the year (...) It’s a big community thing.



**Figure 46:** Main reasons behind the commoners’ decision to turn out animals  
(Based on data presented by Ivey, 2011, p. 17)

Similar to artisan cheesemaking in Vermont analysed by Heather Paxson (2013), commoning is economically marginal but a mainstream cultural project, reflecting a post-industrial

<sup>92</sup> According to the last Commoners’ census, over half (52%) of the commoners declared occupations in the tertiary sector (professional/business/commerce), a quarter worked in agriculture/horticulture/forestry, and 7% described themselves as looking after their family and home (Ivey, 2011, p. 6).

configuration and reimagination of the landscape. However, unlike cheesemaking, commoning is not a “way of making a life and a living” (Paxson, 2013, p. 33). Although it is still considered a ‘way of life’, the New Forest’s pastoral economy has not been functional for a long time. Commoners rely on external sources of money to keep the tradition alive, either from jobs elsewhere or subsidies<sup>93</sup> to help “pay the bills and keep the animals in a proper way,” as an agister explained.

### **6.1.3 New arrangements of power**

The socioeconomic changes outlined above had political implications for forest management. They altered power dynamics. In the New Forest, commoners have historically occupied a marginal position in decision-making processes (cf. Edwards, 2011; Tubbs, 1986). However, changes in their composition and wealth increased their power, especially amongst the urban newcomers. The opinions and perceptions of visitors and amenity users also grew in importance. One of the areas where this is particularly visible is in terms of recreational activities (e.g., horse riding or dog-walking). For instance, when in 2008 the New Forest National Park Authority (NFNPA) published the first draft of the National Park Plan for consultation, many forest residents and users rebelled against what they perceived as “an attempt to take away their freedom” (E. Williams, 2008a). The policies regarding the keeping of ‘recreational horses’<sup>94</sup> attracted significant responses: out of 9,000 respondents, 65% raised objections to them. Those policies aimed to “control recreational horsekeeping and associated development”, in particular “where it involves the loss of agricultural land and back-up grazing land” (New Forest National Park Authority, 2008, p. 9). To do so, recreational horse keepers would have to seek planning permits, for instance, to keep horses in fields classed as agricultural land for over 28 days per

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<sup>93</sup> See footnote 58.

<sup>94</sup> This category excludes the commoners’ ponies (cf. footnote 61). Horse riding became a popular recreational activity in the New Forest amongst the urban incomers, with a proliferation of riding schools, trekking centres and livery stables in the 1960s/70s (Tubbs, 1986, p. 104). Currently, it is estimated that 2% of all visitors use the New Forest primarily for this purpose.

year (beyond which they would only be allowed near residential areas), to keep more than one horse per hectare, or to provide shelter, supplementary feeding and rugs (New Forest National Park Authority, 2008; E. Williams, 2008b). Contestations against these policies also gave rise to a petition signed by over 7,000 people, the creation of a campaign group (Forest Uprising Group) and demonstrations. As suggested by Edwards to explain the failure of repeated attempts by the Forestry Commission to introduce restrictions to horse riding back in the 1990s, “the fact that almost all horse riders are local people, including many commoners, has meant that the local collective choice decision-making arenas have been employed as a forum to lobby against any form of restriction or charging” (Edwards, 1995, p. 266). Another example concerns dog-walking. As explained by a Verderer,

I remember here in Lyndhurst, when there was some talk (...) about dogs and some suggestion that dogs should be put on lead<sup>95</sup> (...) it just caused a fuss! There was a public meeting arranged, and say it was in this room... There would have been people outside who couldn't get in! There were just so many people who reacted to that sort of thing, that anything you suggest in the forest (...) causes huge conflicts. People are very settled in their ways.

These contestations illustrate the rising voice and power of the newcomers and visitors in terms of management and uses of the New Forest, sometimes at the expense of long-term residents and ‘traditional’ commoners. According to a report from 1991, the latter have tended to “feel that they are being swamped by incomers who neither understand or respect commoning nor the Forest itself” (Illingworth et al., 1991, p. 63). As has been suggested in broader rural geography literatures, the relatively novel actors project their expectations of how the landscape should look like, how it should be used and how it should be managed. This creates new sources

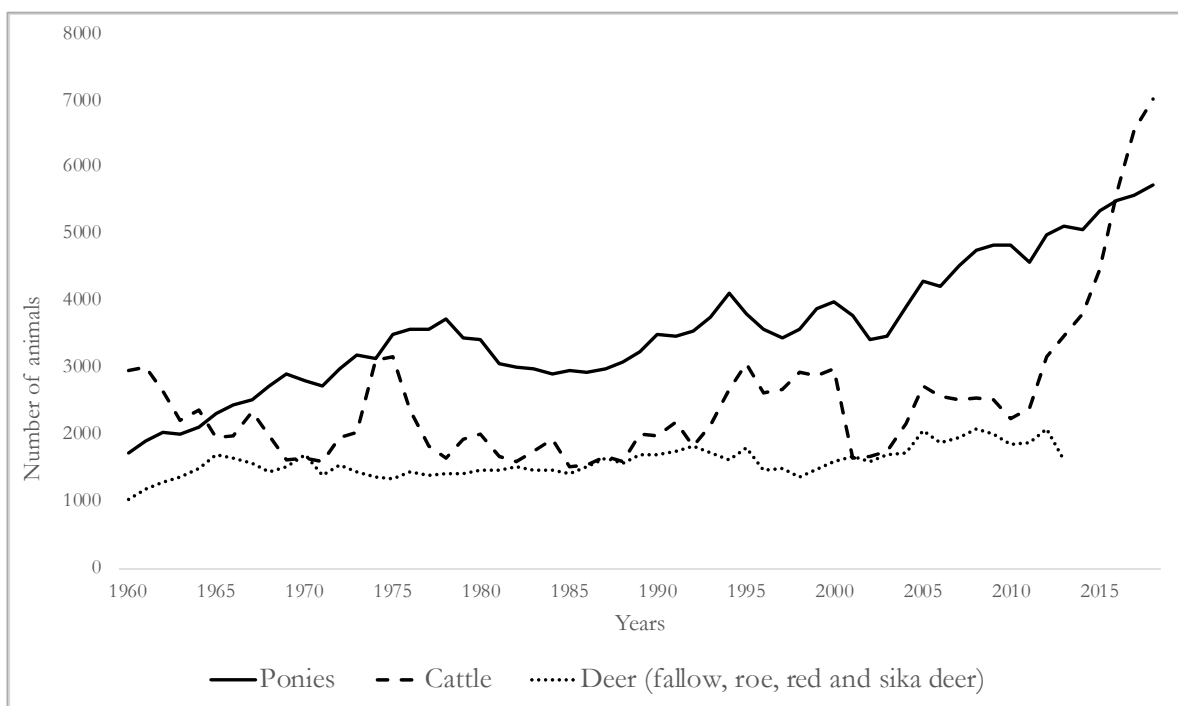
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<sup>95</sup> Due to the Foot-and-Mouth outbreak in 2001, the New Forest was closed for recreation to avoid spreading the virus. Dogs were required to be on leads all the time. When the restrictions were lifted, this request was nevertheless kept. Dogs ‘out of control’ are perceived to be a problem for conservation (e.g., disturbance to ground-nesting birds), commoning (chasing and killing foals and calves) and forestry (chasing and killing deer). A local lobby group was formed against these restrictions – the New Forest Dog Owners Group (see also §4.3).

of tensions, as will be explained at more length later. First, however, I turn to the ecological implications of the changes outlined above.

## 6.2 Large herbivores in a post-productivist countryside

The changing socioeconomic and political makeup of the New Forest had implications for the forest's disturbance regimes. These are particularly visible in the numbers<sup>96</sup> of the main large herbivores since the 1960s (**Figure 47**).



**Figure 47:** Evolution of the number of ponies, cattle and deer in the New Forest (1960-2018) (Based on data presented by Page, 2015; R. J. Putman, 1996a; R. J. Putman & Langbein, 1999; Verderers of the New Forest, 2018)<sup>97</sup>

As the graph above illustrates, by 1965 there was a shift in commonable stock from cattle towards ponies. The number of ponies has since followed a general upward trend, despite the

<sup>96</sup> Unlike other common land elsewhere in England, there has not been set any limit to the number of animals that a commoner might turn out in the New Forest. Even in the case of (temporal) restrictions under the Medieval Forest Law (e.g., rules of levancy and couchancy, Fence month, Winter heyning – cf. **Glossary**), evidence suggests that they were not a rigid requirement and were largely neglected (R. J. Putman, 1986, p. 23). Until the 1970s, stock numbers fluctuated mostly in response to market prices (Tubbs, 1986, p. 108, 1997, p. 10).

<sup>97</sup> Data for cattle and ponies draws on the marking fees paid by the commoners between 1960 and 2017; data for fallow, red, roe and sika deer is based on the Forestry Commission's visual censuses between 1960 and 2013.

low market prices and poor returns. In fact, as Tubbs (1986, 1997) notes, one of the main consequences of the socioeconomic changes outlined above has been a weakened link between stock numbers and market price since the late 1970s, as well as a growing influence of cultural factors. The same applies to the other equine species, the donkey, whose densities have nevertheless been comparatively much lower than ponies' throughout history (cf. **Figure 14**). The number of donkeys has tended to increase since the late 1970s, and almost doubled between 2010 and 2018. Similar to what will be described below for the ponies, the rising number of donkeys might be due to distinct attitudes of counterurbanisers and visitors. According to a commoner, "I don't remember seeing donkeys in the forest when I was little [1960s/70s], now I see many. (...) [Donkeys] are a big hit with visitors (...) and worth more than ponies. Just like the cows." In fact, although commoners pay the same marking fees for donkeys and ponies, the former command a higher market price (almost double) (New Forest National Park Authority, 2018). Unlike the ponies, though, donkeys are more likely to be spotted near villages and around trees and hedges, rather than heathlands.

In the case of cattle, numbers have risen and fallen in response to external forces, notably market prices, the foot-and-mouth outbreak in 2001, or agri-environment subsidies. The latter help explaining the significant increase in cattle numbers since 2010, when the HLS scheme started (see §3.1.1). By then, as a member of the Verderers explained,

Natural England set us some criteria that we had to adhere to as part of the grazing scheme [HLS] (...) at least 25% of the animals have to be cattle, and 25% have to be ponies [to balance, as they have different ways of grazing and thus different impacts on vegetation]. At that time, when we first joined the Scheme, there weren't enough cattle out, so [there were financial incentives and] now we have more cattle.

Later, in 2015, the BPS had encouraged commoners to keep larger herds, receiving around £450 per head of cattle and over £250 per equine, with no cap (*pers. com.*), and the number of cattle increased significantly, surpassing the number of ponies for the first time since 1965. It is worth

noting that unlike pony owners, a small number of people owns the majority of cattle<sup>98</sup>, so any change in this small group has a marked effect on the number of cattle depastured (Ivey, 2011, p. 37).

### **6.2.1 Ponies: from assets to cultural icons**

The preference for ponies can be linked to the aforementioned influx of urban newcomers and the changing rural economy in the New Forest. On the one hand, turning out ponies is more easily combined with a full-time job, not requiring regular attention and skills as cattle do (e.g., supplementary feeding over winter). On the other hand, and perhaps more importantly, the preference for ponies is attached to cultural, post-pastoral values. It illustrates the changing roles of livestock in the post-productivist countryside – what Owain Jones describes as the “counter-urbanisation and urban middle-class ‘capture’ of the rural dream” (Jones, 2013, p. 425). As a member of the Verderers put it, ponies “used to be assets in the past and are now pets.” These changing roles might explain why ponies are still turned out despite the poor economic returns in the pony market and even some losses. As described by a commoner,

I've been doing a bit of sums recently and calculating the cost of being a commoner on the New Forest. I can tell you that it's not cheap. After registering my mark, having my brand made, joining the New Forest Pony Breeding & Cattle Society and the New Forest Commoners Defence Association, paying my grazing fees and getting the Agister to brand my ponies, I'm rather out of pocket. Then of course I need specialist insurance to cover me if, God forbid, a hit and run driver should injure or kill one of my ponies (...) Many of my friends think I must be mad to commit such hard earned resources to a project that, when I sell my first foal, will not yield any higher return than you'd pay for a round of drinks in the pub. But of course they're missing the point. Nothing can be more rewarding than supporting a way of life that has been practised for generations, or in going out on the Forest looking for your stock and finding them safe and well. (New Forest Commoner, 2014)

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<sup>98</sup> According to the last census, only 1/5 of the commoners turned out cattle. Of these, 18% have more than 30 animals and these account for over half the cattle depastured (Ivey, 2011, p. 37).

Since the Second World War, ponies had been valued for their aesthetic, “cuddly charisma” (after J. Lorimer, 2007) and the recreational encounters they provide, which carry “echoes of a rural past where animals were much more visible in society” (Garner, 2001, p. 137). In fact, the “cuddly ponies” (Ivey, 2007, p. 76) are one of the main attractions to the Forest. In the visitors’ perspective, ponies are there “for their amusement, whether just to look and photograph, or to feed and pet” (Ivey, 2007, p. 72), which is nevertheless contrary to the Verderers’ byelaws. Ponies are “cultural icons,” appropriated as symbols of authenticity and identity (cf. Garner, 2001; Ivey, 2007). Their image appears recurrently in tourist brochures, magazines, postcards and logos of local institutions (**Figure 48**), as quintessential “signifiers of the landscape of the New Forest” (Garner, 2001, p. 136). This resonates with what Richard Bulliet (2005) refers to as ‘postdomesticity’. According to him, it encompasses a removal of most consumers from the reality of intensive livestock production, the waning of direct, daily contact with productive domestic animals, and “a powerful desire to humanize animals of all sorts, including farm animals” which are incorporated into romantic visions of a bucolic past (Bulliet, 2005, p. 25; see also Hurn, 2011).



**Figure 48:** The NFNPA’s logo depicting two New Forest ponies

When describing the different attitudes of the urban, middle-class new residents towards ponies and cattle, Francis Kenchington<sup>99</sup> mentioned the following:

[They] were very sound on amenities, but not quite so sound on the ecological processes at work, and not quite so warm to the commoner's cattle as to his ponies. Everyone loved the ponies, used the ponies, liked to see them about to give a distinctive and characteristic life to the scene. Cows, young heifers, or even calves were far less popular. Even quite nice old ladies have a quite irrational virgin timidity of that sweet-tempered, placid, and friendly creature the cow. Hearts flutter with the fear of a wild bull when nice, hand-suckled, bucket-fed babies approach companionably or curiously, and the wholesome, spicy-sweet, drowsy smell of cow is abomination in their nostrils. (Kenchington, 1944, p. 126)

While this consideration regards the first influx of urban migrants to the New Forest (late 19<sup>th</sup> century)<sup>100</sup>, it still holds true nowadays. Indeed, the majority of new and young commoners, some with no agricultural background, tend to prefer turning out ponies rather than cattle (cf. Ivey, 2011; New Forest National Park Authority, 2016).

Ponies help establish a shared 'local' identity amongst the commoners, as has been suggested by different authors in distinct decades. For instance, in the 1940s, Kenchington considered the Forest pony as "a tribal god among the commoners" (Kenchington, 1944, p. 173). In the 1960s, Vesey-Fitzgerald explained that the few new commoners that continued commoning had ponies not as "cash crop, as was the case with the genuine Commoner," but as a "social symbol" (Vesey-Fitzgerald, 1966, p. 189). In the 1980s, Tubbs stated that for most commoners "running ponies on the Forest is an unbreakable habit" (Tubbs, 1986, p. 105), "central to a way of life" (Tubbs, 1986, p. 111). Nevertheless, there is little interaction between commoners and the

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<sup>99</sup> Kenchington was an agriculturist with family roots in the New Forest that moved to the Forest during World War II as part of the County War Agricultural Committee. With the aim of reducing wartime dependency on imported food, his work focused on the agricultural cultivation of the New Forest.

<sup>100</sup> The building of the railway in 1847 made the New Forest accessible to wider populations, beginning an "influx of cultured leisured middle-class folk of education and comfortable means, to take up residence in the New Forest" (Kenchington, 1944, p. 87). These incomers expanded the community originally comprised of landed gentry and agricultural commoners (Edwards, 1995, p. 182; Lascelles, 1915, p. 9). The 1960s marked the second phase of urban newcomers to the New Forest.

depastured ponies, which are adapted to thrive on the Open Forest all year round and are rarely handled. The relationships between ponies and commoners is well illustrated by the following passage from a blog that aims to raise awareness of commoning:

[A commoner] said of the Forest ponies ‘they are a bit indifferent to us’. And it is so true. The ponies are living a wild and free life. We watch over them, are proud of them, fear for them and care for them as best we can, but they are free. They must find their own food and fend for themselves; people are simply a distraction in their daily routine. It is fascinating to observe the ponies on the Forest, for most of the year you can ride up to them to check them over and they ignore you. (Stride, 2018)

### **6.2.2 Ecological implications**

The increase in the number of ponies depastured, for which there is no demand, has had ecological implications. As mentioned in §1.3.1 and §3.1.1, the entire structure, dynamics and ecological functioning of the forest has been determined by the fluctuations of the large herbivores’ populations over the centuries (cf. **Figure 6** and **Figure 47**). The Forest relies on there being a mix of grazing and browsing pressures due to the large herbivores’ distinct habits and feeding strategies (New Forest National Park Authority, 2015, p. 135). This needed mix is however compromised by the rising number of ponies. As non-ruminants, ponies require larger amounts of food and longer periods of continuous feeding (75%-88%) than individual cattle or deer, which are both ruminants (Tubbs, 1986, p. 123, 1997, p. 10). They thus make greater demands on the vegetation.

The increasing number of ponies also has impacts associated with their management. For instance, greater demands on vegetation require more burnt areas to stimulate the regeneration of heath vegetation, for grazing improvements. This is a source of tension, as will be explored later in the chapter. Moreover, due to the difficulties of disposing of ponies, for which there is no market, breeding is also controlled. In fact, the age and structure of the population have been grossly modified by management since the 1980s (Tubbs, 1986, p. 117). To control stock

levels, only geldings (castrated ponies), mares and young foals may be released onto the forest all year round. To reduce the number of foals, for which there is no market, young male ponies are taken off the Forest when they are old enough to breed (over 2 years old) and a small number of stallions are only let out for a short period of 4 weeks per year. The basic social unit in the New Forest consists of a mare-foal assembly, rather than a stallion-maintained harem of mares and sub-adults, as in most populations of (semi-)wild horses, where there is a gender and age mix (R. J. Putman, 1986, p. 29/30). This social structure has behavioural and ecological consequences, notably in terms of habitat variation (cf. R. J. Putman, 1986; Vermeulen, 2015). It gives rise to what two ecologists mentioned as “feminised landscapes”, in relation to the predominant sex of ponies allowed to be out. As an ecologist from the Hampshire & Isle of Wight Wildlife Trust explained,

We’ve got a completely feminised landscape in that there are no bulls on the Forest, there are very few stallions, the animal behaviour is a behaviour of mostly female herds. And if you go to places like the Oostvaardersplassen (...) you get a proper gender mix in your landscape: you have your female herds, and then you have your bachelor herds, so then you get your lone dominant bulls or stallions, and boy!, do they have an impact on the landscape! (...) they would remove great blocks of scrub, and stand around, and thrush about.<sup>101</sup>

### **6.3 Contesting disturbances**

The NFNPA established a Commoning Review Group in 2006. One of the commissioned reports explored the conflicts between commoners, non-commoners, visitors, and other organisations operating in the New Forest. One issue stood out from the report: commoners often felt unwanted and marginalised, with their rights placed second to the demands of recreation, conservation and local economy:

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<sup>101</sup> For instance, fighting stallions turn up soil (e.g., horses regularly create sand baths), causing variations in open soils and closed fields; dominant stallions “want their scent to be most prominent, and so defecate on top of others’ scent, creating huge dunghills, which in time become nutrient hotspots for vegetation, causing local differences in plant communities” (Vermeulen, 2015, p. 21).

[The] public came to see their animals, and did not care how or why the spectacle was brought to them. One commoner said [in 1991]: ‘Commoners should be recognised in their own right for the hardship they’ve suffered, keeping the Forest well maintained for the public to come here and enjoy. (...) you get the impression that we are still looked on as glorified lawn mowers, and the only reason we are tolerated is because they can’t find a way of maintaining the New Forest any cheaper.’ (Ivey, 2007, p. 69)

This consideration illustrates an important characteristic of the post-productivist transformation of rural areas like the New Forest. Besides the re-creation of the social, political and biophysical landscapes, already explored, it encompasses changing, complex and sometimes conflicting interactions between farming, forestry, recreation, and conservation. To a great extent, such conflicts regard disagreements over how the land *should* be used and managed, and ultimately what it *should* look like. They are grounded in contrasting values and perceptions of the landscape, as well as distinct vested interests. They tend to be more complicated than tensions between old and new, rich and poor, insiders and outsiders, as often referred in studies addressing rural conflicts. Overall, these conflicts in the New Forest involve three main groups:

- i) **‘Traditional’ commoners**, including the agisters and Verderers who represent them, and **long-term residents** (hereafter commoners);
- ii) **Ecologists and conservationists** (representatives from the Forestry Commission, Natural England, National Trust, NFNPA, and Hampshire & Isle of Wight Wildlife Trust, as well as wildlife-enthusiasts) (hereafter ecologists);
- iii) **Amenity users**, including visitors and the urban newcomers.

While the social environment is complex and heterogeneous, with differences also within each group, the actors representing each group share similar interests and cultural viewpoints. These three groups are thus useful analytical categories to address the cultural politics of managing disturbances, namely how the ‘post-pastoral’ comes to shape the management of disturbance regimes and how this process is contested.

Below, I provide two examples related to the management *of* and *for* ponies. They provide an overview of the main sources of tension between the three groups, whose interests align in some cases, and at other times collide. The first example pertains to contrasting perceptions of working and leisure landscapes. The second example is focused on the politics of choreographing disturbances through controlled burning. At the core of the tensions lie debates over disturbances as work and how these are ‘naturalised.’

### 6.3.1 Working and leisure landscapes

One of the main sources of friction in the New Forest resulting from the changes outlined above concerns the different meanings and values ascribed to the landscape and to the commoners’ animals. These can be summarised as follows:

Visitors to the forest (...) may naively assume that the docile grazing stock are tame, and not herd animals with fight or flight instincts. (...) [Despite] the appearance of a tranquil idyll, the forest is neither a petting zoo, nor a country park, but a working landscape, demanding care and attention from all who use it. (Verderers’ Court, 2011, p. 7)

As I heard again and again during my fieldwork, for the commoners and ecologists, the New Forest is a living, working landscape. It is, following Paxson, an example of “cultured nature”: a post-pastoral landscape that is lived-in and worked-over (Paxson, 2013, p. 18). In contrast with the industrial agriculture’s technoscientific domination of Nature (work *on* nature), it is worked collaboratively by human and nonhuman agencies (work *with* nature). The semi-feral grazing stock, notably the ponies, ‘work’ alongside commoners, foresters and ecologists, being valued for what they *do* as disturbance agents. Through their grazing and trampling, they assist in the management of the heathland, open woodland and lawns, and thus help to maintain the Open Forest’s unique landscape and habitats (**Figure 49**). Moreover, in suppressing scrub and keeping the landscape open, they create favourable habitats for some of the UK’s rarer species of plants (e.g., wild gladiolus, *Gladiolus illyricus*), birds (e.g., Dartford warbler, *Sylvia undata*) and

reptiles (e.g., Sand lizard, *Lacerta agilis*). They are a desirable disturbance from an ecological viewpoint, although this ecological role has only been acknowledged since the 1960s/70s. It is indeed an unintended consequence of the primarily economic and cultural roles that commonable animals have historically played.



**Figure 49:** Ponies grazing in the Open Forest

Ponies play crucial roles in heathland management in collaboration with human skills and labour, such as cutting and controlled burning by the Forestry Commission, which is a form of ‘artificial management’ for grazing. As an ecologist from the Forestry Commission put it, “We don’t manage grazing; we manage *for* grazing.” Management for grazing entails other types of ‘work’, both by humans, such as checking stock regularly, haymaking and pony annual drifts<sup>102</sup>, and non-humans. For instance, during the pannage season, pigs are allowed in the Forest to eat fallen acorns that can be poisonous to ponies and cattle, making “their contribution to the

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<sup>102</sup> Drifts are annual round-ups of ponies in the autumn, for health checks, worming, branding and tail marking, after which they are ‘turned back out’ (see **Glossary**).

successful pasturing of other livestock” (Stover, 1985, p. 40). To avoid causing any further undesirable disturbance through rooting, rings are clipped into their nose<sup>103</sup> (Figure 50).



**Figure 50:** Pig with nose rings in the New Forest  
(©Richard New Forest, licensed under [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/))

Understood in this way, the New Forest’s working landscape is created and managed *by and for* large herbivores, mostly ponies. These are presented as “the most practical and cost-effective means” of providing the valued grazing (Illingworth et al., 1991). In this sense, besides being ecologically valued, ponies also provide a cheap form of labour (cf. J. Lorimer, 2018).

In contrast, most of the visitors perceive the Forest and the ponies as a *spectacle* to be enjoyed. They are part of an “idealized landscape” (Grant & Edwards, 2008). To use the expressions mentioned in the quote from the beginning of this section, the landscape is considered a ‘tranquil idyll’, a ‘petting zoo’, a ‘country park’. Instead of working animals, ponies are (re)imagined, to use Wood’s terminology, “in an almost wholly aesthetic sense (...) [being] expected to act as ‘props’ for an imagined rural idyll” (Woods, 1998, p. 1226). Contrary to the

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<sup>103</sup> Pig-ringing is an example of “coercive technology for enrolling farm animals into agricultural production collectives,” according to Owain Jones (2013, p. 296/7). In the New Forest, it is required by local regulations (New Forest Act 1949).

“less spectacular” cattle (Pasmore, 1976, p. 92), more readily perceived as farm stock, ponies occupy a liminal position. They are perceived to be ‘wild’, in the sense that most of the visitors are unaware of their ownership, but tame and ‘docile’, behaving in predictable ways:

The most common misconception amongst visitors still appears to be that the ponies are ‘wild’ and owned by no-one. Moreover, they may think they have a certain ownership of them: they are there to be fed or petted, to have children put on their backs. (...) If there is a bad outcome, the visitors may take action to address their grievance that ‘their’ New Forest did not provide the safe and trouble free experience that they have come to expect from ‘theme park’ Britain. (Ivey, 2007, p. 76)

These clashing perceptions and attitudes towards the landscape and ponies create tensions between visitors, commoners and ecologists regarding their management. There are, on the one hand, direct interferences with management activities. For instance, according to an agister,

[It] is very difficult to go and do something on the forest without there being like 50 people that you’ve got to consider before you do it. We run the annual drifts, of which we’re talking (...) of people on horses, galloping horses, and public, and dogs, and children do not mix. So it’s quite difficult to just do what you want to do and be safe. (...) people just think that (...) they have a god-driven right to get here, come here, do it, and we’re just kind of getting in their way, really, rather than actually being the other way. They’re actually getting in our way of trying to keep this working forest actually carrying on as it should.

There is a sense amongst the ‘traditional’ commoners that the majority of people who live and work in and around the New Forest area is unaware of its ecology and commoning. This can be attributed to the shifts mentioned throughout this chapter. In fact, “public ignorance, urbanisation and pressure of tourism” was listed by commoners in the last Commoning census as the second most serious problems that commoning faces, behind “high costs/poor returns” (Ivey, 2011, p. 13). As the same agister further argued,

I can realise why they want to come here, but I just sometimes would like them to realise what the forest is all about, and I think it’s maybe lack in education. They’re not realising what we’re doing when (...) all these horses are galloping around, and they’re walking on a weekend with

their child and think “what the hell are these people doing?” Do you know what I mean? It’s not for fun, it’s for management, and I think they probably don’t realise that.

This distinction between ‘fun’ and ‘management’ is relevant to explain what lies at the core of tensions between the two perceptions: how work is differently valued and understood. Within a working landscape, ‘work’ in the form of management is needed, both by humans and non-humans. For those who manage the New Forest, management is considered more important (and serious) than recreation or ‘fun’. On the contrary, management is not entirely understood by visitors and does not fit in their idyllic, timeless landscape (i.e., a landscape that is understood to be unchanging).

Tensions between perceptions of *working* and *leisure* landscapes are also present when it comes to the management *for* ponies. This is clear when it involves an interference in the landscape, such as burning, which will be explored in the next section. Besides the lack of knowledge, the resulting conflicts are also grounded in aesthetics and a resistance to changes in the landscape that might disrupt the public’s stereotyped image of rurality. According to an ecologist from Natural England,

That’s a new twist on the whole difficult story of management [of the New Forest] (...): the public have sort of an idealised view. There’s a core of people who are local and are used to the management (...) and the change that goes on in the forest, and they let it go ahead. But there’s a lot of novel people that have moved into the area, and retired into the area, and got a lot of time on their hands, and they like to keep their bit of the forest looking the same. And of course, it never looks the same because there’s slow change all the time. People don’t notice slow change, but they notice a quick change of trees suddenly being chopped down.

The contrasting perceptions of the landscape explored in this section raise important questions related to land use and management, which is tied to the maintenance of the New Forest’s valued character. Following the rural restructuring and growing power of the amenity users’ voices and perceptions, there might be pressures to change management regimes, more focused

on amenity and aesthetic values, rather than ecology and conservation. Against this scenario, commoners and ecologists have been defending the need to maintain and preserve the tradition of commoning, in order to keep the New Forest's ecological and recreational values. This was reiterated and summarised in a response by the Commoners Defence Association (2018) to DEFRA's *Review of Designated Landscapes 2018-19*<sup>104</sup>:

For commoners it is vital that the New Forest continues to be a working forest, resilient to change but maintaining its cultural heritage (...) The more the landscape becomes a retirement or commuter home for the wealthy few, the more it is "tidied" and becomes a manufactured depiction of a "national park." (...) Despite considerable educational efforts few seem to understand the benefits they enjoy due to the grazing, or appreciate the exceptional biodiversity associated with the grazing of the heaths, mires, and woodlands.

### 6.3.2 'Working the ground'

Controlled burning is since the 19<sup>th</sup> century an 'official' heathland management practice in the New Forest<sup>105</sup>. It is currently carried out by the Forestry Commission's as part of its statutory duties under the New Forest Act 1949, for both grazing and conservation purposes (**Figure 51**). Together with grazing and other anthropogenic disturbances (e.g., cutting), burning helps to maintain the 'traditional character' of heathlands, which are one of the most iconic sceneries of the New Forest, and allows them to remain in a stable state (cf. **Figure 7**).

In order to flourish, heathland vegetation communities (heather (*Calluna vulgaris*), common gorse (*Ulex europaeus*) and purple moor-grass (*Molinia caesulea*)) need to be controlled and frequently disturbed. Burning removes old growth, creates early stage succession, stimulates

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<sup>104</sup> This consisted of an independent review into whether the protections for National Parks and Areas of Outstanding Natural Beauty are still fit for purpose. It was commissioned by the government in response to the 25-year Environment Plan (see DEFRA, 2018).

<sup>105</sup> Although burning has been practiced by the commoners since at least the 18<sup>th</sup> century (e.g., Gilpin, 1791; Sumner, 1910), it was only adopted by the Crown in 1870. This was an attempt to prevent incendiary, 'unofficial' heath fires lit by the commoners, in response to the Crown's inclosures and the perceived decrease in the quality and quantity of grazing available to depastured stock (cf. Edwards, 1995, pp. 162, 216; Pasmore, 1976, p. 100/1; Tubbs, 1974, p. 303).

regrowth and hence improves the quality of vegetation, while hindering invading woody shrub (e.g., birch (*Betula* spp.) and pine (*Pinus* spp.)). Burning also provides a nutritious food source for commoners' animals and creates habitat diversity by maintaining a mosaic of heathland plants in different growth stages, which benefits bird, reptile and invertebrate species (Forestry Commission, 2008, pp. B5-23). According to an ecologist from Natural England that is responsible for the New Forest area, controlled burning mimics a natural process:

we need to recreate what the large herbivores would have done, which is [what] the cattle and ponies [do], and we recreate wildfires that would have happened, which is burning heathland. So, we have to do those little bits of nature because no one is going to let the New Forest burn randomly as a massive wildfire, are they?



**Figure 51:** Keepers undertaking controlled burning (Copyright Sally Fear; reproduced with permission. Source: Fear, 2016, p. 168)

Burning in the New Forest has been a particularly contentious issue since the 1960s, when non-productive land uses came to the fore, particularly conservation. Following conservationists' pressures and demands, the area burnt annually was reduced from 800-1,200 hectares to an average of 400 hectares in 1965 (Tubbs, 1974, 1986). This was due to the apparently diminishing area of mature heathland vegetation, particularly gorse, which is rich in birds, reptiles and

invertebrates. Around this time, the fencing of the New Forest's perambulation and increasing recreational facilities reduced the available grazing areas, whilst the number of stock depastured kept increasing, mostly ponies. This situation led to tensions between commoners and ecologists, concerning desirable burning regimes, as the following cutting from a local newspaper illustrates, reporting on heathland management in 1991/2:

The simmering row over the shortfall in controlled burning on the Forest was ignited again at last week's New Forest Consultative Panel<sup>106</sup>, when one member warned that it could lead to indiscriminate torching. (...) [He] criticised the way that the Forestry Commission's burning areas had been reduced and the programme had fallen behind schedule. There had to be a balance between the views of the conservationists and the wishes of the commoners (...) but it seemed that the balance had tilted away from the commoners. (...) English Nature's spokesman, Colin Tubbs, said he did not think his organisation was the problem. The burning programme had to be agreed between all the parties "which means it has to be a compromise between the conflicting views very often." ('Commoners suffer from lack of scorched earth', 1992; retrieved from Forestry Commission, 1993)

There are two major sources of tension around controlled burning: the need for burning and the extent of it. To begin with, ecologists and conservationists have not always been in favour of burning as a heathland management tool. As explained by a former ecologist from Natural England,

[By the 1970s] there was a lot of conflict between those who wanted to burn, and those who didn't want to see things burned. And that probably was still until the 1980s. It was very much how one viewed the burning in the Forest. It was a contentious issue. (...) ecologists were very much against burning, whereas today we are in fact in favour of burning.

Even today, not everyone is in favour of burning, especially wildlife-enthusiasts that live in the New Forest. Some argue that it actually has detrimental effects on the heathland by reducing the nutrients in the soil. As I was told by a volunteer from the New Forest Heritage Centre,

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<sup>106</sup> Established in 1971, the New Forest Consultative Panel is a discussion and advisory forum for voluntary and statutory organisations with an interest in the protection and conservation of the New Forest. These represent local communities, recreational and environmental groups, land managers and local authorities.

with a background in wildlife conservation, “I question why burning is necessary. There is not enough evidence... They should have ecology as priority, but the current status is too biased for the grazing stock.” Some of these issues resonate with wider debates around burning, for example on grouse moors<sup>107</sup> in Northern England and Scotland, which has been heavily contested by conservation groups, like the RSPB (e.g., Avery, 2015; Fowlie, 2018). Drawing on scientific evidence that demonstrates the damaging impacts of burning, they advocate for the end of it. Moorland burning is also contested by rewilding advocates in national parks such as Exmoor and Dartmoor, where it is targeted towards livestock grazing (e.g., Monbiot, 2016). While the set of interests and actors involved in these cases is different, there are similar worries that recurrent burning prevents regeneration, simplifies and damages ecosystems, prioritising grazing/shooting at the expense of ecology.

Visitors, in turn, “see burning as being the wrong thing to do,” according to a Verderer. This is mostly due to aesthetic reasons. Often mistaken with wildfire, burning is perceived to be ‘out of place’, undesirable. As an ecologist from the Forestry Commission explained, “they think that what we are doing is damaging and impacting, but [it] is not, on the short time.” Burning, and in particular how the landscape looks like afterwards, does not fit in the general public’s image of an *unspoiled* landscape. When walking in the New Forest, for example, I passed by an area that had been burnt and cut recently. When I stopped to take the photo in **Figure 52**, a couple in their 60s who was not from the area approached me. Focusing on the physical condition of the pony, the lady commented: “It is so thin that we can even see his ribs! Poor thing has nothing left to eat, only dead things. I feel like I’m in a cemetery.” The husband added: “Indeed! Desolating view!” This echoes some studies about the social and symbolic dimensions

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<sup>107</sup> Prescribed or rotational burning (also called muirburn) is one of the management techniques conducted in grouse shooting estates to create favourable conditions for red grouse, together with drainage and predator control.

of natural disturbances that involve the transformation of landscapes (e.g., insect outbreaks, wildfires, etc.) and contrasting understandings of the post-disturbance landscapes (cf. §2.4.2).



**Figure 52:** Pony amongst burnt and cut vegetation in the New Forest

Nowadays, although most ecologists and commoners tend to perceive controlled burning as a favourable disturbance, there are, however, continuing disagreements over the extent of burning, notably in terms of frequency and size of the area burnt. Ecologists and commoners want different fire regimes, tied to their own interests and perceptions of how and to what purposes the landscape should be managed. Commoners, on the one hand, have pressed for more and bigger areas burnt, particularly after the aforementioned reduction of grazing and burning areas. They also want areas to be more frequently burnt, to produce a higher proportion of young, palatable growth for their stock, and thus improve the forage value of the heaths (**Figure 53**). This is particularly important for ponies, which stay out in the forest throughout the year, as it contributes to maintain a good condition over winter. An additional benefit of controlled burning, unlike other types of heathland management (e.g., cutting, swiping), is the control of parasites and diseases, such as Lyme Disease (*pers. com.*).



**Figure 53:** Re-growth after a burn provides fresh forage for ponies (Source: Chatters, 2009, p. 65)

For conservation, on the contrary, a larger rotation and smaller burns are desirable to produce a patchwork of different age structure. Some commoners, however, perceive this as opposed to the Forestry Commission's duties to secure that "the grazing will be kept sufficiently clear of coarse herbage, scrub and self-sown trees" (New Forest Act 1949, §11). Besides, ecologists and conservationists want to make sure that they are not damaging any species of conservation importance. The Forestry Commission, in turn, has to find a balance between the commoners' and the ecologists' perspectives. As explained by a member of the Open Forest management team, "In the end, we are not managing for ponies or species x, but for the habitat, the whole."

An ecologist that has been involved in the burning programme for the last 30 years, first in Natural England and now as an appointed Verderer, explained that, to reduce conflicts, "over the last twenty or so years we have managed to come to a sort of agreement about the amount of burning and the way it is done." This agreement pertains to the total area burnt (around 2% across the Crown lands, distributed in smaller patches) and timing (burning is undertaken between November and end of March and in rotation). Furthermore, the areas to be burnt each year are identified, assessed *in situ* and approved over the summer by the Open Forest Advisory

Committee<sup>108</sup>. Areas tend to be suggested by commoners and keepers, which reduces controversies, although local conservation issues are crucial for the final decision. As the same ecologist further argued,

the way it is at the moment is sort of driven by the commoners and in a sense I think it's quite a good way of managing it (...) it leads to less criticism, because if somebody else did it, I think they would probably criticise what we would have done. Too early, or too late, or whatever! (...) [M]ost of the areas [suggested] get agreed to these days, but Natural England can still say "no, I don't want to burn that yet, it's still very good habitat for warblers, they will use that for other 2 or 3 years at least" (...) [The commoners] don't have everything their way as it was, but I think it works quite well, that they put the areas in the first place.

This type of planning without a set plan (i.e., inductive, as considered in the previous chapter) is also beneficial from a conservation perspective because it creates dynamism. According to a member of Natural England involved in the process,

what is good about that ad hoc management is it allows things to change all the time, whereas if you had a structure, and a plan, and you would run and did every single bit, you wouldn't get that. So ad hocery is a very good thing in my view.

Despite the agreements, compromises and consultation previously mentioned, which greatly minimised the conflicts, controversies remain around the size of the area that is actually burnt each year. In 2013, for instance, when only 46% of the burning programme target was achieved, concerns were raised at the “relatively little burning that took place over the winter” and “failure to undertake the agreed area each year,” which “may result in more people questioning its necessity and objecting to its continuation” (Verderers' Court, 2013, p. 9).

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<sup>108</sup> The Open Forest Advisory Committee is run by the Forestry Commission to consult over management of the Open Forest. It includes members of the Forestry Commission, Verderers, Commoners Defence Association, Natural England, Friends of the New Forest (former New Forest Association), Hampshire & Isle of Wight Wildlife Trust, Environment Agency, Lyndhurst Parish Council, RSPB, and individuals with a key interest in the Open Forest.

The tensions and different burning regimes advocated by commoners and ecologists provide interesting insights to the idea and metaphor of “working landscape” explored in the previous section, specifically around choreographing disturbances. Although the two groups imagine and desire different disturbance regimes, both appeal to and rely on ‘natural’ justifications to legitimise their values and interests.

To begin with, both commoners and ecologists acknowledge that the New Forest’s heathlands are the result of a collective undertaking of human and nonhuman agencies, whose *work* is crucial to maintain the “unique landscape and habitats so characteristic of the Open Forest” (Forestry Commission, 2008, pp. B5-1). In this “collaborative landscape” (after Plumwood, 2006), grazing and fire play a crucial role as key management technologies (cf. Fuhlendorf et al., 2009). In a report about the Open’s Forest management, for instance, it is stated that “burning, next to grazing, is the most important way that heaths were kept open traditionally” (Forestry Commission, 1993). A former ecologist from Natural England explained this interdependency as follows:

I think if we didn’t have burning, we would find it very difficult to actually maintain the heathland over a long period of time. (...) the woodland would come in at the edges and gradually, gradually, it would close in, and I think we would lose it [heathland] without the burning. We have the grazing animals, and they do a very good job, but they don’t seem to be able to stop the vegetation. Unless there are very high densities of animals, you will see the vegetation will win over the grazing.

The New Forest heathlands are thus a “multiply disturbed” feral landscape assemblage, emerging from a gathering of ways of being: humans, large herbivores, heath vegetation, soil, and fire (cf. Tsing, 2017b, pp. 10–11). They are “unnaturally being kept natural,” as an ecologist from the National Trust put it.

When it comes to the different burning regimes advocated by commoners and ecologists, they ultimately pertain to perceptions of appropriate types and degrees of disturbance or “working

the ground,” to use a term employed by a member of the Verderers. For commoners, working with fire maximises the productivity of heathland vegetation and increases the grazing capacity for their ponies, the so-called ‘architects’ of the forest scenery, without which the landscape that is also valued by ecologists and visitors would not have its traditional character. For ecologists, in turn, burning allows regeneration and helps to keep the heathland open, dynamic and free from being colonised by trees, which in turn is crucial for some species of conservation relevance. It is targeted towards wildlife and habitat management. Ecologists want to make sure that the land is worked over in a way that allows regeneration (right intensity and timing), within the vegetation life cycles. Compared to other heathland management options, such as mulching or cutting, burning is considered “the best option”:

A discussion took place on the merits of burning versus mulching. At Hilltop an area of old gorse has been mulched and the resulting thick layer of dead vegetation appears to be preventing any regeneration. This is in contrast to areas which have been burned, where regeneration is obvious. (Verderers’ Court, 2017, p. 10)

Although heathland vegetation results from a collaborative work between humans and nonhumans, it is “naturalized” and used as justification for the desired burning regime. However, as Paxson (2018) considers, “nature does not naturally work”: the nonhuman entities involved are imbued with a capacity to work and contribute to the making of the landscape, but not under conditions of their own choosing (see also J. Lorimer, 2018).

## **6.4 Conclusion**

In this chapter, I have explored how the ‘post-pastoral ethos’ has come to shape the management of the New Forest’s disturbance regimes and the contestations herein. I traced the main socioeconomic, political and ecological changes associated with the diversification of land uses. Through the example of the depastured ponies and their management, I have explored how the shift towards post-productivism and the controversies generated around forest

management are both cultural and political, with ecological implications. On the one hand, commoning shifted from an economic practice to an eminently cultural one. The rising number of ponies in spite of their unprofitability is telling here. It illustrates the cultural values attached to livestock, beyond production. On the other hand, the increasing power of conservationists, as well as counterurbanisers and visitors, has been contested. I analysed this through two examples of the management of disturbances (grazing by ponies and burning) and the controversies generated. These pertain to competing understandings and meanings of the landscape and appropriate management. Ultimately, I argue that they rely on contrasting values and perceptions of different types of work within the idea of working landscape.

Working landscape is indeed a key concept and metaphor that runs throughout the chapter. According to some authors, this term conveys an implied reconciliation of production, consumption and environmental protection, and could provide an alternative to dualistic framings (preservationist/productivist, nature/culture) embedded in conservation and rural policy (e.g., Abrams & Bliss, 2013; McCarthy, 2005). It nevertheless masks tensions over land use practices and understandings of the countryside and human-nature relations, as the examples above demonstrate. While this term has been used to a great extent as a synonym of humans working *on* the landscape, I align with and contribute to more relational understandings which consider it as a collaborative, hybrid work between humans and nonhumans (cf. Plumwood's (2006) critique of the concept of cultural landscape). To this end, I drew on Paxson's (2013) understanding of working landscape through the post-pastoral. The artisan cheesemaking case that the author explored shares similarities with commoning in the New Forest, namely the idea of working *with* and shaping the landscape, keeping or recreating a tradition and the fact that it is a "vehicle for social and aesthetic value" (Paxson, 2013, p. 20). It nevertheless has important and interesting differences, such as geographic and historical differences (in the US the post-pastoral started in the 2000s, in the UK it started much earlier),

and perhaps more importantly for the arguments of this chapter, the fact that cheesemaking is also productive of commercial goods and profitable, while the New Forest's pastoral economy has not been functional for a long time. Commoning does not allow to 'make a living', but persists due to cultural and social reasons. It could nevertheless be argued that, by being one of the main touristic attractions, ponies play a major role in fuelling the local economy. In fact, tourism is the largest industry in the New Forest. In 2016, the tourism sector (notably accommodation and food) represented over 30% of all employees (EBIS & New Forest District Council, 2018).

Some of these issues speak to the politics of (European) rewilding, particularly in so-called cultural landscapes that result from complex, intertwining human and ecological histories (cf. Drenthen, 2018; Jørgensen, 2015; Wynne-Jones et al., 2018). Like the two examples presented in this chapter, such conflicts ultimately pertain to distinct values and understandings of working and cultural landscapes, as well as desirable land uses. For instance, the rewilding project at Knepp initially faced mounting local opposition. It was considered 'immoral' because it was reversing productive to unproductive land: "local farmers look in horror at what they perceive as a 'mess' of invaded fields and rank hedges" (P. Taylor, 2006, p. 45). The resident ecologist told me that it was a "cultural thing": "they think they should be working every inch of the land, as always, even if it is not profitable" (cf. Tree, 2018a, Chapter 7). It is also about resisting change, preserving "what is considered as traditional, rural countryside with an aesthetically pleasing, tightly ordered landscape" (Tree, 2018a, p. 301).

Another example, perhaps more heated, concerns the British uplands, where rewilding has been presented in stark opposition to the working landscapes of livestock husbandry and pastoralism. For rewilding advocates, most vocally George Monbiot, these landscapes are ecological wastelands that have been destroyed by centuries of overgrazing (Monbiot, 2013; Wynne-Jones et al., 2018). In Monbiot's words, they have been "sheepwrecked" (Monbiot, 2013, Chapter 9),

accusing sheep grazing to be the primary reason for “the sad state of the British uplands” (Monbiot, 2013, p. 154/5). For farming communities, on the contrary, the working landscape is strongly connected to identity and production. In the Cambrian Mountains of Mid Wales, for example, farmers conceive “the land as home, known through regularly working, walking and observing one’s *milltir squar* (square mile)” (Wynne-Jones et al., 2018, p. 387).

By drawing attention to the entangled socio-political and biopolitical regimes and histories, this research argues for a reframing or reinterpretation of rewilded landscapes as working landscapes. They are to be worked collaboratively by both humans and nonhumans, continuing or reinventing traditional practices. This reframing might be useful to alleviate some of the tensions explored above, making it possible, for instance, to accommodate change while recognising the cultural significance of the past and the practices that have shaped the landscapes.

## CHAPTER 7. Conclusions

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In this final and concluding chapter, I bring together the analyses undertaken in the preceding chapters and discuss the empirical and conceptual contributions of the thesis as a whole. The chapter begins by summarising and reflecting upon the main findings of this research in relation to the three guiding questions reiterated below. Informed by these findings, I then reflect upon the contributions of the thesis to the body of work on which it draws, particularly to contemporary debates around nature-society relations, rewilding and the governance of (wild)life in the Anthropocene. To this end, I refer back to some of the issues identified in the theoretical literature reviewed in **Chapter 2**. By way of conclusion, I consider the practical implications of these findings for the governance of disturbance regimes and for rewilding practice, and suggest pathways for future research.

### **Research questions:**

RQ1. How have disturbance regimes been conceived and governed in the UK?  
How do they differ under rewilding?

RQ2. How do ecologists and forest managers know and enact disturbance regimes?

RQ3. Whose values count in the management of disturbance regimes and how are these contested?

### **7.1 Summary of findings**

As explained in the introductory chapter of this thesis, each empirical chapter corresponded to one research question. Here, I address the three questions by summarising the findings of the corresponding empirical chapters.

In relation to the first research question, **Chapter 4** focused on the bio- and ontological politics of governing large herbivores as part of the forest's disturbance regimes. Drawing upon the example of the New Forest's deer populations, I explored how deer have historically been understood since the 11<sup>th</sup> century within the various forestry periods in the UK and the modes of biopolitics that these understandings have come to shape. To this end, I identified four disturbance regimes based on the ways through which deer have been enacted, and the associated biopolitics: deer as *game*, *spectacle*, *ecological agent*, and *vermin*. These regimes are not mutually exclusive nor sequential; there is often more than one in play at any one time. For each, I explored the 'animal spaces' historically allocated to them and the 'beastly places' made by the deer themselves, considering the intertwined human and nonhuman histories of disturbance regimes. I then analysed the ecological impacts of these various biopolitical modes.

Considering the four dominant regimes, which sometimes overlap, deer-as-disturbance are deemed desirable and killable within controlled and pre-defined sets of objectives and also under a regime of game; undesirable and killable when their beastly places surpass the animal spaces allocated to them, which legitimises their culling. They are targeted primarily as disturbance agents when enacted as ecological agents and vermin, sometimes with unintentional and unpredictable ecological consequences. In all regimes, death is induced by human agents and dead bodies are removed, for utilitarian and/or aesthetic reasons. There are, however, some exceptions, including the cases when deer die because of road traffic accidents, natural death or dog predation. In the final section, I proposed a fifth disturbance regime: deer as *agents of rewilding*. I tentatively explored possible ontological politics at the interface between the biopolitics of rewilding and the four main regimes and modes of understanding disturbances previously described. Drawing upon the example of two processes that are deemed crucial in rewilding but are missing from British landscapes (decay and predation), I explored the frictions, constraints and needed compromises when rewilding runs into orthodox biopolitical modes of

governing life that are more concerned with ‘securing’ and controlling the lives of individual organisms and/or populations, rather than ecologies.

Underlying these biopolitical regimes are not only the competing and overlapping valuations of life and disturbances, but also competing visions of how they are known. These modes of knowing also determine how nonhuman lives are rendered governable and choreographed. This was the focus of **Chapter 5**, which answered the second research question. It explored the knowledge practices through which disturbances are known and enacted by ecologists and forest managers as part of the forest’s disturbance regimes, in their multiple spatiotemporal dynamics. Drawing on three distinct monitoring methods deployed in the case studies to assess deer populations and/or impacts, I compared and contrasted two sets of knowledge practices: *calculating* and *experimenting with* disturbances. For the purposes of the chapter, the former was considered an example of the mainstream, prescriptive approaches to nature conservation and forest management, and the latter an example of rewilding approaches. Both draw on particular ways of imagining future ecologies, which determine how these are acted upon (or not) and ultimately enacted. Whilst calculative practices render disturbances predictable and amenable to control in order to deliver desired ecological properties, experimental practices involve more exploratory and open-ended practices.

The comparison between the two knowledge practices was structured around two axes (*deductive-inductive* and *objective-subjective*). These concern the different modes of knowing that ecologists and forest managers rely upon and draw together, which determine the methodologies followed and the roles of bodies and senses. They inform how emergent and unanticipated ecological properties are worked with (or against). Whereas a deductive mode draws on a set of predictable targets set *a priori*, against which outcomes are evaluated, inductive modes rely on more flexible approaches that work with unpredictable ecological trajectories. The knowledge practices in the New Forest example are closer to what I described as deductive

and objective, while the rewilding experiments are closer to inductive and subjective. However, neither conforms entirely to one end of the continuum.

Attending to the intricacies of practice reveals the multiplicity of ways of knowing and enacting disturbances. It reveals too how rewilding is multiple. Despite its discursive openness to uncertainty and emergent events and open-endedness, rewilding is shaped by past governance histories and involves compromises that relate to the broader local political and cultural contexts. Particularly important are the conflicting values of different groups of actors that have a stake in which future ecologies are accepted following the diversification of land uses in a post-productive countryside.

I explored these conflicting values in **Chapter 6**, which answers the third research question. The chapter focused on the implications of the post-productivist shift in the mid-20<sup>th</sup> century for the management of large herbivores in the New Forest. Through a cultural political lens, it traced the shifting values and powers in discussions about forest management and their implication for the landscape and its management. I explored in particular how the ‘post-pastoral ethos’ has come to shape the management of the New Forest’s disturbance regimes and has been contested. The chapter started by tracing the main socioeconomic and political changes since the 1950s/60s, which altered power dynamics: the increasing importance of the New Forest for recreation, the decline of the pastoral economy and the growing interest in the New Forest’s conservation value. Through the example of the New Forest ponies and their management, I explored how the post-productivist shift and the controversies generated around forest management are both cultural and political, with ecological implications. Commoning shifted from an economic practice towards a social and cultural one. This explains, for instance, the growing number of ponies despite their unprofitability.

The last part of the chapter focused on some of the controversies generated around disturbance management owing to the increasing power of conservationists, counterurbanisers and visitors.

To this end, I drew upon two examples: the management of ponies and prescribed burning (management *for* ponies). These controversies pertain to disagreements over how the land should be used, how it should be managed, and what it should look like. Ultimately, I argue that they rely on contrasting perceptions of different types of work within the idea of working landscape and how they are ‘naturalised’. The chapter concluded by reflecting upon the pertinence of these themes in discussions around rewilding, particularly within European cultural, working landscapes. Some of the contestations and local opposition to rewilding projects ultimately pertain to distinct values and understandings of working landscapes in terms of ‘(un)productivity’ and (un)desirable land uses.

## **7.2 Contributions: Thinking through and with disturbances**

Broadly, the thesis has critically engaged with relational understandings of nature, space and time, as reviewed in **Chapter 2**, to develop a processual approach to disturbance regimes as a means of exploring the implications of rewilding for the governance of large herbivores in the UK. It drew upon a variety of conceptual resources from distinct disciplines, notably the expanding body of work in relational cultural geography, rural geography, political ecology, STS, disturbance ecology and conservation biology concerned with the governance of (wild)life in a post-Natural world. More specifically, each chapter drew upon one main concept (biopolitics, knowledge practices and the post-pastoral), which together pertain to distinct but entangled modes of politics: ontological, epistemological and cultural, respectively. When combined with resources from more-than-human geography, they provide an analytical guide to think about the multiple political ecologies and histories of disturbance regimes and their governance. Below I identify three modest contributions that weave together the preceding chapters.

### 7.2.1 Disturbance as cultural and ecological process

Throughout the thesis, I deployed a processual, relational approach to the governance of disturbance regimes in a post-Natural, ‘weedy’ world. To this end, I developed an understanding of disturbance as a cultural and ecological process that combines multiple more-than-human agencies and multiple space-times. Through this approach, I contribute to the expanding body of work in relational cultural geography developing more-than-human, nonlinear approaches to the governance of life through wildlife conservation and biosecurity. These, however, have tended to focus on nonhuman organisms and populations rather than processes, with some exceptions mentioned in §2.1. They have also tended to disregard temporal dimensions to the detriment of hybrid spatialities. On the contrary, by focusing on long-term and ‘mundane’ disturbance regimes such as herbivory and their governance, rather than sporadic, episodic and/or ‘catastrophic’ ones, I have stressed the relevance of history and temporality for thinking through and with disturbances. Furthermore, I attended to the multifarious agencies involved in the making and governance of the forest’s disturbance regimes at various space-times, considering the historical geographies of forest management.

Thinking relationally with and about disturbances entails noticing the various processes and “polyphonic assemblages” (after Tsing, 2015) (biological, ecological, material, cultural, political, economic, etc.) out of which they emerge. This research explored the synergies between cultural and ecological disturbances by demonstrating how the former have ecological implications and vice versa. The case of the increasing recreational pressures in the New Forest since the 1970s provides a good example. As a response to these pressures, deer have changed their behaviour, either by becoming nocturnal, which in turn has led to changes in the ways they are known (Chapter 5), or ‘semi-tame’, when enacted and governed under a regime of spectacle (cf. §4.2.2). Multiple agencies and temporalities are herein intertwined, creating particular disturbance regimes with intended and unintended consequences. Another example pertains to

equines and heathlands. In **Chapter 6**, I explored the ecological implications of shifting economic and social relations by the mid-20<sup>th</sup> century. These have translated into a significant increase in the numbers of ponies depastured, compromising the needed mix of grazing and browsing pressures that has maintained the New Forest's multiple stable states. Greater demands on vegetation by an increasing number of ponies require more areas burnt, which is controversial from an aesthetic, ecological and utilitarian point of view (cf. §6.3.2). To counter some of the controversies, the timings and areas to be burnt annually are agreed among stakeholders. This inductive management has ecological consequences: it creates dynamism and allows change to happen, similar to rewilding (cf. **Chapter 5**). As successional habitats, heathlands depend on multiple disturbances and provide a good example of the relational understanding of disturbances deployed in this thesis. They emerge from a gathering of multiple and heterogeneous actors and processes: large herbivores, heather, gorse, soil, fire, forest managers, ecologists, commoners, decision-making processes, economic relations, etc.

A processual and relational approach to disturbances thus enables noticing the entangled more-than-human histories that shape anthropogenic, disturbed landscapes such as the New Forest and the more-than-human collaborations they have nurtured. These landscapes are not a mere result of planned human management and the various underlying interests throughout time (e.g., deer hunting in medieval times or timber production in the time of plantation forests in the New Forest (**Chapter 4**), or past uses of the rewilding case studies – intensive farming and deerstalking). They also result from more-than-human 'negotiations' through time (**Chapter 4**), unruly nonhuman agencies that not always conform to established ontological and biopolitical boundaries or to knowledge practices geared towards anticipating future ecologies (**Chapters 4 and 5**), or even broader socioeconomic and political changes (**Chapter 6**) that simultaneously produce stability and change. These considerations are relevant to understand the meanings and implications of rewilding. Deliberate re-entanglements like rewilding, sometimes with

unexpected outcomes, result from specific spatio-temporal configurations outside of which they cannot be analysed. Nevertheless, discussions about rewilding have tended to disregard this aspect. This research contributes to these discussions, by attending to the multiple, intertwined ecological, social and temporal layers underlying the governance of disturbance regimes.

The processual approach deployed in this thesis has also sought to contribute to existing work tracing livelier, relational, and more affirmative approaches to the biopolitics of wildlife management. I engaged with these literatures in **Chapter 4**. Herein, I tentatively explored how biopolitics might be applied to understanding the governance of processes (disturbances in this case), beyond species or populations, with ecological implications. It focused on four distinct biopolitical regimes mobilised in management through the deliberate control of nonhuman agencies and how the latter have folded into or disrupted such efforts, thus noticing the intertwined human and nonhuman histories of disturbance regimes. These regimes can operate simultaneously, either in harmony or friction. To these biopolitical regimes I added rewilding, tentatively exploring the possible ontological politics and needed compromises through the example of decay and predation.

In doing so, the thesis also contributes to emerging biopolitical approaches to rewilding, both conceptually and empirically. The focus on death in an ecological and functional sense, as generative and entangled with life, rather than separated from it, also contributes to more relational biopolitical approaches to wildlife management by extending their scope. It allows us to rethink the understanding of biopolitics as more than “an assemblage of matters of life” (Asdal et al., 2017b, p. 2). It entangles not only humans and nonhumans, but also living and non-living. *Bio-*, *thanato-* and *socio-*political regimes become an ecological ‘milieu’.

### 7.2.2 Disturbance as practice/work

In **Chapter 5**, I drew upon STS and ANT understandings of knowledge as situated practice to explore how knowledges about dynamic natures are gathered and enacted. Although the epistemologies underlying rewilding are often discursively portrayed as departing from and opposed to conventional conservation (functionalist and speculative vs compositionalist and prescriptive), my analysis of calculative and experimental practices as enacted in the three case studies showed that, *in practice*, neither conforms entirely to one end of the continuum. As I will explain below, in practice rewilding is multiple. And so are the ways of knowing and enacting disturbances, which determine the methodologies to follow and the roles of bodies and senses, while also informing how emergent ecological properties are acted upon (worked with or against). Through the concepts of *knowledge of* and *knowing around*, for instance, I also explored multiple and complementary forms of expertise involved in disparate but complicit human and non-human landscape-making practices. These include not only the expert practitioners' knowledge of the landscape they work in and with, but also nonhumans that 'experiment' becoming nocturnal or finding safe places as adaptations to recreation and culling/hunting, respectively. As I argued, understood in this way, the landscape is rather what Ingold defines as a 'taskscape' – an ensemble of practical operations.

This idea of taskscape speaks to the concept of working landscape deployed in **Chapter 6**. I used this concept in two ways. First, as a manifestation of broader socioeconomic and political changes in rural settings, notably the rising power of counterurbanisers and visitors, with important ecological implications that have often been neglected in the literatures reviewed in §2.4. Through the example of the New Forest ponies, I explained how commoning persists for cultural reasons, similar to the example of artisanal cheesemaking in the USA since the 2000s provided by Heather Paxson (see §2.4). However, these two examples have some important differences: contrary to cheesemaking, commoning in the New Forest is neither directed

towards the provision of food, nor profitable since at least the 1970s. It aligns more with (European) post-pastoral visions for rewilding. The second use of the concept relates to the cultural politics of disturbance management. To this end, I provided two examples of the main sources of tension between different groups with a stake on which future ecologies are accepted: contrasting perceptions of the commoners' animals and the landscape (working and leisure landscapes) and the politics of choreographing disturbances through controlled burning. At the core of the tensions lie considerations of disturbances as 'work'. This also extends to rewilding projects, as I argue in the conclusion of **Chapter 6**.

Rather than humans working *on* the landscape, the term 'working landscapes' deployed in this thesis aligns with relational understandings of landscape. It is a collaboration between humans and nonhumans at multiple space-times. Appreciating and framing rewilded landscapes as working, post-pastoral landscapes, wherein ecological processes and functions matter more than the composition of its constituent forms, requires attending to the multiple more-than-human practices and rhythms that go into their making. For instance, the dynamic and heterogeneous ecologies at Knepp are a result not only of the presence of large herbivores and their interactions with vegetation and the soil, but also of their management by the estate manager, of decisions to intervene or not, of the agencies of birds and small mammals that autonomously disperse seeds, of absent crops and agricultural machinery, of spectral presences of fertilisers and pesticides, of emerging ragwort, etc.

At Dundreggan, the desired restoration of semi-natural ancient woodlands entails 'speeding up' the natural process of regeneration within the framework of human generational time through planting and fencing, thereby stopping its more 'natural' and autonomous historical action (cf. Buller, 2013, p. 192; Tsing, 2015, p. 168). It is, however, compromised by the 'semi-tameness' and overgrazing of deer and the 'landscape of calm' derived from past deerstalking practices within the estate, which still occur in neighbouring estates. On the other hand, this framing and

the consideration of ecological processes and disturbances as a collaborative ‘work’ might also contribute to discussions about the political economy of nature conservation, although this was not explored in the thesis. They call into question the more anthropocentric rhetoric of ‘ecosystem services’ and ‘natural capital assets’ underpinning conservation and forest policies that has also extended to rewilding. Indeed, there have been growing pressures from private landowners and both governmental and non-governmental institutions to bring the ‘ecosystem services’ delivered by rewilding to the market (Lorimer, 2017, p. 38; cf. Pettorelli et al., 2018).

### **7.2.3 Rewilding as multiple**

An important aim of this thesis was to explore how the governance of disturbance regimes through rewilding shifts (or otherwise) from normative modes of understanding, knowing and governing life in the UK, which would contribute to the ongoing and increasing discussions around rewilding. As explained in **Chapter 3**, this research adds a new ethnographic experiment and also offers a comparative approach to rewilding that is nevertheless mostly focused on a study site that is not considered a rewilding site, but rather an analogue. This focus, however, provided an opportunity to draw out the importance of temporality not only for theorising disturbance, both also for rewilding thinking and praxis, which is often neglected. Beyond the ontological binaries that are often the focus of rewilding debates (e.g., wild/domestic, distant past/future, autonomous/non-autonomous), it is important to consider the complex and shifting more-than-human encounters through time. As DeSilvey and Bartolini argue, rewilding “must be grounded in histories of landscape co-habitation and co-production, and consider the intersection of past cultural tradition and conceptions of desired future natures” (DeSilvey & Bartolini, 2019, p. 1).

Perhaps more importantly, the analyses undertaken throughout this thesis, and particularly in **Chapter 5**, reveal ‘multiplicities’. This is akin to another body of work that explores what

conservation comes to mean in practice and the ‘conservation multiple’ (see §2.3.1). Whilst discourses around rewilding tend to characterise it as a process-led, non-goal-orientated, hands-off approach, despite the various meanings the term has come to embody (cf. §1.1.1), in practice rewilding is multiple: it often involves compromises and is shaped by past governance histories and the broader political and social context. It is rather a continuum, a ‘hybrid’ practice which is not radically separated from more conventional modes of conservation and forest management.

Underlying this multiplicity are not only the knowledge practices explored in **Chapter 5**, but also practicalities and governance issues that impose constraints and require compromises, which were touched upon in all chapters at some point (e.g., §4.3, §5.2 and §6.4). This is particularly evident when it comes to unanticipated and emergent events. For instance, in the case of ragwort at Knepp (§5.2), its emergence and increasing numbers are considered a positive outcome of land-use changes and of the disturbances created by pigs. It is acknowledged as part of the process and is thus allowed to flourish. The monitoring of ragwort is not intended to be prescriptive or to eradicate it, but rather to assess changes. However, there are some constraints to this non-interventionist approach, such as the grazing animals’ welfare. As I argued, despite an openness to surprises and emergent properties, there are political constraints as to how to respond to those surprises in practice, which bring rewilding into closer alignment with more conventional conservation modes.

Likewise, in the example of dogs-as-wolves explored in §4.3, whereas their role as predators could allow the return of ‘natural death’ and ‘landscapes of fear’ to future landscapes, which is desirable from a rewilding perspective, it raises tensions with biopolitical regimes that tend to privilege fixity, form, and static boundings, such as conservation or welfare. In cases where dogs are already unintentionally performing a predatory role, such as the New Forest, conservationists consider that they have detrimental impacts on wildlife if not kept under

control. At Knepp, too, Isabella Tree criticises in her book the dog-walkers that “allow their pets to rampage off the footpaths, chasing the free-roaming herds and putting up ground-nesting and water birds (...) uncontrolled dogs are yet another burden, to add to the predation by free-roaming domestic cats, putting unwarranted pressure on wildlife” (Tree, 2018a, p. 292/3).

This idea of control is indeed one of the main challenges of rewilding, both in theory and practice. According to a conservationist from Natural England that I interviewed,

One of the things about rewilding is that you have to accept that you do step back if you're to do that properly and that I think would be challenging (...) particularly [for] this generation (...) of conservations who have grown up with the idea of control. (...) conservationists themselves have got to get used to this idea of not being in control, of letting things happen, accepting losses of species possibly in some places, and changes in habitat, and being content with that and not immediately thinking "we've got to do something" (...) it's how we've been engrained for the last 50 years.

In this sense, this study also has implications for conservationists, forest managers and policy makers. In the following and final section of this thesis, I consider these practical implications.

### **7.3 Looking ahead and final remarks**

As explained above, the empirical research and respective analysis carried out throughout the thesis provided interesting conceptual insights and empirical contributions, which are relevant to both social and natural scientific audiences interested in thinking through and with disturbances and in the governance of (wild)life in a post-Natural and uncertain future, notably through rewilding. There have certainly been some aspects of this study that for various reasons have not been included. However, this research can set the agenda for further research that could be of interest to scholars from human geography and cognate disciplines and there is indeed a great deal of potential for more work in this area. This further research could be

empirically extended, for instance, to other disturbance regimes (e.g., flooding, fire, disease outbreaks, predators, etc.), to other British geographies (e.g., uplands, ‘urban’ areas, etc.) or to contexts beyond the United Kingdom. On this note, it is worth stressing that what has been described throughout this thesis is not intended to be generalised in the statistical sense of the word. Rather, it is ecologically, politically and culturally specific. Further research could also be extended to other theoretical topics, incorporating for instance the question of gender within rewilding, which has received little attention to date (cf. J. Lorimer, 2020; Tsing, 2017b), the role of commoning and rewilding in a context of austerity (and possibly after Brexit), or contentious management issues surrounding ‘novel ecologies’ and disturbances, to name but three examples.

Contrary to more positivistic approaches, this research did not intend to look for solutions nor to advocate for or against rewilding. Rather, it intended to provide a critical approach to the issues of disturbance management and rewilding. Nevertheless, the empirical cases and analyses deployed here can be informative for those involved in the direct management of the study sites. They can also be informative for policy-makers, forest managers and ecologists that are responsible for implementing rewilding initiatives in the UK and/or interested in rethinking the role of disturbance regimes and their management in temperate forests.

As has been mentioned in various studies, rewilding is not appropriate everywhere and, in some cases, might be a complement to other forms of management. It often involves compromises in practice, as mentioned above, being context-specific and shaped by past governance histories. There is a need to attend carefully to the intertwined social and ecological contexts and to foster inclusive decision-making processes, at a local and national levels. As an ecologist told me,

[it is better to think of] rewilding as a sort of a journey, a sort of movement towards something that might be completely wild, but on different situations you would have to stop at different points, and in very few circumstances would you ever get to the position of being completely wild.

Perhaps acknowledging rewilding as a journey and thinking through/with disturbances allow us to 'stay with the trouble' (after Haraway, 2016), to consider hope in an increasingly troubling, uncertain, flammable world.

# **APPENDIXES**

## Appendix I: The New Forest throughout history<sup>109</sup>

| Date                | Event                                                                         | Description/historical significance                                                                                                                                                                                                                                                                           |
|---------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1079                | <b>Designation of the New Forest as a Royal Forest by King William I</b>      | Removal of all fences and introduction of the Forest Law, which was set up to protect game species (notably deer and their habitat). It also regulated traditional land uses and rights of common were granted as recompense.                                                                                 |
| 1086                | <b>Domesday Book</b>                                                          | The New Forest was first recorded as <i>Nova Foresta</i> .                                                                                                                                                                                                                                                    |
| 1542                | <b>Assize of Wood and Coals Act</b>                                           | Creation of the post of Surveyor General of the King's Woods to increase the commercial function of the Crown's woodlands. This established the basis for the future exploitation of woodlands for timber, for the 'profit of the King'.                                                                      |
| 1698                | <b>Act of the Increase and Preservation of Timber in the New Forest</b>       | First large-scale efforts at establishing tree plantations, through the creation of Inclosures from which livestock were excluded. The Act also gave statutory recognition to common rights. It nevertheless resulted in conflicts with commoners over loss of grazing land and imposition of the Forest Law. |
| 1808                | <b>Act of the Increase and Preservation of Timber in Dean and New Forests</b> | Confirmed allowances of the 1698 Act, resulting in the enclosure of a further 24 km <sup>2</sup> of common land at any one time, in a rolling programme, for timber production and to reduce the extent of commoning activity.                                                                                |
| 1845                | <b>Opening of the Southampton to Dorchester railway</b>                       | Extended the London to Southampton railway. The railway passed through the New Forest, increasing recreational access. It led to the first influx of urban, middle-class migrants to the New Forest.                                                                                                          |
| 1846-52             | <b>First drainage schemes</b>                                                 | Improvement of the Open Forest for grazing.                                                                                                                                                                                                                                                                   |
| 1851                | <b>Deer Removal Act</b>                                                       | Relinquished the interest of the Crown in deer, which were to be removed from the Forest within 2 years. As compensation, 41 km <sup>2</sup> were enclosed for timber plantations. This enclosure, together with impositions of the Forest Law, provoked large-scale revolts among commoners.                 |
| 1867                | <b>Creation of the New Forest Association</b>                                 | Outcome of the large-scale revolts mentioned above, following the Deer Removal Act and the attempt by the Crown to remove commoners' rights. The aim of the Association, which is still active nowadays, has been to protect traditional rights.                                                              |
| 1877                | <b>New Forest Act</b>                                                         | No further creation of Inclosures permitted, other than that granted under previous Acts, and no further enclosures of Ancient & Ornamental woodlands. Reestablishment of the Court of Verderers to administer common rights and commoning activities, free from the influence of the monarchy.               |
| 1909                | <b>Creation of the New Forest Commoners' Defence Association (CDA)</b>        | Established due to rising threats to the commoning way of life, giving the commoners a more formal voice. The CDA still exists to champion the commoners rights and to defend the forest from perceived development and recreation threats.                                                                   |
| 1914-18;<br>1939-45 | <b>First and Second World Wars</b>                                            | Forest intensively managed for timber production. Extensive areas of native woodlands felled during 1914-1918, which were then converted to exotic conifer plantations.                                                                                                                                       |

<sup>109</sup> Information retrieved from: Forestry Commission (2008, 2019), Newton (2011), and Smith & Burke (2010).

|                  |                                                              |                                                                                                                                                                                                                                                                                                                       |
|------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1920s-30s        | Further drainage schemes                                     | Improvement of the Open Forest for grazing.                                                                                                                                                                                                                                                                           |
| 1923             | Forestry (Transfer of Woods) Act                             | Forestry Commission takes over responsibility to manage the New Forest. In line with national forest policies, it resulted in successive attempts to convert native woodlands to exotic conifer plantations, exploit native woods commercially, and enclose more land.                                                |
| 1949             | New Forest Act                                               | Conservation management of the Open Forest stems from this Act. It sets out requirement for Forestry Commission to maintain drainage and scrub control for grazing interests, which led to significant drainage between 1965-1986. Creation of the Verderers Inclosures in return for compensation payments.          |
| 1959, 1971, 1987 | New Forest Site of Special Scientific Interest (SSSI)        | Designation of parts of the Forest as SSSI in 1959 and of the whole area in 1971. Renotification in 1987 under the Wildlife and Countryside Act 1981, which reinforced the legal status of SSSI.                                                                                                                      |
| 1964             | New Forest Act                                               | Alteration of the perambulation boundary and addition of fences and cattle grids to help control livestock movement and prevent accidents. Forestry Commission and Verderers obliged to give due regard to nature conservation interests. Granted permission to carry out silvicultural maintenance of A&O woodlands. |
| 1969             | New Forest becomes 'National Nature Reserve'                 | 'Minute of Intent' signed between the Forestry Commission and Nature Conservancy Council (now Natural England), wherein the former acknowledged the conservation interests of the latter in the area.                                                                                                                 |
| 1970             | New Forest Act                                               | Enabled the fencing of the A337 through the New Forest. Forestry Commission required to seek the agreement of the Verderers before providing recreation facilities in the New Forest (e.g., car parks, toilets, campsites, etc.). This Act also allows the Verderers to improve the Open Forest grazing.              |
| 1971             | Wild Creatures and Forest Laws Act                           | Abolition of the Forest Law and of any prerogative right of the Crown to wild creatures (except royal fish and swans).                                                                                                                                                                                                |
| 1971             | Minister's Mandate                                           | In recognition of the unique environment of the New Forest, permission was granted to allow forest management to diverge from national policy of large-scale conifer planting, following the woodland crisis 1968-1971. It was renewed unaltered in 1982.                                                             |
| 1991             | Minister's Mandate                                           | Places obligation on the Forestry Commission to conserve the natural and cultural heritage and places a high priority on maintaining the Forest's traditional character.                                                                                                                                              |
| 1993             | Special Protection Area (SPA)                                | The New Forest is recognised as a SPA for the conservation of a number of bird species, under the EU Wild Birds Directive (1979).                                                                                                                                                                                     |
| 1999             | Minister's Mandate                                           | Aims to achieve "a proper balance (...) between conservation, recreation and a working forest environment (...) for future generations," by restoring pasture woodlands, heathlands, valley mires and A&O woodlands. Favours broadleaf trees over conifers.                                                           |
| 2000             | Countryside and Rights of Way Act                            | Legislative requirements place duty on organisations and individuals to promote the interests and sustainability of the Forest and to achieve favourable status of habitats.                                                                                                                                          |
| 2005             | The New Forest National Park Authority (Establishment) Order | New Forest designated a National Park, implementing a recommendation made 14 years before.                                                                                                                                                                                                                            |
| 2005             | Special Area of Conservation (SAC)                           | Proposed in 1995, under the Habitats Directive (92/43/EEC), the New Forest received full status as a SAC.                                                                                                                                                                                                             |

## Appendix II: List of interviewees

The list below summarises the formal interviews (consented, recorded and transcribed) conducted to the three groups specified in **Chapter 3 (§3.2.1)**. To keep their anonymity, the names of the interviewees were removed from the list, which only mentions the organisations they belong to or represent.

|                                                                                    |                                                                                                                      | <b>Organisations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ecologists and policy-makers</b><br>(n=27)                                      | <b>Group I:</b> Grazing and landscape ecologists conducting research in the UK                                       | <p><u>Universities:</u> Aberystwyth University (Institute of Biological, Environmental and Rural Sciences), King's College London (Department of Geography), NERC Centre for Ecology &amp; Hydrology, University of Bournemouth (School of Conservation Sciences), University of Liverpool (School of Environmental Sciences), University of Oxford (Departments of Plant Sciences and Zoology)</p> <p><u>Other:</u> Epping Forest (Open Spaces Department), Forest Research, Sylva Foundation and Wild Ennerdale</p> |
|                                                                                    | <b>Group II:</b> Members of the institutions responsible for conservation, forest management and rewilding in the UK | Association of Deer Management Groups, Botanical Society of Britain and Ireland, Butterfly Conservation, Forestry Commission, Friends of the Boar (Forest of Dean), National Trust, Natural England, Rewilding Britain, Scottish Natural Heritage, The Deer Initiative, Woodland Trust                                                                                                                                                                                                                                |
| <b>Members of the institutions responsible for managing the study sites</b> (n=23) | <b>New Forest</b>                                                                                                    | Forestry Commission, Hampshire & Isle of Wight Wildlife Trust, National Trust, Natural England, New Forest Commoners' Defence Association, New Forest National Park Authority, Verderers of the New Forest                                                                                                                                                                                                                                                                                                            |
|                                                                                    | <b>Dundreggan Estate</b>                                                                                             | Trees for Life                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                    | <b>Knepp Estate</b>                                                                                                  | Knepp Castle Estate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## Appendix III: Consent form



# SCHOOL OF GEOGRAPHY AND THE ENVIRONMENT



### CONSENT FORM

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

**Title of Study:** The political ecologies of managing forest disturbances

Thank you for considering taking part in this research. The principle investigator, Filipa Soares (doctoral student), must explain the project to you before you agree to take part.

If you agreed to participate, I will contact you for an interview at your work place at a time convenient for you. The interview will be no longer than one hour, will be electronically recorded with your consent, and will be deleted upon transcription. Your identity and personal information will be withheld from my thesis and any published report and will not be shared with any other participants in the research. You may withdraw your data from the project at any time up until transcribing, which is prior to 31<sup>st</sup> August 2016. On the completion of the research you will be sent an electronic copy on request.

If you have any questions arising from the Information Sheet or explanation already given to you, please ask me before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

- I understand that if I decide at any time during the research that I no longer wish to participate in this project, I can notify the researchers involved and withdraw from it immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my data up to 31<sup>st</sup> August 2016.
- I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the Data Protection Act 1998.
- I would like to receive an electronic copy of this project.

Please tick  
or initial

**Participant's Statement:**

I, \_\_\_\_\_

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed \_\_\_\_\_

Date \_\_\_\_\_

**Investigator's Statement:**

I, Filipa Soares, confirm that I have carefully explained the nature, demands and any foreseeable risks (where applicable) of the proposed research to the participant.

Signed \_\_\_\_\_

Date \_\_\_\_\_

**Complaints:** If you feel this study has harmed you in any way, please feel free to contact me ([filipa.soares@ouce.ox.ac.uk](mailto:filipa.soares@ouce.ox.ac.uk)). If you are still unhappy and wish to make a formal complaint, please contact my DPhil supervisor Dr Jamie Lorimer ([jamie.lorimer@ouce.ox.ac.uk](mailto:jamie.lorimer@ouce.ox.ac.uk)) or Research Ethics Committee at the University of Oxford ([ethics@socsci.ox.ac.uk](mailto:ethics@socsci.ox.ac.uk); +44 (0)1865 614871; Social Sciences & Humanities Inter-Divisional Research Ethics Committee, Oxford University, Hayes House, 75 George Street, Oxford, OX1 2BQ, UK).

# GLOSSARY

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## **Adjacent commons**

Commons outside of the Crown lands.

## **Agister**

*New Forest term.* An employee of the Verderers who oversees the management and general wellbeing of the commoners' animals. Currently there are five agisters, each responsible for a given area of the Forest. The name agister comes from the word 'agist' (i.e., to charge for letting animals graze in one's private property).

## **Ancient and Ornamental (A&O) Woodlands**

*New Forest term.* Unenclosed ancient pasture woodlands within the Open Forest that originated in or before the 18<sup>th</sup> century. They are subject to special legal protection under the New Forest Act 1877.

## **Back-up (grazing) land**

Enclosed land used by the commoners to support grazing (e.g., for animals which do not spend the whole year on the Forest or sick animals, for haymaking, etc.).

## **Beat**

Area within the Crown land for which a keeper is responsible.

## **Common rights**

See Rights of common.

## **Commoners**

Those who occupy land or property to which attaches one or more rights of common.

## **Crown land(s)**

*New Forest term.* Majority of the land within the New Forest, owned by the Crown and managed since 1923 by the Forestry Enterprise (part of the Forestry Commission) on behalf of DEFRA, under the New Forest Acts. It includes the Open Forest and Statutory Inclosures.

## **Depastured**

Animals turned out on the Open Forest.

## **Deputy Surveyor**

*New Forest term.* Senior officer of the Forestry Commission in the New Forest, who administers the Crown land.

## **Drifts**

*New Forest term.* Annual round-ups of ponies in the autumn (approximately 40 per year), organised by the agisters. Ponies are herded on horseback into pounds, for health checks, worming, branding<sup>110</sup> and tail marking, and can also be removed if unwell or to be sold.

## **Fence month**

Period in the midsummer when deer give birth and during which grazing by commoners' animals was forbidden under Forest Law.

## **Forest Law**

Set of regulations which governed medieval hunting forests, "cut off from the regular codes of Roman and common law" (Schama, 1995, p. 144).

## **Haymaking**

Collecting bales of hay off the fields to be stored and used over the winter as fodder for the animals. Traditional way of feeding ponies and cattle in winter.

## **Inclosure**

*New Forest term.* Older form of 'enclosure'. See Statutory Inclosures.

## **Keeper**

*New Forest term.* An employee of the Forestry Commission responsible for managing wildlife, namely deer populations, and for supervising the condition of fences, gates, drains and ditches, within a specific area of the Forest (a 'beat'). They oversee general day-to-day activities on the Forest and are involved in some visitor management.

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<sup>110</sup> Process of marking ponies with hot irons to enable their identification. Each commoner has a brand mark that has to be approved by the Verderers.

**Lawn**

*New Forest term.* Grassland. Areas of the New Forest that have been completely grazed down and are maintained through grazing, located within woodlands and along stream sides.

**Levancy and couchancy**

Rule limiting a commoner's right of pasture to the number of animals that their holding can sustain through winter.

**Marking Fee**

*New Forest term.* Annual charges that commoners pay to the Verderers for each animal depastured in the Open Forest. To show that the marking fee has been paid, the agisters mark ponies and cattle by cutting their tail hairs in a certain way, according to the area of the New Forest where the owner resides.

**Minister's Mandate**

First introduced in 1971, it is the Forestry Commission's 'licence to operate' in the Crown lands, based on a management plan.

**New Forest Acts**

Set of statutes that govern the New Forest and dictate how certain elements should be managed.

**Open Forest**

*New Forest term.* Unenclosed common land within the Crown land over which rights of common may be exercised and where free-roaming grazing animals can wander. It is bounded by the ancient perambulation of the New Forest.

**Pannage season**

Period in the autumn when acorns drop and when pigs are allowed to be turned out to eat them (minimum 60 days). The pigs eat the fallen acorns which can be poisonous to other stock if eaten in great quantities.

**Perambulation**

*New Forest term.* Legal boundary of the New Forest that marks the geographic limits to the powers of the Verderers, as defined by the New Forest Act 1964. Former boundary of the Royal Forest, within which the ancient Forest Law once held sway.

## **Rights of common**

Rights given to the commoners that allow them to take or use resources within the Crown land. These rights were originally granted to local inhabitants as compensation for the restrictions to the customary exploitation of the natural resources regulated by the Forest Law and were legally recognised in 1698. In the New Forest the rights do not belong to a person but to a holding and pass with the holding to the occupier of that property. When land is subdivided, a proportional part of the rights goes with each piece.

## **Royal Forest**

Medieval hunting forest.

## **Statutory Inclosures**

*New Forest term.* Fenced areas within the Crown land formed under the Acts of 1698, 1808 and 1851 for timber production (broadleaved trees and later conifers), and held in perpetuity. These areas are managed by the Forestry Commission under the New Forest Act 1877.

## **Venison**

Any wild animal hunted for food or sport (game animal), notably deer, protected by the Forest Law within medieval hunting forests, for the exclusive use of the Crown for hunting. Currently the meaning is restricted to the carcass of a deer or any edible part of the carcass (cf. Deer Act 1991, §16).

## **Verderers**

*New Forest term.* The statutory body which administers and protects the commoning practices in the New Forest, with powers of veto over Forestry Commission operations in the Open Forest. Although the origins of the Verderers go back to medieval times, the Court of Verderers was established by the New Forest Act of 1877, which sets their powers and responsibilities. The Court comprises: an Official Verderer (Chairman); five elected Verderers that represent the Commoners; and four Verderers appointed by the Forestry Commission, DEFRA, the New Forest National Park Authority and Natural England.

## **Verderers' byelaws**

Set of rules about commoning practices that apply through the Forest. They are a Statutory instrument (Order No. 993, 2010).

## **Vert**

Under Forest Law, the vert was every green leaf or plant with green leaves that might serve as food or cover for game species (venison). The Verderers take their name from this term.

## **Winter heyning**

Period in the winter when natural forage was scarce and during which grazing by commoners' animals was prohibited by Forest Law to avoid competition with deer.

**This glossary is based on:** Cook (2017), Forestry Commission (2008), Illingworth et al. (1991), New Forest Trust (2018), Smith & Burke (2010), Spencer (2002), Verderers of the New Forest (2015)

# BIBLIOGRAPHY

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- Abrams, J., & Bliss, J. C. (2013). Amenity landownership, land use change, and the re-creation of “working landscapes”. *Society & Natural Resources*, 26(7), 845–859.
- Abrams, J., Gill, N., Gosnell, H., & Klepeis, P. (2012). Re-creating the rural, reconstructing nature: An international literature review of the environmental implications of amenity migration. *Conservation and Society*, 10(3), 270.
- Adam, B. (2005). *Timescapes of modernity: The environment and invisible hazards*. Routledge.
- Adam, B., & Groves, C. (2007). *Future matters: Action, knowledge, ethics*. Brill.
- Adams, W. M. (1997). Rationalisation and conservation: Ecology and the management of nature in the United Kingdom. *Transactions of the Institute of British Geographers*, 22(3), 277–291.
- Adams, W. M. (2003a). *Future Nature: A vision for conservation*. Earthscan.
- Adams, W. M. (2003b). Nature and the colonial mind. In W. M. Adams & M. Mulligan (Eds.), *Decolonizing nature: Strategies for conservation in a post-colonial era*. Earthscan.
- Adams, W. M. (2003c). When nature won't stay still: Conservation, equilibrium and control. In W. M. Adams & M. Mulligan (Eds.), *Decolonizing nature: Strategies for conservation in a post-colonial era* (pp. 220–246). Earthscan.
- Adams, W. M. (2015a). The political ecology of conservation conflicts. In S. M. Redpath, R. J. Gutierrez, K. A. Wood, J. C. Young, A. Evely, & M. Reed (Eds.), *Conflicts in conservation* (pp. 64–78). Cambridge University Press.
- Adams, W. M. (2015b, August). Rewilding as process. Thinking like a Human. <https://thinkinglikeahuman.com/2015/08/13/rewilding-as-process/>
- Adams, W. M. (2017). Geographies of conservation I. *Progress in Human Geography*, 41(4), 534–545.

- Anderson, B. (2010). Preemption, precaution, preparedness: Anticipatory action and future geographies. *Progress in Human Geography*, 34(6), 777–798.
- Anderson, B. (2012). Affect and biopower: Towards a politics of life. *Transactions of the Institute of British Geographers*, 37(1), 28–43.
- Anderson, R. M., Buitenwerf, R., Driessen, C., Genes, L., Lorimer, J., & Svenning, J.-C. (2019). Introducing rewilding to restoration to expand the conservation effort: A response to Hayward et al. *Biodiversity and Conservation*, 28(13), 3691–3693.
- Ansell-Pearson, K. (1999). *Germinal life: The difference and repetition of Deleuze*. Routledge.
- Arendt, H. (1978). Hannah Arendt: From an interview. *The New York Review of Books*, October 26, 1–4.
- Argent, N., Tonts, M., Jones, R., & Holmes, J. (2010). Amenity-led migration in rural Australia: A new driver of local demographic and environmental change? In G. W. Luck, R. Black, & D. Race (Eds.), *Demographic change in Australia's rural landscapes: Implications for society and the environment* (pp. 23–44). Springer Netherlands.
- Armstrong, H., Black, B., Holl, K., & Thompson, R. (2014). *Assessing herbivore impact in woodlands: A subjective method*. Unpublished manuscript.
- Asdal, K., Druglitrø, T., & Hinchliffe, S. (Eds.). (2017a). *Humans, animals and biopolitics: The more-than-human condition*. Routledge.
- Asdal, K., Druglitrø, T., & Hinchliffe, S. (2017b). Introduction: The 'more-than-human' condition: Sentient creatures and versions of biopolitics. In K. Asdal, T. Druglitrø, & S. Hinchliffe (Eds.), *Humans, animals and biopolitics: The more-than-human condition* (pp. 1–29). Routledge.
- Asdal, K., & Marres, N. (2014). Performing environmental change: The politics of social science methods. *Environment and Planning A*, 46, 2055–2064.
- Attiwill, P. M. (1994). The disturbance of forest ecosystems: The ecological basis for conservative management. *Forest Ecology and Management*, 63(2–3), 247–300.

- Audi, R. (Ed.). (1999). *The Cambridge Dictionary of Philosophy*. Cambridge University Press.
- Avery, M. (2015). *Inglorious: Conflict in the Uplands*. Bloomsbury Publishing.
- Barad, K. (2003). Posthumanist performativity: Toward an understanding of how matter comes to matter. *Signs: Journal of Women in Culture and Society*, 28(3), 801–831.
- Barua, M. (2014a). Bio-geo-graphy: Landscape, dwelling, and the political ecology of human–elephant relations. *Environment and Planning D: Society and Space*, 32(5), 915–934.
- Barua, M. (2014b). Circulating elephants: Unpacking the geographies of a cosmopolitan animal. *Transactions of the Institute of British Geographers*, 39(4), 559–573.
- Bastian, M. (2009). Inventing nature: Re-writing time and agency in a more-than-human world. *Australian Humanities Review*, 128, 99–116.
- Bauer, N., Wallner, A., & Hunziker, M. (2009). The change of European landscapes: Human–nature relationships, public attitudes towards rewilding, and the implications for landscape management in Switzerland. *Journal of Environmental Management*, 90(9), 2910–2920.
- Bear, C., & Eden, S. (2011). Thinking like a fish? Engaging with nonhuman difference through recreational angling. *Environment and Planning D: Society and Space*, 29(2), 336–352.
- Beekers, B., Meertens, H., Reiniers, K., & Helmer, W. (2017). *Circle of Life: A new way to support Europe's scavengers*. Rewilding Europe and ARK Nature.
- Bell, D. (2006). Variations on the rural idyll. In P. Cloke, T. Marsden, & P. Mooney (Eds.), *Handbook of rural studies* (pp. 149–160). SAGE Publications.
- Bengtsson, J., Angelstam, P., Elmqvist, T., Emanuelsson, U., Folke, C., Ihse, M., Moberg, F., & Nyström, M. (2003). Reserves, Resilience and Dynamic Landscapes. *AMBIO: A Journal of the Human Environment*, 32(6), 389–396.
- Bengtsson, J., Nilsson, S. G., Franc, A., & Menozzi, P. (2000). Biodiversity, disturbances, ecosystem function and management of European forests. *Forest Ecology and Management*, 132, 39–50.

- Bennett, J. (2009). *Vibrant Matter: A political ecology of things*. Duke University Press.
- Bennett, J. (2015). Systems and Things: On Vital Materialism and Object-Oriented Philosophy. In R. Grusin (Ed.), *Nonhuman turn* (pp. 223–239). University of Minnesota Press.
- Berger, J. (2007). Fear, human shields and the redistribution of prey and predators in protected areas. *Biology Letters*, 3(6), 620–623.
- Berger, J. (2010). Into the Woods//2006. In S. Morley (Ed.), *The Sublime* (pp. 125–127). Whitechapel Gallery; The MIT Press.
- Bernard, H. R. (2006). *Research methods in Anthropology: Qualitative and quantitative approaches*. AltaMira Press.
- Beschta, R. L., & Ripple, W. J. (2016). Riparian vegetation recovery in Yellowstone: The first two decades after wolf reintroduction. *Biological Conservation*, 198, 93–103.
- Biermann, C., & Anderson, R. M. (2017). Conservation, biopolitics, and the governance of life and death. *Geography Compass*, 11(10), e12329.
- Biermann, C., & Mansfield, B. (2014). Biodiversity, purity, and death: Conservation biology as biopolitics. *Environment and Planning D: Society and Space*, 32(2), 257–273.
- Biersack, A. (1999). Introduction: From the ‘New Ecology’ to the New Ecologies. *American Anthropologist*, 101(1), 5–18.
- Bingham, N. (2003). Writing reflexively. In M. Pryke, G. Rose, & S. Whatmore (Eds.), *Using Social Theory: Thinking through research* (pp. 146–162). SAGE Publications.
- Bingham, N. (2006). Bees, butterflies, and bacteria: Biotechnology and the politics of nonhuman friendship. *Environment and Planning A: Economy and Space*, 38(3), 483–498.
- Bingham, N., & Hinchliffe, S. (2008). Reconstituting natures: Articulating other modes of living together. *Geoforum*, 39, 83–87.
- Birrell, J. (1992). Deer and deer farming in Medieval England. *Agricultural History Review*, 40(2), 112–126.
- Blackburn, S. (2008). *The Oxford dictionary of Philosophy*. Oxford University Press.

- Blaser, M. (2013). Ontological conflicts and the stories of peoples in spite of Europe: Toward a conversation on political ontology. *Current Anthropology*, 54(5), 547–568.
- Bohnet, I., Potter, C., & Simmons, E. (2003). Landscape change in the multi-functional countryside: A biographical analysis of farmer decision-making in the English high weald. *Landscape Research*, 28(4), 349–364.
- Botkin, D. B. (1992). *Discordant harmonies: A new ecology for the twenty-first century*. Oxford University Press.
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27–40.
- Bowker, G. C. (2000). Biodiversity datadiversity. *Social Studies of Science*, 30(5), 643–683.
- Bradshaw, R. H. W., Hannon, G. E., & Lister, A. M. (2003). A long-term perspective on ungulate–vegetation interactions. *Forest Ecology and Management*, 181(1–2), 267–280.
- Braun, B. (2002). *The intemperate rainforest: Nature, culture, and power on Canada's west coast*. University of Minnesota Press.
- Braun, B. (2004). Modalities of posthumanism. *Environment and Planning A*, 36(8), 1352–1355.
- Braun, B. (2007). Biopolitics and the molecularization of life. *Cultural Geographies*, 14(1), 6–28.
- Braun, B. (2008). Environmental issues: Inventive life. *Progress in Human Geography*, 32(5), 667–679.
- Braun, B. (2013). Power over life: Biosecurity as biopolitics. *Biosecurity: The Socio-Politics of Invasive Species and Infectious Diseases*, 45–58.
- Braun, B. (2014). A new urban dispositif? Governing life in an age of climate change. *Environment and Planning D: Society and Space*, 32(1), 49–64.
- Braun, B. (2015a). From critique to experiment? Rethinking political ecology for the Anthropocene. In T. Perreault, G. Bridge, & J. McCarthy (Eds.), *Routledge Handbook of Political Ecology* (pp. 102–114). Routledge.

- Braun, B. (2015b). Futures: Imagining Socioecological Transformation: An Introduction. *Annals of the Association of American Geographers*, 105(2), 239–243.
- Braverman, I. (2014a). Governing the wild: Databases, algorithms, and population models as biopolitics. *Surveillance and Society*, 12(1), 15–37.
- Braverman, I. (2014b). Conservation without nature: The trouble with *in situ* versus *ex situ* conservation. *Geoforum*, 51, 47–57.
- Braverman, I. (2015). *Wild life: The institution of nature*. Stanford University Press.
- Braverman, I. (2017). Anticipating endangerment: The biopolitics of threatened species lists. *BioSocieties*, 12(1), 132–157.
- Brice, J. (2014). Attending to grape vines: Perceptual practices, planty agencies and multiple temporalities in Australian viticulture. *Social & Cultural Geography*, 15(8), 942–965.
- Brown, C., McMorran, R., & Price, M. F. (2011). Rewilding – A new paradigm for nature conservation in Scotland? *Scottish Geographical Journal*, 127(4), 288–314.
- Brown, K. M. (2015). The role of landscape in regulating (ir)responsible conduct: Moral geographies of the ‘proper control’ of dogs. *Landscape Research*, 40(1), 39–56.
- Bubandt, N., & Tsing, A. L. (2018a). Supplement—An ethnoecology for the Anthropocene: How a former brown-coal mine in Denmark shows us the feral dynamics of post-industrial ruin. *Journal of Ethnobiology*, 38(1), 1–13.
- Bubandt, N., & Tsing, A. L. (2018b). Feral dynamics of post-industrial ruin: An introduction. *Journal of Ethnobiology*, 38(1), 1–7.
- Buglife. (2018). *Ragwort: Weed or wildflower?* <https://www.buglife.org.uk/ragwort-weed-or-wildflower>
- Bulkeley, H., & Castán Broto, V. (2013). Government by experiment? Global cities and the governing of climate change. *Transactions of the Institute of British Geographers*, 38(3), 361–375.

- Bulkens, M., Muzaini, H., & Minca, C. (2016). Dutch new nature: (Re)landscaping the Millingerwaard. *Journal of Environmental Planning and Management*, 59(5), 808–825.
- Buller, H. (2004). Where the wild things are: The evolving iconography of rural fauna. *Journal of Rural Studies*, 20(2), 131–141.
- Buller, H. (2008). Safe from the wolf: Biosecurity, biodiversity, and competing philosophies of nature. *Environment and Planning A*, 40(7), 1583–1597.
- Buller, H. (2012). One slash of light, then gone. *Études Rurales*, 189(1), 139–153.
- Buller, H. (2013). Introducing aliens, reintroducing natives: A conflict of interest for biosecurity? In A. Dobson, K. Barker, & S. L. Taylor (Eds.), *Biosecurity: The socio-politics of invasive species and infectious diseases* (pp. 183–198). Routledge.
- Buller, H. (2014). Going wild in space: The porous boundaries of wild animal geographies. In G. Marvin & S. McHugh (Eds.), *Routledge Handbook of Human-Animal Studies* (pp. 233–244). Routledge.
- Buller, H. (2015). Animal geographies II: Methods. *Progress in Human Geography*, 39(3), 374–384.
- Bulliet, R. W. (2005). *Hunters, herderers and hamburgers: The past and future of human-animal relationships*. Columbia University Press.
- Bunce, M. (2003). Reproducing rural idylls. In P. Cloke (Ed.), *Country visions* (pp. 14–30). Pearson Education Limited.
- Bunting, R. (2017). *Project Wolf helps restore Highland woodland*. <https://treesforlife.org.uk/project-wolf-helps-restore-highland-woodland/>
- Burrell, C., & Tree, I. (2015). The Knepp Wildland Project—Process-led conservation. *Conservation Land Management, Summer 2015*, 9–13.
- Büscher, B. (2018). From biopower to ontopower? Violent responses to wildlife crime and the new geographies of conservation. *Conservation and Society*, 16(2), 157.
- Butler, J., Alexander, K., & Green, T. (2002). Decaying wood: An overview of its status and ecology in the United Kingdom and Continental Europe. In W. F. Laudenslayer Jr., P.

- J. Shea, B. E. Valentine, C. P. Westerspoon, & T. E. Lisle (Eds.), *Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests* (pp. 11–19). U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station.
- Cadieux, K. V. (2011). Competing discourses of nature in exurbia. *GeoJournal*, 76(4), 341–363.
- Cadman, W. A. (1961). The deer of the New Forest and their control. *Journal of the Forestry Commission*, 30, 95–100.
- Cadman, W. A. (1969). The forester's task. In H. L. Edlin (Ed.), *New Forest: Forestry Commission Guide* (pp. 42–48). Her Majesty's Stationery Office.
- Callicott, J. B., Crowder, L. B., & Mumford, K. (1999). Current normative concepts in conservation. *Conservation Biology*, 13(1), 22–35.
- Callicott, J. B., & Nelson, M. P. (1998). *The great new wilderness debate*. University of Georgia Press.
- Callon, M., & Law, J. (2005). On qualculation, agency, and otherness. *Environment and Planning D: Society and Space*, 23(5), 717–733.
- Cameron, L. (1999). Histories of disturbance. *Radical History Review*, 74, 4–27.
- Cameron, L. (2013). Resources of hope: Wicken Fen stories of anthropogenic nature. *Cambridge Anthropology*, 31(1), 105–118.
- Campbell, T. C., & Sitze, A. (Eds.). (2013). *Biopolitics: A reader*. Duke University Press.
- Caro, T., Darwin, J., Forrester, T., Ledoux-Bloom, C., & Wells, C. (2012). Conservation in the Anthropocene. *Conservation Biology*, 26(1), 185–8.
- Carroll, M. S., Cohn, P. J., Seesholtz, D. N., & Higgins, L. L. (2005). Fire as a galvanizing and fragmenting influence on communities: The case of the Rodeo–Chediski fire. *Society & Natural Resources*, 18(4), 301–320.
- Cartmill, M. (1993). *A view to a death in the morning: Hunting and nature through history*. Harvard University Press.
- Carver, S. (2019). Rewilding through land abandonment. In N. Pettorelli, S. M. Durant, & J. T. du Toit (Eds.), *Rewilding* (pp. 99–122). Cambridge University Press.

- Castree, N. (2002). False antitheses? Marxism, nature and actor-networks. *Antipode*, 34(1), 111–146.
- Castree, N. (2003). Environmental issues: Relational ontologies and hybrid politics. *Progress in Human Geography*, 27(2003), 203–211.
- Castree, N. (2005). *Nature*. Routledge.
- Castree, N., & Braun, B. (1998). The construction of nature and the nature of construction: Analytical and political tools for building survivable futures. In B. Braun & N. Castree (Eds.), *Remaking reality: Nature at the millenium* (pp. 2–41). Routledge.
- Castree, N., & Braun, B. (2006). Constructing rural natures. In P. Cloke, T. Marsden, & P. Mooney (Eds.), *Handbook of rural studies* (pp. 161–170). SAGE Publications.
- Cavanagh, C. J. (2014). Biopolitics, environmental change, and development studies. *Forum for Development Studies*, 41(2).
- Cavanagh, C. J. (2018). Political ecologies of biopower: Diversity, debates, and new frontiers of inquiry. *Journal of Political Ecology*, 25(2), 402–425.
- Ceballos, G., Ehrlich, P. R., & Dirzo, R. (2017). Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. *Proceedings of the National Academy of Sciences*, 114(30), E6089–E6096.
- Chandler, D. (2018). *Ontopolitics in the Anthropocene: An Introduction to Mapping, Sensing and Hacking*. Routledge.
- Chatters, C. (2009). *Flowers of the forest: Plants and people in the New Forest National Park*. WILDGuides Ltd.
- Chrulew, M. (2011). Managing love and death at the zoo: The biopolitics of endangered species preservation. *Australian Humanities Review*, 50, 1–12.
- Clark, G. (2005). Secondary data. In R. Flowerdew & D. Martin (Eds.), *Methods in Human Geography: A guide for students doing a research project* (pp. 57–73). Pearson Education Limited.

- Clark, N. (2002). The Demon-Seed: Bioinvasion as the unsettling of environmental cosmopolitanism. *Theory, Culture & Society*, 19(1–2), 101–125.
- Clark, N. (2011). *Inhuman Nature: Sociable life on a dynamic planet*. SAGE Publications.
- Clark, N. (2013). Mobile Life: Biosecurity Practices and Insect Globalization. *Science as Culture*, 22(1), 16–37.
- Clark, N., Gormally, A., & Tuffen, H. (2018). Speculative Volcanology. *Environmental Humanities*, 10(1), 273–294.
- Clifford, N., French, S., & Valentine, G. (2010). Getting started in geographical research: How this book can help. In N. Clifford, S. French, & G. Valentine (Eds.), *Key methods in Geography* (pp. 3–15). SAGE Publications Ltd.
- Cloke, P. (1985). Counterurbanisation: A rural perspective. *Geography*, 70(1), 13–23.
- Cloke, P. (1997). Country backwater to virtual village? Rural studies and ‘the cultural turn’. *Journal of Rural Studies*, 13(4), 367–375.
- Cloke, P. (2003). Knowing ruralities. In P. Cloke (Ed.), *Country visions* (pp. 1–13). Pearson Education Limited.
- Cloke, P. (2006). Conceptualizing rurality. In P. Cloke, T. Marsden, & P. Mooney (Eds.), *Handbook of rural studies* (pp. 18–28). SAGE Publications.
- Cloke, P., Marsden, T., & Mooney, P. (2006). Preface. In P. Cloke, T. Marsden, & P. Mooney (Eds.), *Handbook of rural studies* (pp. xi–xii). SAGE Publications.
- Cochoy, F. (2008). Calculation, qualculation, calculation: Shopping cart arithmetic, equipped cognition and the clustered consumer. *Marketing Theory*, 8(1), 15–44.
- Collard, R.-C. (2012). Cougar-human entanglements and the biopolitical un/making of safe space. *Environment and Planning D: Society and Space*, 30(1), 23–42.
- Collard, R.-C., Dempsey, J., & Sundberg, J. (2015). A manifesto for abundant futures. *Annals of the Association of American Geographers*, 105(2), 322–330.

- Commoners Defence Association. (2018). *DEFRA Landscapes Review*.  
<https://www.realnewforest.org/wp-content/uploads/2018/12/Glover-Review-CDA-final.pdf>
- Commoners suffer from lack of scorched earth. (1992, May 16). *Advertiser & Times*.
- Cook, H. (2017). *New forest: The forging of a landscape*. Windgather Press.
- Cooke, B., & Lane, R. (2015). Re-thinking rural-amenity ecologies for environmental management in the Anthropocene. *Geoforum*, 65, 232–242.
- Cooper, D. (1997). ‘For the sake of the deer’: Land, local government and the hunt. *The Sociological Review*, 45(4), 668–689.
- Corlett, R. T. (2016). Restoration, reintroduction, and rewilding in a changing world. *Trends in Ecology & Evolution*, 31(6), 453–462.
- Cortes-Vazquez, J. A. (2014). A natural life: Neo-rurals and the power of everyday practices in protected areas. *Journal of Political Ecology*, 21(1), 493.
- Cortes-Vazquez, J. A. (2017). The end of the idyll? Post-crisis conservation and amenity migration in natural protected areas. *Journal of Rural Studies*, 51, 115–124.
- Cox, G., Hallett, J., Short, C., & Thorne, P. (1994). *Recreational use of horses in the New Forest Heritage Area: Report to the New Forst Committee*. Unpublished manuscript.
- Cox, G., Hallett, J., & Winter, M. (1994). Hunting the wild red deer: The social organization and ritual of a ‘rural’ institution. *Sociologia Ruralis*, XXXIV(2–3), 190–205.
- Cox, J. (1905). *The Royal Forests of England*. Methuen & Co.
- Crang, M. (2002). Qualitative methods: The new orthodoxy? *Progress in Human Geography*, 26(5), 647–655.
- Crang, M. (2003). Telling Materials. In M. Pryke, G. Rose, & S. Whatmore (Eds.), *Using Social Theory: Thinking through research* (pp. 128–144). SAGE Publications.
- Crang, M., & Cook, I. (1995). *Doing ethnographies*. Geobooks.

- Cresswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches*. SAGE Publications, Inc.
- Cromsigt, J. P. G. M., Kuijper, D. P. J., Adam, M., Beschta, R. L., Churski, M., Eycott, A., Kerley, G. I. H., Mysterud, A., Schmidt, K., & West, K. (2013). Hunting for fear: Innovating management of human-wildlife conflicts. *Journal of Applied Ecology*, *50*, 544–549.
- Cronon, W. (1990). Modes of prophecy and production: Placing nature in history. *The Journal of American History*, *76*(4), 1122.
- Cronon, W. (1995). The trouble with wilderness: Or, getting back to the wrong nature. In W. Cronon (Ed.), *Uncommon ground: Rethinking the human place in nature* (pp. 69–90). W. W. Norton & Co.
- Crowley, S. L., Hinchliffe, S., & McDonald, R. A. (2017). Nonhuman citizens on trial: The ecological politics of a beaver reintroduction. *Environment and Planning A: Economy and Space*, *49*(8), 1846–1866.
- Crowley, S. L., Hinchliffe, S., & McDonald, R. A. (2018). Killing squirrels: Exploring motivations and practices of lethal wildlife management. *Environment and Planning E: Nature and Space*, *1*(1–2), 120–143.
- Dalby, S. (2013). Biopolitics and climate security in the Anthropocene. *Geoforum*, *49*, 184–192.
- Dale, V. H., Archer, S., Chang, M., & Ojima, D. (2005). Ecological impacts and mitigation strategies for rural land management. *Ecological Applications*, *15*(6), 1879–1892.
- Dale, V. H., Joyce, L. A., McNulty, S., Neilson, R. P., Ayres, M. P., Flannigan, M. D., Hanson, P. J., Irland, L. C., Lugo, A. E., Peterson, C. J., Simberloff, D., Swanson, F. J., Stocks, B. J., & Wotton, M. (2001). Climate change and forest disturbances. *Bioscience*, *51*(9), 723–734.
- Dandy, N., & Wynne-Jones, S. (2019). Rewilding forestry. *Forest Policy and Economics*, *109*, 101996.

- Deary, H., & Warren, C. R. (2017). Divergent visions of wildness and naturalness in a storied landscape: Practices and discourses of rewilding in Scotland's wild places. *Journal of Rural Studies*, 54, 211–222.
- DEFRA. (2018). *A Green Future: Our 25 Year Plan to Improve the Environment*. DEFRA.
- Deleuze, G., & Guattari, F. (2013). *A Thousand plateaus: Capitalism and Schizophrenia* (B. Massumi, Trans.). Bloomsbury Academic.
- Demeritt, D. (2005). Hybrid geographies, relational ontologies and situated knowledges. *Antipode*, 37(4), 818–823.
- Deryabina, T. G., Kuchmel, S. V., Nagorskaya, L. L., Hinton, T. G., Beasley, J. C., Lerebours, A., & Smith, J. T. (2015). Long-term census data reveal abundant wildlife populations at Chernobyl. *Current Biology*, 25(19), R824–R826.
- Descola, P. (2005). *Par-delà nature et culture*. Gallimard.
- DeSilvey, C. (2019). Rewilding Time in the Vale do Côa. In M. Tamm & L. Olivier (Eds.), *Rethinking Historical Time: New Approaches to Presentism* (pp. 193–206). Bloomsbury Academic.
- DeSilvey, C., & Bartolini, N. (2019). Where horses run free? Autonomy, temporality and rewilding in the Côa Valley, Portugal. *Transactions of the Institute of British Geographers*, 44(1), 94–109.
- DeSilvey, C., Bartolini, N., & Lyons, A. (2020). Processing change. In R. Harrison, C. DeSilvey, C. Holtorf, S. Macdonald, N. Bartolini, E. Breithoff, H. Fredheim, A. Lyons, S. May, J. Morgan, & Penrose (Eds.), *Heritage Futures: Comparative Approaches to Natural and Cultural Heritage Practices* (pp. 446–461). UCL Press.
- Despret, V. (2004). The body we care for: Figures of Anthro-zoo-genesis. *Body & Society*, 10(2–3), 111–134.
- Despret, V. (2013). Responding bodies & partial affinities in human-animal worlds. *Theory, Culture & Society*, 30(7/8), 51–76.

- Despret, V. (2015). Models and methods. *Angelaki*, 20(2), 37–52.
- Despret, V. (2016). *What would animals say if we asked the right questions?* (B. Buchanan, Trans.). University of Minnesota Press.
- Dirzo, R., Young, H. S., Galetti, M., Ceballos, G., Isaac, N. J. B., & Collen, B. (2014). Defaunation in the Anthropocene. *Science*, 345(6195), 401–406.
- Disturbance. (2018). In *Oxford English Dictionary*. <http://www.oed.com>
- Douglas, M. (2002). *Purity and Danger: An analysis of concept of pollution and taboo*. Routledge.
- Dowling, R., Lloyd, K., & Suchet-Pearson, S. (2017). Qualitative methods II: 'More-than-human methodologies and/in praxis'. *Progress in Human Geography*, 41(6), 823–831.
- Drenthen, M. (2015). The return of the wild in the Anthropocene: Wolf resurgence in the Netherlands. *Ethics, Policy & Environment*, 18(3), 318–337.
- Drenthen, M. (2018). Rewilding in cultural layered landscapes. *Environmental Values*, 27(4), 325–330.
- Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D., & Gregory, R. (2015). Birds of conservation concern 4: The population status of birds in the UK, Channel Islands and Isle of Man. *British Birds*, 108, 708–746.
- EBIS, & New Forest District Council. (2018). *New Forest economic profile 2018*. Unpublished manuscript.
- Edward, 2nd Duke of York. (2005). *The master of game: The oldest English book on hunting* (W. A. Baillie-Grohman & F. Baillie-Grohman, Eds.). University of Pennsylvania Press.
- Edwards, V. (1995). *Managing the commons: A framework for the analysis of institutional change and its application to the management of the multiple use commons of the New Forest, Hampshire*. [PhD Thesis]. University of Reading, Faculty of Urban and Regional Studies, Department of Land Management and Development.

- Edwards, V. (2011). Rights evolution and contemporary forest activism in the New Forest, England. In T. Sikor & J. Stahl (Eds.), *Forests and people: Property, governance and human rights* (pp. 137–150). Earthscan.
- Egerton, F. N. (1973). Changing concepts of the balance of nature. *The Quarterly Review of Biology*, 48(2), 322–350.
- Eisenberg, C. (2010). *The Wolf's Tooth: Keystone predators, trophic cascades, and biodiversity*. Island Press.
- Ellis, E. C. (2015). Ecology in an anthropogenic biosphere. *Ecological Monographs*, 85(3), 287–331.
- Enticott, G. (2001). Calculating nature: The case of badgers, bovine tuberculosis and cattle. *Journal of Rural Studies*, 17(2), 149–164.
- Escobar, A. (1997). Cultural politics and biological diversity: State, capital, and social movements in the Pacific Coast of Colombia. In L. Lowe & D. Lloyd (Eds.), *The politics of culture in the shadow of capital* (pp. 201–226). Duke University Press.
- Escobar, A. (1998). Whose knowledge, whose nature? Biodiversity, conservation, and the political ecology of social movements. *Journal of Political Ecology*, 5, 53.
- Eurostat. (2015). [Interactive map showing percentage of land cover]. <https://ec.europa.eu/eurostat/web/lucas/statistics-illustrated>
- Evans, N., Morris, C., & Winter, M. (2002). Conceptualizing agriculture: A critique of post-productivism as the new orthodoxy. *Progress in Human Geography*, 26(3), 313–332.
- Fairhead, J., Leach, M., Millimouno, D., & Kamano, M. (1996). *Misreading the African landscape: Society and ecology in a forest-savanna mosaic*. Cambridge University Press.
- Fawcett, J. K. (2016a). Muntjac deer. *Forest Matters, Autumn/Winter*, 11–12.
- Fawcett, J. K. (2016b). Sika. *Forest Matters, Spring*, 15–18.
- Fear, S. (2016). *Crown Keepers of the New Forest*. Tile Barn Farm.

- Feldman, J. W. (2010). Spontaneous rewilding in the Apostle Islands. In M. Hall (Ed.), *Restoration and history: The search for a usable environmental past* (pp. 35–45). Routledge.
- Feldman, J. W. (2013). *A storied wilderness: Rewilding the Apostle Islands*. University of Washington Press.
- Fiennes, C. (1949). *The journeys of Celia Fiennes*. Cresset Press.
- Fissell, M. (1999). Imagining vermin in early modern England. *History Workshop Journal*, 47(1), 1–29.
- Fitz-Henry, E. (2017). Multiple temporalities and the nonhuman other. *Environmental Humanities*, 9(1), 1–17.
- Fletcher, J. (2014). *Deer*. Reaktion Books.
- Flint, C. G. (2006). Community perspectives on spruce beetle impacts on the Kenai Peninsula, Alaska. *Forest Ecology and Management*, 227(3), 207–218.
- Flint, C. G., McFarlane, B., & Müller, M. (2009). Human dimensions of forest disturbance by insects: An international synthesis. *Environmental Management*, 43(6), 1174–1186.
- Flower, N. (1977). *An historical and ecological study of inclosed and uninclosed woods in the New Forest, Hampshire* [PhD thesis]. King's College, University of London.
- Flower, N. (1980). The management history and structure of unenclosed woods in the New Forest, Hampshire. *Journal of Biogeography*, 7(4), 311–328.
- Foreman, D. (2004). *Rewilding North America: A vision for conservation in the 21st century*. Island Press.
- Forestry Commission. (1993). *Managing the New Forest's "Open Forest"*. Unpublished manuscript.
- Forestry Commission. (2008). *Forestry Commission (New Forest) Management Plan—Part B: The Crown Lands 2008-2013*. Forestry Commission England.
- Forestry Commission. (2019). *Celebrating 100 years of forestry: Explore our history*. <https://www.forestryengland.uk/100#timeline>
- Forssman, N., & Root-Bernstein, M. (2018). Landscapes of anticipation of the other: Ethno-ethology in a deer hunting landscape. *Journal of Ethnobiology*, 38(1), 71–87.

- Foucault, M. (1984). *The Foucault reader* (P. Rabinow, Ed.). Pantheon Books.
- Foucault, M. (1994). *The order of things: An archaeology of the Human Sciences*. Vintage Books.
- Foucault, M. (2003). *Society must be defended: Lectures at the Collège de France, 1975-76* (M. Bertani & A. Fontana, Eds.; D. Macey, Trans.). Picador.
- Foucault, M. (2007). *Security, territory, population: Lectures at the Collège de France, 1977-78* (M. Senellart, Ed.; G. Burchell, Trans.). Palgrave Macmillan.
- Foucault, M. (2008). *The birth of biopolitics: Lectures at the Collège de France, 1978-79* (M. Senellart, Ed.; G. Burchell, Trans.). Palgrave Macmillan.
- Fowle, M. (2018, September 28). *No moor burning on upland peat bogs*. RSPB. <https://www.rspb.org.uk/about-the-rspb/about-us/media-centre/press-releases/no-moor-burning-on-upland-peat-bogs/#CGcwVXWgovYzhBzS.99>
- Fraser, C. (2009). *Rewilding the world: Dispatches from the conservation revolution*. Picador.
- Fredriksen, A. (2016). Of wildcats and wild cats: Troubling species-based conservation in the Anthropocene. *Environment and Planning D: Society and Space*, 34(4), 689–705.
- Fuhlendorf, S. D., Engle, D. M., Kerby, J., & Hamilton, R. (2009). Pyric herbivory: Rewilding landscapes through the recoupling of fire and grazing. *Conservation Biology*, 23(3), 588–598.
- Fuller, R. J., & Gill, R. (2001). Ecological impacts of increasing numbers of deer in British woodland. *Forestry*, 74(3), 193–199.
- Fuller, R. J., & Warren, M. S. (1993). *Coppiced woodlands: Their management for wildlife*. Joint Nature Conservation Committee.
- Gad, C., & Jensen, C. B. (2014). The promises of practice. *The Sociological Review*, 62(4), 698–718.
- Gammon, A. R. (2018). The many meanings of rewilding: An introduction and the case for a broad conceptualisation. *Environmental Values*, 27(4), 331–350.
- Gan, E., & Tsing, A. L. (2018). How things hold. *Social Analysis*, 62(4), 102–145.

- Gan, E., Tsing, A., Swanson, H., & Bubandt, N. (2017). Introduction: Haunted landscapes of the Anthropocene. In A. L. Tsing, H. Swanson, E. Gan, & N. Bubandt (Eds.), *Arts of living on a damaged planet: Ghosts of the Anthropocene* (pp. G1–G14). University of Minnesota Press.
- Garner, A. (2001). Whose New Forest? Making place on the urban/rural fringe. In B. Bender & M. Winer (Eds.), *Contested Landscapes: Movement, Exile and Place* (pp. 133–148). Berg.
- Gifford, T. (1999). *Pastoral*. Routledge.
- Gifford, T. (2013). Pastoral, anti-pastoral, and post-pastoral. In L. Westling (Ed.), *The Cambridge Companion to Literature and the Environment* (pp. 17–30). Cambridge University Press.
- Gill, N. (1994). The cultural politics of resource management: The case of bushfires in a conservation reserve. *Australian Geographical Studies*, 32(2), 224–240.
- Gill, R., & Beardall, V. (2001). The impact of deer on woodlands: The effects of browsing and seed dispersal on vegetation structure and composition. *Forestry*, 74(3), 209–218.
- Gilpin, W. (1791). *Remarks on forest scenery, and other woodland views*. R. Blamire.
- Giraud, E., Kershaw, E. H., Helliwell, R., & Hollin, G. (2019). Abundance in the Anthropocene. *The Sociological Review*, 67(2), 357–373.
- Glenmoriston Deer Management Group. (2016). *Deer Management Plan 2016-26 (with mid-term review 2021)*. Unpublished manuscript.
- Godfrey-Smith, P. (2009). *Theory and Reality: An Introduction to the Philosophy of Science*. University of Chicago Press.
- Goemans, M., & Ballamingie, P. (2013). Forest as hazard, forest as victim: Community perspectives and disaster mitigation in the aftermath of Kelowna's 2003 wildfires. *The Canadian Geographer / Le Géographe Canadien*, 57(1), 56–71.
- Gosnell, H., & Abrams, J. (2011). Amenity migration: Diverse conceptualizations of drivers, socioeconomic dimensions, and emerging challenges. *GeoJournal*, 76(4), 303–322.

- Grabbatin, B., & Rossi, J. (2012). Political ecology: Nonequilibrium science and nature-society research. *Geography Compass*, 6(5), 275–289.
- Grant, M. J., & Edwards, M. E. (2008). Conserving idealized landscapes: Past history, public perception and future management in the New Forest (UK). *Vegetation History and Archaeobotany*, 17(5), 551–562.
- Great Britain. (1810). *The statutes of the realm: Printed by command of his majesty King George the Third, in pursuance of an address of the House of Commons of Great Britain. From original records and authentic manuscripts* (Vol. 1). Dawsons of Pall Mall.
- Greenaway, T. (2006). Knepp Castle Estate baseline ecological survey. *English Nature Research Reports, No. 693*.
- Greenaway, T. (2009). *Knepp Wildland Project: Annual biodiversity report and monitoring update 2009*. Unpublished manuscript.
- Greenaway, T. (2011). *Knepp Wildland Project: Year 10 for the re-wilding project*. Knepp Castle Estate.
- Greenaway, T. (2013). *Knepp Wildland Project: Annual biodiversity report and monitoring update 2013*. Unpublished manuscript.
- Greenhough, B. (2012). Vitalist Geographies: Life and the More-Than-Human. In P. Harrison & B. Anderson (Eds.), *Taking-Place: Non-Representational Theories and Geography* (pp. 37–54). Ashgate Publishing.
- Greenhough, B. (2014). More-than-human Geographies. In R. Lee, N. Castree, R. Kitchin, V. Lawson, A. Paasi, C. Philo, S. Radcliffe, S. M. Roberts, & C. W. J. Withers, *The SAGE Handbook of Human Geography* (pp. 94–119). SAGE Publications.
- Griffin, C. J. (2010). More-than-human histories and the failure of grand state schemes: Sylviculture in the New Forest, England. *Cultural Geographies*, 17(4), 451–472.
- Griffin, C. J. (2011). Space and place – Popular perceptions of forests. In E. Ritter & D. Dauksta (Eds.), *New Perspectives on People and Forests* (pp. 139–158). Springer.
- Griffin, E. (2008). *Blood sport: Hunting in Britain since 1066*. Yale University Press.

- Gross, M. (2010). *Ignorance and surprise: Science, society, and ecological design*. MIT Press.
- Gross, M., & Hoffmann-Riem, H. (2005). Ecological restoration as a real-world experiment: Designing robust implementation strategies in an urban environment. *Public Understanding of Science*, 14(3), 269–284.
- Guattari, F. (2014). *The three ecologies* (I. Pindar & P. Sutton, Trans.). Bloomsbury Academic.
- Halfacree, K. H. (1993). Locality and social representation: Space, discourse and alternative definitions of the rural. *Journal of Rural Studies*, 9(1), 23–37.
- Halfacree, K. H. (1995). Talking about rurality: Social representations of the rural as expressed by residents of six English parishes. *Journal of Rural Studies*, 11(1), 1–20.
- Halfacree, K. H. (1997). Contrasting roles for the post-productivist countryside: A postmodern perspective on counterurbanisation. In P. Cloke & J. Little (Eds.), *Contested countryside cultures: Otherness, marginalisation and rurality* (pp. 67–90). Routledge.
- Hall, S. (1997). The work of representation. In S. Hall (Ed.), *Representation: Cultural representations and signifying practices* (pp. 13–74). SAGE Publications.
- Hall, M. (Ed.). (2010). *Restoration and history: The search for a usable environmental past*. Routledge.
- Hall, M. (2014). Extracting culture or injecting nature? Rewilding in Transatlantic perspective. In M. Drenthen & J. Keulartz (Eds.), *Old World and New World Perspectives in Environmental Philosophy* (pp. 17–35). Springer.
- Hanawalt, B. (1988). Men's Games, King's Deer: Poaching in medieval England. *Journal of Medieval and Renaissance Studies*, 18(2), 175–93.
- Haraway, D. (1988). Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies*, 14(3), 575–599.
- Haraway, D. (2003). *The companion species manifesto: Dogs, people, and significant otherness*. Prickly Paradigm Press.
- 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.

- Harting, J. E. (1880). *British animals extinct within historic times; with some account of British wild white cattle*. J. R. Osgood and Co.
- Hayward, M. W., Scanlon, R. J., Callen, A., Howell, L. G., Klop-Toker, K. L., Di Blanco, Y., Balkenhol, N., Bugir, C. K., Campbell, L., Caravaggi, A., Chalmers, A. C., Clulow, J., Clulow, S., Cross, P., Gould, J. A., Griffin, A. S., Heurich, M., Howe, B. K., Jachowski, D. S., ... Weise, F. J. (2019). Reintroducing rewilding to restoration – Rejecting the search for novelty. *Biological Conservation*, *233*, 255–259.
- Hebblewhite, M., White, C. A., Nietvelt, C. G., McKenzie, J. A., Hurd, T. E., Fryxell, J. M., Bayley, S. E., & Paquet, P. C. (2005). Human activity mediates a trophic cascade by wolves. *Ecology*, *86*(8), 2135–2144.
- Hecht, S. B., Morrison, K. D., & Padoch, C. (Eds.). (2014). *The social lives of forests: Past, present, and future of woodland resurgence*. The University of Chicago Press.
- Helmer, W., Saavedra, D., Sylvén, M., & Schepers, F. (2015). Rewilding Europe: A new strategy for an old continent. In H.M. Pereira & L. M. Navarro (Eds.), *Rewilding European Landscapes* (pp. 171–190). Springer.
- Herbert, S. (2000). For ethnography. *Progress in Human Geography*, *24*(4), 550–568.
- Hetherington, K., & Law, J. (2000). After networks. *Environment and Planning D: Society and Space*, *18*(2), 127–132.
- Higgins, V., & Natalier, K. (2004). Governing environmental harms in a risk society. In R. White (Ed.), *Controversies in environmental sociology* (pp. 77–91). Cambridge University Press.
- Higgs, E., Falk, D. A., Guerrini, A., Hall, M., Harris, J., Hobbs, R. J., Jackson, S. T., Rhemtulla, J. M., & Throop, W. (2014). The changing role of history in restoration ecology. *Frontiers in Ecology and the Environment*, *12*(9), 499–506.
- Hildyard, R. (2014). A case study in the literary construction of the rural idyll: The English farm. In G. Bosworth & P. Somerville (Eds.), *Interpreting rurality: Multidisciplinary approaches* (pp. 132–145). Routledge.

- Hinchliffe, S. (2007). *Geographies of Nature: Societies, environments, ecologies*. SAGE Publications.
- Hinchliffe, S. (2008). Reconstituting nature conservation: Towards a careful political ecology. *Geoforum*, 39, 88–97.
- Hinchliffe, S. (2017). Sensory biopolitics: Knowing birds and a politics of life. In K. Asdal, T. Druglitrø, & S. Hinchliffe (Eds.), *Humans, animals and biopolitics: The more-than-human condition* (pp. 152–170). Routledge.
- Hinchliffe, S., Allen, J., Lavau, S., Bingham, N., & Carter, S. (2013). Biosecurity and the topologies of infected life: From borderlines to borderlands. *Transactions of the Institute of British Geographers*, 38(4), 531–543.
- Hinchliffe, S., & Bingham, N. (2008). Securing life: The emerging practices of biosecurity. *Environment and Planning A*, 40, 1534–1551.
- Hinchliffe, S., Bingham, N., Allen, J., & Carter, S. (2017). *Pathological lives: Disease, space and biopolitics*. Wiley Blackwell.
- Hinchliffe, S., Kearnes, M. B., Degen, M., & Whatmore, S. (2005). Urban wild things: A cosmopolitical experiment. *Environment and Planning D: Society and Space*, 23(5), 643–658.
- Hinchliffe, S., & Lavau, S. (2013). Differentiated circuits: The ecologies of knowing and securing life. *Environment and Planning D: Society and Space*, 31(2), 259–274.
- Hinchliffe, S., & Whatmore, S. (2006). Living cities: Towards a politics of conviviality. *Science as Culture*, 15(2), 123–138.
- Hobbs, R. J., Higgs, E. S., & Hall, C. M. (2013). *Novel ecosystems: Intervening in the new ecological world*. John Wiley & Sons.
- Hodder, K., Buckland, P. C., Kirby, K. J., & Bullock, J. (2009). Can the pre-Neolithic provide suitable models for rewilding the landscape in Britain? *British Wildlife*, June, 4–15.
- Hodder, K., & Bullock, J. (2009). Really wild? Naturalistic grazing in modern landscapes. *British Wildlife*, June, 37–43.

- Hodder, K., & Bullock, J. (2010). Nature without nurture? In M. Hall (Ed.), *Restoration and history: The search for a usable environmental past* (pp. 223–235). Routledge.
- Hodder, K., Bullock, J., Buckland, P. C., & Kirby, K. J. (2005). Large herbivores in the wildwood and modern naturalistic grazing systems. *English Nature Research Reports, No. 648*.
- Hodgetts, T. (2017). Wildlife conservation, multiple biopolitics and animal subjectification: Three mammals' tales. *Geoforum, 79*, 17–25.
- Hodgetts, T., & Lorimer, J. (2015). Methodologies for animals' geographies: Cultures, communication and genomics. *Cultural Geographies, 22*(2), 285–295.
- Hoggart, K. (1990). Let's do away with rural. *Journal of Rural Studies, 6*(3), 245–257.
- Holling, C. S. (1978). *Adaptive Environmental Assessment and Management*. John Wiley & Sons.
- Holling, C. S., & Meffett, G. K. (1996). Command and control and the pathology of natural resource management. *Conservation Biology, 10*(2), 328–337.
- Holloway, L. (2000). 'Hell on earth and paradise all at the same time': The production of smallholding space in the British countryside. *Area, 32*(3), 307–315.
- Holmes, G. D. (1975). History of forest and forest management. *Philosophical Transactions of the Royal Society of London, Series B, 271*, 69–80.
- Holmes, J. (2006). Impulses towards a multifunctional transition in rural Australia: Gaps in the research agenda. *Journal of Rural Studies, 22*(2), 142–160.
- Holton, J. A. (2007). The coding process and its challenges. In A. Bryant & K. Charmaz (Eds.), *The SAGE Handbook of Grounded Theory*. SAGE Publications.
- Hook, O. (1969). Wild animals and birds. In H. L. Edlin (Ed.), *New Forest: Forestry Commission Guide* (pp. 49–62). Her Majesty's Stationery Office.
- Hooke, D. (2011). Royal Forests – Hunting and other forest use in medieval England. In E. Ritter & D. Dauksta (Eds.), *New Perspectives on People and Forests* (pp. 41–59). Springer Netherlands.
- Hoskins, W. G. (1960). *The making of the English landscape*. Hodder and Stoughton Ltd.

- Howorth, R. (2011). *Fixed point photography survey of the Knepp Estate 2005-11*. Unpublished manuscript.
- Hughes, F. M. R., Adams, W. M., & Stroh, P. a. (2012). When is open-endedness desirable in restoration projects? *Restoration Ecology*, 20(3), 291–295.
- Hughes, F. M. R., Stroh, P. A., Adams, W. M., Kirby, K. J., Mountford, J. Owen., & Warrington, S. (2011). Monitoring and evaluating large-scale, ‘open-ended’ habitat creation projects: A journey rather than a destination?. *Journal for Nature Conservation*, 19(4), 245–253.
- Humphrey, J., & Bailey, S. (2012). *Managing deadwood in forests and woodlands*. Forestry Commission.
- Huntsinger, L., & Sayre, N. F. (2007). Introduction: The working landscapes Special Issue. *Rangelands*, 29(3), 3–4.
- Hurn, S. (2011). Dressing down: Clothing animals, disguising animality? *Civilisations*, 59(2), 109–124.
- Illingworth, R., Perry, J., & Barron, E. (1991). *Report of the Working Party on Grazing in the New Forest*. Unpublished manuscript.
- Ingold, T. (2000). *The Perception of the Environment: Essays on livelihood, dwelling and skill*. Routledge.
- Insley, H., & Clarke, M. P. G. (1975). A short history of the New Forest deer. *Deer: Journal of the British Deer Society*, 7, 376–381.
- IPBES. (2019). *Summary for policymakers of the Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES secretariat.
- Ivey, J. (2007). Education and awareness raising including conflicts between recreation, conservation and commoning. In New Forest Commoning Review Group (Ed.), *New Forest Commoning Review 2007: Full report—A commoner led review of current issues relating to the practice of commoning within the New Forest National Park*. Unpublished manuscript.

- Ivey, J. (2011). *Census of the New Forest Commoners 2011: A report based on census data and the marking fee register from 1965 to 2010*. Unpublished manuscript.
- James, N. D. G. (1981). *A history of English forestry*. Blackwell.
- Jensen, K. B., & Glasmeier, A. K. (2010). Policy, research design and the socially situated researcher. In D. DeLyser, S. Herbert, S. Aitken, M. Crang, & L. McDowell, *The SAGE Handbook of Qualitative Geography* (pp. 82–93). SAGE Publications.
- Jones, O. (2011). Lunar-solar rhythmpatterns: Towards the material cultures of tides. *Environment and Planning A*, 43(10), 2285–2303.
- Jones, O. (2013). “Who milks the cows at Maesgwyn?” The animality of UK rural landscapes in affective registers. *Landscape Research*, 38(4), 421–442.
- Jørgensen, D. (2015). Rethinking rewilding. *Geoforum*, 65, 482–488.
- Joys, A. C., Fuller, R. J., & Dolman, P. M. (2004). Influences of deer browsing, coppice history, and standard trees on the growth and development of vegetation structure in coppiced woods in lowland England. *Forest Ecology and Management*, 202(1–3), 23–37.
- Judkins, R. R. (2013). The game of the Courtly Hunt: Chasing and breaking deer in late medieval English literature. *The Journal of English and Germanic Philology*, 112(1), 70–92.
- Kareiva, P., Marvier, M., & Lalasz, R. (2011). Conservation in the Anthropocene: Beyond solitude and fragility. *Breakthrough Journal*, 2.  
<https://thebreakthrough.org/journal/issue-2/conservation-in-the-anthropocene>
- Kenchington, F. E. (1944). *The commoners' New forest: An outline of the folk-history of the New forest in the county of Southampton, its peasant pastoral industry and its possibilities*. Hutchinson.
- Keulartz, J. (2012). The emergence of enlightened anthropocentrism in ecological restoration. *Nature and Culture*, 7(1), 48–71.
- Kirby, K. J. (2001). The impact of deer on the ground flora of British broadleaved woodland. *Forestry*, 74(3), 219–229.

- Kirby, K. J. (2003). What might a British forest-landscape driven by large herbivores look like? *English Nature Research Reports, No. 530*.
- Kirby, K. J. (2004). Rewilding and the role of large herbivores. *ECOS, 25*(3), 59–62.
- Kirby, K., & Watkins, C. (2015a). Overview of Europe's woods and forests. In K. J. Kirby & C. Watkins (Eds.), *Europe's changing woods and forests: From wildwood to managed landscapes* (pp. 3–17). CABI.
- Kirby, K., & Watkins, C. (2015b). The forest landscape before farming. In K. J. Kirby & C. Watkins (Eds.), *Europe's changing woods and forests: From wildwood to managed landscapes* (pp. 33–45). CABI.
- Kirksey, E. (2015). *Emergent ecologies*. Duke University Press.
- Knight, J. (2000). Introduction. In J. Knight (Ed.), *Natural enemies: People-wildlife conflicts in anthropological perspective* (pp. 1–35). Routledge.
- Knight, J. (2006). *Waiting for wolves in Japan: An anthropological study of people-wildlife relations*. University of Hawai'i Press.
- Kobayashi, A. (2009). Situated Knowledge, Reflexivity. In R. Kitchin & N. Thrift (Eds.), *International Encyclopedia of Human Geography* (pp. 138–143). Elsevier Science.
- Kohn, E. (2013). *How forests think: Toward an anthropology beyond the human*. University of California Press.
- Kolbert, E. (2014). *The Sixth Extinction: An Unnatural History*. Henry Holt and Co.
- Krohn, W., & Weyer, J. (1994). Society as a laboratory: The social risks of experimental research. *Science and Public Policy, 21*(3), 173–183.
- Kulakowski, D., Seidl, R., Holeksa, J., Kuuluvainen, T., Nagel, T. A., Panayotov, M., Svoboda, M., Thorn, S., Vacchiano, G., Whitlock, C., Wohlgemuth, T., & Bebi, P. (2017). A walk on the wild side: Disturbance dynamics and the conservation and management of European mountain forest ecosystems. *Forest Ecology and Management, 388*, 120–131.

- Lane, S., Odoni, N., Landström, C., Whatmore, S., Ward, N., & Bradley, S. (2011). Doing flood risk science differently: An experiment in radical scientific method. *Transactions of the Institute of British Geographers*, 36(1), 15–36.
- Langton, J. (2015). Forest Law in the landscape: Not the clearing of the woods, but the running of the deer? In K. Baker, R. Carden, & R. Madgwick (Eds.), *Deer and People* (pp. 218–230). Windgather Press.
- Lascelles, G. (1915). *Thirty-five years in the New Forest*. Edward Arnold.
- Latour, B. (1986). Visualisation and cognition: Drawing things together. *Knowledge and Society: Studies in the Sociology of Culture Past and Present*, 6, 1–40.
- Latour, B. (1999). *Pandora's hope: Essays on the reality of science studies*. Harvard University Press.
- Latour, B. (2004). *Politics of nature: How to bring the sciences into democracy*. Harvard University Press.
- Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford University Press.
- Latour, B., Stengers, I., Tsing, A. L., & Bubandt, N. (2018). Anthropologists are talking – About capitalism, ecology, and apocalypse. *Ethnos*, 83(3), 587–606.
- Laundré, J. W., Hernández, L., & Ripple, W. J. (2010). The landscape of fear: Ecological implications of being afraid. *The Open Ecology Journal*, 3(3), 1–7.
- Law, J. (1994). *Organizing modernity*. Blackwell.
- Law, J. (1999). After ANT: Complexity, naming and topology. *The Sociological Review*, 47(S1), 1–14.
- Law, J. (2004). *After method: Mess in Social Science research*. Routledge.
- Law, J. (2008). Actor network theory and material semiotics. In B. S. Turner (Ed.), *The New Blackwell Companion to Social Theory* (pp. 141–158). Blackwell.
- Law, J. (2010). The materials of STS. In D. Hicks & M. C. Beaudry (Eds.), *The Oxford Handbook of Material Culture Studies* (pp. 158–159). Oxford University Press.

- Law, J., & Mol, A. (2001). Situating technoscience: An inquiry into spatialities. *Environment and Planning D: Society and Space*, 19, 609–621.
- Law, J., & Mol, A. (2002). *Complexities: An introduction* (J. Law & A. Mol, Eds.). Duke University Press.
- Law, J., & Urry, J. (2005). Enacting the social. *Economy and Society*, 33(3), 390–410.
- Lawton, G. (2018). The call of rewilding. *New Scientist*, 35, 34–38.
- Lefebvre, H. (2015). *Rhythmanalysis: Space, time, and everyday life*. Bloomsbury Academic.
- Lemke, T. (2011). *Biopolitics: An advanced introduction*. New York University Press.
- Lemke, T. (2015). New materialisms: Foucault and the ‘government of things’. *Theory, Culture & Society*, 32(4), 3–25.
- López-i-Gelats, F., Tàbara, J. D., & Bartolomé, J. (2009). The rural in dispute: Discourses of rurality in the Pyrenees. *Geoforum*, 40(4), 602–612.
- Lorimer, H. (1999). Ways of seeing the Scottish Highlands: Marginality, authenticity and the curious case of the Hebridean blackhouse. *Journal of Historical Geography*, 25(4), 517–533.
- Lorimer, H. (2000). Guns, Game and the Grandee: The cultural politics of deerstalking in the Scottish Highlands. *Ecumene*, 7(4), 403–431.
- Lorimer, H. (2010). Caught in the Nick of Time: Archives and fieldwork. In D. DeLyser, S. Herbert, S. Aitken, M. Crang, & L. McDowell, *The SAGE Handbook of Qualitative Geography* (pp. 248–273). SAGE Publications.
- Lorimer, J. (2006). What about the nematodes? Taxonomic partialities in the scope of UK biodiversity conservation. *Social & Cultural Geography*, 7(4), 539–558.
- Lorimer, J. (2007). Nonhuman charisma. *Environment and Planning D: Society and Space*, 25(5), 911–932.
- Lorimer, J. (2008). Counting comcrakes: The affective science of the UK comcrake census. *Social Studies of Science*, 38(3), 377–405.

- Lorimer, J. (2012). Multinatural geographies for the Anthropocene. *Progress in Human Geography*, 36(5), 593–612.
- Lorimer, J. (2015). *Wildlife in the Anthropocene: Conservation after Nature*. University of Minnesota Press.
- Lorimer, J. (2017). Probiotic environmentalities: Rewilding with wolves and worms. *Theory, Culture & Society*, 34(4), 27–48.
- Lorimer, J. (2018). Leave it to beavers: Animal work in austerity environmentalism. *Cultural Anthropology Website*. <https://culanth.org/fieldsights/1519-the-naturalization-of-work>
- Lorimer, J. (2020). *Probiotic Planet: Using life to manage life*. University of Minnesota Press.
- Lorimer, J., & Driessen, C. (2013). Bovine biopolitics and the promise of monsters in the rewilding of Heck cattle. *Geoforum*, 48, 249–259.
- Lorimer, J., & Driessen, C. (2014). Wild experiments at the Oostvaardersplassen: Rethinking environmentalism in the Anthropocene. *Transactions of the Institute of British Geographers*, 39, 169–181.
- Lorimer, J., & Driessen, C. (2016). From “nazi cows” to cosmopolitan “ecological engineers”: Specifying rewilding through a history of Heck cattle. *Annals of the American Association of Geographers*, 106(3), 631–652.
- Lorimer, J., Sandom, C. J., Jepson, P., Doughty, C., Barua, M., & Kirby, K. J. (2015). Rewilding: Science, Practice, and Politics. *Annual Review of Environment and Resources*, 40, 39–62.
- Lorimer, J., & Whatmore, S. (2009). After the ‘king of beasts’: Samuel Baker and the embodied historical geographies of elephant hunting in mid-nineteenth-century Ceylon. *Journal of Historical Geography*, 35(4), 668–689.
- Lulka, D. (2004). Stabilizing the herd: Fixing the identity of nonhumans. *Environment and Planning D: Society and Space*, 22(3), 439–463.
- MacDonald, D., Crabtree, J. R., Wiesinger, G., Dax, T., Stamou, N., Fleury, P., Gutierrez Lazpita, J., & Gibon, A. (2000). Agricultural abandonment in mountain areas of Europe:

- Environmental consequences and policy response. *Journal of Environmental Management*, 59, 47–69.
- MacDonald, F. (1998). Viewing Highland Scotland: Ideology, representation and the ‘natural heritage’. *Area*, 30(3), 237–244.
- MacKenzie, D., Muniesa, F., & Siu, L. (Eds.). (2006). *Do economists make markets?: On the performativity of economics*. Princeton University Press.
- Macnair, D. (2006). *New Forest ponies: Architects of the Forest*. Whittet Books.
- Manwood, J. (1717). *Manwood’s treatise of the forest laws*. In the Savoy.
- Marris, E. (2011). *Rambunctious garden: Saving nature in a post-wild world*. Bloomsbury.
- Marris, E. (2014). ‘New conservation’ is an expansion of approaches, not an ethical orientation. *Animal Conservation*, 17, 516–517.
- Marris, E. (2018). A good story: Media bias in trophic cascade research in Yellowstone National Park. In P. M. Kareiva, M. Marvier, & B. Silliman (Eds.), *Effective Conservation Science: Data Not Dogma* (pp. 80–84). Oxford University Press.
- Marsh, G. P. (1965). *Man and Nature: Or, physical geography as modified by human action* (D. Lowenthal, Ed.). The Belknap Press of Harvard University Press.
- Martin, L. J. (2015). Mathematizing nature’s messiness: Graphical representations of variation in ecology, 1930–present. *Environmental Humanities*, 7, 59–88.
- Marvin, G. (2000). The problem of foxes: Legitimate and illegitimate killing in the English countryside. In J. Knight (Ed.), *Natural enemies: People-wildlife conflicts in anthropological perspective* (pp. 189–211). Routledge.
- Marx, L. (2000). *The machine in the garden: Technology and the pastoral ideal in America*. Oxford University Press.
- Massey, D. (2005a). *For space*. SAGE Publications.
- Massey, D. (2005b). Negotiating nonhuman/human place. *Antipode*, 37(2), 353–357.

- Massey, D. (2006). Landscape as a provocation: Reflections on moving mountains. *Journal of Material Culture*, 11(1–2), 33–48.
- Massumi, B. (2009). National enterprise emergency: Steps toward an ecology of powers. *Theory, Culture & Society*, 26(6), 153–185.
- Mather, A. S. (1993). Protected areas in the periphery: Conservation and controversy in northern Scotland. *Journal of Rural Studies*, 9(4), 371–384.
- Mather, A. S. (2001). Forests of consumption: Postproductivism, postmaterialism, and the postindustrial forest. *Environment and Planning C: Government and Policy*, 19(2), 249–268.
- Mathews, A. S. (2017). Ghostly forms and forest histories. In A. L. Tsing, H. Swanson, E. Gan, & N. Bubandt (Eds.), *Arts of living on a damaged planet: Ghosts of the Anthropocene* (pp. G145–G156). University of Minnesota Press.
- Mathews, A. S. (2018). Landscapes and throughscapes in Italian forest worlds: Thinking dramatically about the Anthropocene. *Cultural Anthropology*, 33(3), 386–414.
- Matless, D. (2005). *Landscape and Englishness*. Reaktion Books.
- Mbembe, A. (2003). Necropolitics (L. Meintjes, Trans.). *Public Culture*, 15(1), 11–40.
- McCarthy, J. (2005). Rural geography: Multifunctional rural geographies - reactionary or radical? *Progress in Human Geography*, 29(6), 773–782.
- McCormack, D. P. (2008). Thinking-spaces for research-creation. *Inflexions*, 1.1.
- McDowell, L. (2010). Interviewing: Fear and Liking in the Field. In D. DeLyser, S. Herbert, S. Aitken, M. Crang, & L. McDowell, *The SAGE Handbook of Qualitative Geography* (pp. 156–171). SAGE Publications.
- McFarlane, B. L., Stumpf-Allen, R. C. G., & Watson, D. O. (2006). Public perceptions of natural disturbance in Canada's national parks: The case of the mountain pine beetle (*Dendroctonus ponderosae* Hopkins). *Biological Conservation*, 130(3), 340–348.
- McKibben, B. (1990). *The end of nature*. Penguin Books.

- Miller, B., Soulé, M. E., & Terborgh, J. (2014). 'New conservation' or surrender to development? *Animal Conservation*, 17, 509–515.
- Milton, K. (2000). Ducks out of water: Nature conservation as boundary maintenance. In J. Knight (Ed.), *Natural enemies: People-wildlife conflicts in anthropological perspective* (pp. 229–246). Routledge.
- Mitchell, C. J. A. (2004). Making sense of counterurbanization. *Journal of Rural Studies*, 20(1), 15–34.
- Mitchell, F. J. G. (2005). How open were European primeval forests? Hypothesis testing using palaeoecological data. *Journal of Ecology*, 93(1), 168–177.
- Mol, A. (1999). Ontological politics. A word and some questions. *Sociological Review*, 47(S1), 74–89.
- Mol, A. (2002). *The body multiple: Ontology in medical practice*. Duke University Press.
- Mol, A., & Law, J. (1994). Regions, networks and fluids: Anaemia and social topology. *Social Studies of Science*, 24(4), 641–671.
- Monbiot, G. (2013). *Feral: Searching for enchantment on the frontiers of rewilding*. Allen Lane.
- Monbiot, G. (2016, January 14). *Meet the conservationists who believe that burning is good for wildlife*. <https://www.theguardian.com/environment/georgemonbiot/2016/jan/14/swaling-is-causing-an-environmental-disaster-on-britains-moors>
- Mori, A. S. (2011). Ecosystem management based on natural disturbances: Hierarchical context and non-equilibrium paradigm. *Journal of Applied Ecology*, 48(2), 280–292.
- Müller, M. (2011). How natural disturbance triggers political conflict: Bark beetles and the meaning of landscape in the Bavarian Forest. *Global Environmental Change*, 21(3), 935–946.
- Murdoch, J. (2006). *Post-structuralist Geography: A guide to relational space*. Sage.
- Murdoch, J., & Pratt, A. C. (1993). Rural studies: Modernism, postmodernism and the 'post-rural'. *Journal of Rural Studies*, 9(4), 411–427.

- Murdoch, J., & Pratt, A. C. (1997). From the power of topography to the topography of power: A discourse on strange ruralities. In P. Cloke & J. Little (Eds.), *Contested countryside cultures: Otherness, marginalisation and rurality* (pp. 49–66). Routledge.
- Mustafa, D. (2005). The production of an urban hazardscape in Pakistan: Modernity, vulnerability, and the range of choice. *Annals of the Association of American Geographers*, 95(3), 566–586.
- Nail, S. (2008). *Forest policies and social change in England*. Springer.
- National Parks UK. (2019). *National Park facts and figures*.  
<https://nationalparks.uk/students/whatisanationalpark/factsandfigures>
- Navarro, L. M., & Pereira, H. M. (2012). Rewilding abandoned landscapes in Europe. *Ecosystems*, 15(6), 900–912.
- Navarro, L. M., Proença, V., Kaplan, J. O., & Pereira, H. M. (2015). Maintaining disturbance-dependent habitats. In H.M. Pereira & L. M. Navarro (Eds.), *Rewilding European Landscapes* (pp. 143–167). Springer.
- Neumann, R. P. (2004). Nature-State-Territory: Toward a critical theorization of conservation enclosures. In R. Peet & M. Watts (Eds.), *Liberation ecologies: Environment, development, social movements* (pp. 179–199). Routledge.
- Neumann, R. P. (2014). Stories of nature's hybridity in Europe: Implications for forest conservation in the Global South. In S. B. Hecht, K. D. Morrison, & C. Padoch (Eds.), *The social lives of forests: Past, present, and future of woodland resurgence* (pp. 31–44). The University of Chicago Press.
- New Forest Commoner. (2014, May 12). New Forest: The costs and benefits of commoning. *New Forest Commoner*. <http://newforestcommoner.co.uk/2014/05/12/new-forest-the-costs-and-benefits-of-commoning/>
- New Forest District. (2007). *New Forest District Deer Management Plan*. Unpublished manuscript.

- New Forest National Park Authority. (2008). *New Forest National Park Plan—Recreational Horse Keeping Working Group: Background Information Prepared by NPA*. Unpublished manuscript.
- New Forest National Park Authority. (2015). *Our Past Our Future Landscape Partnership Scheme: Landscape Conservation Action Plan*. Unpublished manuscript.
- New Forest National Park Authority. (2016). *New Forest: State of the Park Report 2016*. Unpublished manuscript.
- New Forest National Park Authority. (2018). *Donkeys*.  
<https://www.newforestnpa.gov.uk/discover/commoning/the-animals/donkey/>
- New Forest Trust. (2018). *A-Z of Commoning and the New Forest*.  
<https://www.newforesttrust.org.uk/a-z-commoning-new-forest>
- Newton, A. C. (2010). Preface. In A. C. Newton (Ed.), *Biodiversity in the New Forest* (pp. vii–x). Pisces Publications.
- Newton, A. C. (2011). Social-ecological resilience and biodiversity conservation in a 900-year-old protected area. *Ecology and Society*, 16(4), 13.
- Newton, A. C. (2013). Biodiversity conservation and the traditional management of common land: The case of the New Forest. In I. D. Rotherham (Ed.), *Cultural severance and the environment: The ending of traditional and customary practice on commons and landscapes managed in common* (pp. 353–370). Springer.
- Newton, A. C., Cantarello, E., Douglas, S., Martin, P., Evans, P., & Gosal, A. (2015). Managing landscape resilience: The example of the New Forest. In I. D. Rotherham & C. Handley (Eds.), *Wild thing?? Managing landscape change and future ecologies—Conference pre-proceedings* (pp. 123–144). Unpublished manuscript.
- Newton, A. C., Cantarello, E., Myers, G., Douglas, S., & Tejedor, N. (2010). The condition and dynamics of New Forest woodlands. In A. C. Newton (Ed.), *Biodiversity in the New Forest* (pp. 132–146). Pisces Publications.
- Nightingale, A. (2013). *Available edible fodder survey*. Unpublished manuscript.

- Niklasson, M. (2014). A critical look at forestry and forest management practices and ideology in Europe. In C. J. Sandom (Ed.), *Making Europe a Wilder Place* (pp. 6–7). Rewilding Europe.
- Nilsen, E. B., Milner-Gulland, E. J., Schofield, L., Mysterud, A., Stenseth, N. Chr., & Coulson, T. (2007). Wolf reintroduction to Scotland: Public attitudes and consequences for red deer management. *Proceedings of the Royal Society B*, *274*, 995–1002.
- Nogués-Bravo, D., Simberloff, D., Rahbek, C., & Sanders, N. J. (2016). Rewilding is the new Pandora's box in conservation. *Current Biology*, *26*(3), R87–R91.
- Ockendon, N., Thomas, D. H. L., Cortina, J., Adams, W. M., Aykroyd, T., Barov, B., Boitani, L., Bonn, A., Branquinho, C., Brombacher, M., Burrell, C., Carver, S., Crick, H. Q. P., Duguay, B., Everett, S., Fokkens, B., Fuller, R. J., Gibbons, D. W., Gokhelasvili, R., ... Sutherland, W. J. (2018). One hundred priority questions for landscape restoration in Europe. *Biological Conservation*, *221*, 198–208.
- Oliver-Smith, Anthony. (2002). Theorizing disasters: Nature, power, and culture. In A. Oliver-Smith & S. M. Hoffman (Eds.), *Catastrophe & culture: The anthropology of disaster* (pp. 23–47). School of American Research Press.
- Onions, C. T. (Ed.). (1966). *The Oxford dictionary of English etymology*. Clarendon Press.
- Otter, C. (2011). Hippophagy in the UK: A failed dietary revolution. *Endeavour*, *35*(2–3), 80–90.
- Overend, D., & Lorimer, J. (2018). Wild performatives: Experiments in rewilding at the Knepp Wildland Project. *GeoHumanities*, *4*(2), 527–542.
- Page, A. (2015). *Deer Management Strategy 2014-2020*. Unpublished manuscript.
- Paquette, S., & Domon, G. (2003). Changing ruralities, changing landscapes: Exploring social recomposition using a multi-scale approach. *Journal of Rural Studies*, *19*(4), 425–444.
- Pasmore, A. (1976). *Verderers of the New Forest: A history of the New Forest 1877-1977*. Pioneer Publications Limited.

- Paxson, H. (2010). Placing the taste of Vermont cheese. *Cuisine*, 2(2). Érudit.  
<https://id.erudit.org/iderudit/044349ar>
- Paxson, H. (2013). *The life of cheese: Crafting food and value in America*. University of California Press.
- Paxson, H. (2018). The naturalization of nature as working. *Cultural Anthropology Website*.  
<https://culanth.org/fieldsights/1519-the-naturalization-of-work>
- Pearce, F. (2015). *The new wild: Why invasive species will be nature's salvation*. Icon Books.
- Pelling, M. (2001). Natural disasters? In N. Castree & B. Braun (Eds.), *Social nature: Theory, practice, and politics* (pp. 170–188). Blackwell Publishing.
- Pereira, H. M., & Navarro, L. M. (Eds.). (2015). *Rewilding European Landscapes*. Springer.
- Perino, A., Pereira, H. M., Navarro, L. M., Fernández, N., Bullock, J. M., Ceaușu, S., Cortés-Avizanda, A., van Klink, R., Kuemmerle, T., Lomba, A., Pe'er, G., Plieninger, T., Rey Benayas, J. M., Sandom, C. J., Svenning, J.-C., & Wheeler, H. C. (2019). Rewilding complex ecosystems. *Science*, 364(6438), eaav5570.
- Peterken, G. F. (2016). Searching for natural woodland—Lady Park, Wye Valley. In A. Cooper (Ed.), *Arboreal: A collection of new woodland writing* (pp. 277–286). Little Toller Books.
- Peterken, G. F., & Tubbs, C. R. (1965). Woodland regeneration in the New Forest, Hampshire, since 1650. *Journal of Applied Ecology*, 2(1), 159–170.
- Peters, K. (2012). Manipulating material hydro-worlds: Rethinking human and more-than-human relationality through offshore radio piracy. *Environment and Planning A: Economy and Space*, 44(5), 1241–1254.
- Pettorelli, N., Barlow, J., Stephens, P. A., Durant, S. M., Connor, B., Schulte to Bühne, H., Sandom, C. J., Wentworth, J., & du Toit, J. T. (2018). Making rewilding fit for policy. *Journal of Applied Ecology*, 55(3), 1114–1125.
- Pettorelli, N., Durant, S. M., & du Toit, J. T. (2019). Rewilding: A captivating, controversial, twenty-first-century concept to address ecological degradation in a changing world. In

- N. Pettorelli, S. M. Durant, & J. T. du Toit (Eds.), *Rewilding* (pp. 1–11). Cambridge University Press.
- Phillips, C. (2020). Telling times: More-than-human temporalities in beekeeping. *Geoforum*, 108, 315–324.
- Phillips, M. (1998). The restructuring of social imaginations in rural geography. *Journal of Rural Studies*, 14(2), 121–153.
- Phillips, M. (2010). Counterurbanisation and rural gentrification: An exploration of the terms. *Population, Space and Place*, 16, 539–558.
- Philo, C. (1995). Animals, geography, and the city: Notes on inclusions and exclusions. *Environment and Planning D: Society and Space*, 13(6), 655–681.
- Philo, C. (2005). Spacing lives and lively spaces: Partial remarks on Sarah Whatmore's *Hybrid Geographies*. *Antipode*, 37, 824–833.
- Philo, C., & Wilbert, C. (2000). Animal spaces, beastly places: An introduction. In C. Philo & C. Wilbert (Eds.), *Animal spaces, beastly places: New geographies of human-animal relations* (pp. 1–34). Routledge.
- Pickett, S., & Ostfeld, R. (1995). The Shifting Paradigm in Ecology. In R. L. Knight & S. F. Bates (Eds.), *A new century for natural resources management* (pp. 261–278). Island Press.
- Pink, S., & Morgan, J. (2013). Short-term ethnography: Intense routes to knowing. *Symbolic Interaction*, 36(3), 351–361.
- Plumwood, V. (2006). The concept of a cultural landscape: Nature, culture and agency in the land. *Ethics and the Environment*, 11(2), 115–150.
- Pluskowski, A. G. (2010). The wolf. In T. O'Connor & N. Sykes (Eds.), *Extinctions and invasions: A social history of British fauna* (pp. 68–74). Windgather Press.
- Porter, T. M. (1995). *Trust in numbers: The pursuit of objectivity in science and public life*. Princeton University Press.

- Potter, C., & Urquhart, J. (2016). Tree disease and pest epidemics in the Anthropocene: A review of the drivers, impacts and policy responses in the UK. *Forest Policy and Economics*, 79, 61–68.
- Prentice, E. W., Qin, H., & Flint, C. G. (2018). Mountain pine beetles and ecological imaginaries: The social construction of forest insect disturbance. In J. Urquhart, M. Marzano, & C. Potter (Eds.), *The human dimensions of forest and tree health* (pp. 77–107). Palgrave Macmillan.
- Probyn-Rapsey, F. (2013). Nothing to see—Something to see: White animals and exceptional life/death. In F. Probyn-Rapsey & J. Johnston (Eds.), *Animal death* (pp. 239–252). Sydney University Press.
- Pryke, M., Rose, G., & Whatmore, S. (2003). Introduction. In M. Pryke, G. Rose, & S. Whatmore (Eds.), *Using Social Theory: Thinking through research* (pp. 2–7). SAGE Publications.
- Puplett, D. (2018). *Carrion*. <https://treesforlife.org.uk/forest/forest-ecology/carrion/>
- Putman, R. J. (1986). *Grazing in temperate ecosystems: Large herbivores and the ecology of the New Forest*. Croom Helm.
- Putman, R. J. (1989). Introduction: Mammals as pests. In R. J. Putman (Ed.), *Mammals as pests* (pp. 1–20). Chapman and Hall.
- Putman, R. J. (1996a). *Competition and resource partitioning in temperate ungulate assemblies*. Chapman & Hall.
- Putman, R. J. (1996b). Ungulates in temperate forest ecosystems: Perspectives and recommendations for future research. *Forest Ecology and Management*, 88(1–2), 205–214.
- Putman, R. J. (2010a). The effects of grazing on the ecological structure and dynamics of the New Forest. In A. C. Newton (Ed.), *Biodiversity in the New Forest* (pp. 148–156). Pisces Publications.

- Putman, R. J. (2010b). Ungulates and their management in Great Britain and Ireland. In M. Apollonio, R. Andersen, & R. Putman (Eds.), *European ungulates and their management in the 21st century* (pp. 129–164). Cambridge University Press.
- Putman, R. J., Edwards, P. J., Mann, J. C. E., How, R. C., & Hill, S. D. (1989). Vegetational and faunal changes in an area of heavily grazed woodland following relief of grazing. *Biological Conservation*, 47(1), 13–32.
- Putman, R. J., & Langbein, J. (1999). *Deer and their management in the New Forest – a consultation report*. Unpublished manuscript.
- Putman, R. J., & Langbein, J. (2000). The development of a deer management plan for the New Forest. *Deer: Journal of the British Deer Society*, 11(6), 290–299.
- Putman, R. J., & Moore, N. P. (1998). Impact of deer in lowland Britain on agriculture, forestry and conservation habitats. *Mammal Review*, 28(4), 141–164.
- Putman, R. J., & Staines, B. W. (2004). Supplementary winter feeding of wild red deer *Cervus elaphus* in Europe and North America: Justifications, feeding practice and effectiveness. *Mammal Review*, 34(4), 285–306.
- Pyne, S. J. (1997). *Vestal Fire: An environmental history, told through fire, of Europe and Europe's encounter with the World*. University of Washington Press.
- Rabinow, P. (1984). Introduction. In P. Rabinow (Ed.), *The Foucault reader* (pp. 3–29). Pantheon Books.
- Rackham, O. (1998). Savanna in Europe. In K. J. Kirby & C. Watkins (Eds.), *The ecological history of European forests* (pp. 1–24). CAB International.
- Rackham, O. (2000). *The history of the countryside: The classic history of Britain's landscape, flora and fauna*. Phoenix.
- Rackham, O. (2006). *Woodlands*. Collins.

- Raffles, H., & WinklerPrins, A. M. G. A. (2003). Further reflections on Amazonian environmental history: Transformations of rivers and streams. *Latin American Research Review*, 38(3), 165–187.
- Raum, S. (2017). The ecosystem approach, ecosystem services and established forestry policy approaches in the United Kingdom. *Land Use Policy*, 64, 282–291.
- Raum, S., & Potter, C. (2015). Forestry paradigms and policy change: The evolution of forestry policy in Britain in relation to the ecosystem approach. *Land Use Policy*, 49, 462–470.
- Read, H., & Spencer, J. (2001). The New Forest: Management of a unique and extensive historic landscape. In H. Read, A. S. Forfang, R. Marciau, H. Paltto, L. Andersson, & B. Tardy (Eds.), *Tools for preserving woodland biodiversity: Textbook 2* (pp. 91–95). NACONEX Project.
- Reice, S. R. (2001). *The silver lining: The benefits of natural disasters*. Princeton University Press.
- Rewilding Britain. (2014). *Rewilding Britain: A proposal to make Britain a wilder place*. Unpublished manuscript.
- Richardson, L., & St. Pierre, E. A. (2005). Writing: A method of inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (3rd ed., pp. 959–978). SAGE Publications.
- Ripple, W. J., & Beschta, R. L. (2012). Trophic cascades in Yellowstone: The first 15 years after wolf reintroduction. *Biological Conservation*, 145(1), 205–213.
- RJS Associates Ltd. (2018). *New Forest National Park Recreation and Leisure Visits*. Unpublished manuscript.
- Rocheleau, D., & Roth, R. (2007). Rooted networks, relational webs and powers of connection: Rethinking human and political ecologies. *Geoforum*, 38(3), 433–437.
- Rogers, P. (1996). *Disturbance Ecology and Forest Management: A Review of the Literature*. United States Department of Agriculture.

- Roodhouse, M. (2013, March 19). *Eating horse in austerity Britain*.  
<https://blog.oup.com/2013/03/horsemeat-austerity-britain/>
- Rose, G. (1997). Situating knowledges: Positionality, reflexivities and other tactics. *Progress in Human Geography*, 21(3), 305–320.
- Rose, N. (1991). Governing by numbers: Figuring out democracy. *Accounting, Organizations and Society*, 16(7), 673–692.
- Rutherford, P., & Rutherford, S. (2013). The confusions and exuberances of biopolitics. *Geography Compass*, 7, 412–422.
- Rutherford, S. (2011). *Governing the wild: Ecotours of power*. University of Minnesota Press.
- Rutherford, S., & Rutherford, P. (2013). Geography and biopolitics. *Geography Compass*, 7, 423–434.
- Ryan, J. R. (2000). ‘Hunting with the camera’: Photography, wildlife and colonialism in Africa. In C. Philo & C. Wilbert (Eds.), *Animal spaces, beastly places: New geographies of human-animal relations* (pp. 203–221). Routledge.
- Sandom, C. J., Donlan, C. J., Svenning, J.-C., & Hansen, D. (2013). Rewilding. In D. W. Macdonald & K. J. Willis (Eds.), *Key Topics in Conservation Biology 2* (pp. 430–451). John Wiley & Sons, Ltd.
- Sandom, C. J., Ejrnæs, R., Hansen, M. D. D., & Svenning, J.-C. (2014). High herbivore density associated with vegetation diversity in interglacial ecosystems. *Proceedings of the National Academy of Sciences of the United States of America*, 111(11), 4162–7.
- Sandom, C. J., & Wynne-Jones, S. (2019). Rewilding a country: Britain as a study case. In N. Pettorelli, S. M. Durant, & J. T. du Toit (Eds.), *Rewilding* (pp. 222–247). Cambridge University Press.
- Schama, S. (1995). The liberties of the Greenwood. In *Landscape and Memory* (pp. 135–184). HarperCollins.
- Schepers, F., & Jepson, P. (2016). *Rewilding in a European Context*. 22(2), 25–30.

- Schlosser, K. (2008). Bio-political geographies. *Geography Compass*, 2/5, 1621–1634.
- Schnitzler, A. (2014). Towards a new European wilderness: Embracing unmanaged forest growth and the decolonisation of nature. *Landscape and Urban Planning*, 126, 74–80.
- Schrader, A., Johnson, E. R., Buller, H., Robinson, D., Rundle, S., Sagan, D., Schmitt, S., & Spicer, J. (2017). Considering killability: Experiments in unsettling life and death. *Catalyst: Feminism, Theory, Technoscience*, 3(2), 1–15.
- Schwartz, K. Z. S. (2006). “Masters in our native place”: The politics of Latvian national parks on the road from Communism to “Europe”. *Political Geography*, 25(1), 42–71.
- Scoones, I. (1999). New ecology and the social sciences: What prospects for a fruitful engagement? *Annual Review of Anthropology*, 28(1999), 479–507.
- Scott, J. C. (1998). *Seeing like a State: How certain schemes to improve the human condition have failed*. Yale University Press.
- Scott, S., Hinton-Smith, T., Härmä, V., & Broome, K. (2012). The reluctant researcher: Shyness in the field. *Qualitative Research*, 12(6), 715–734.
- Seidl, R., Thom, D., Kautz, M., Martin-Benito, D., Peltoniemi, M., Vacchiano, G., Wild, J., Ascoli, D., Petr, M., Honkaniemi, J., Lexer, M. J., Trotsiuk, V., Mairota, P., Svoboda, M., Fabrika, M., Nagel, T. A., & Reyer, C. P. O. (2017). Forest disturbances under climate change. *Nature Climate Change*, 7(6), 395–402.
- Shapin, S. (1998). Placing the view from nowhere: Historical and sociological problems in the location of science. *Transactions of the Institute of British Geographers*, 23(1), 5–12.
- Sharp, J., Lowen, J., & Liley, D. (2008). *Changing patterns of visitor numbers within the New Forest National Park, with particular reference to the New Forest SPA*. Unpublished report.
- Sheail, J. (2002). *Environmental History of Twentieth-Century Britain*. Palgrave Macmillan.
- Short, B. (2006). Idyllic ruralities. In P. Cloke, T. Marsden, & P. Mooney (Eds.), *Handbook of rural studies* (pp. 133–148). SAGE Publications.

- Simberloff, D. (2014). The ‘balance of nature’—Evolution of a panchreston. *PLOS Biology*, 12(10), e1001963.
- Smit, C., & Putman, R. (2011). Large herbivores as ‘environmental engineers’. In R. Putman, M. Apollonio, & R. Andersen (Eds.), *Ungulate Management in Europe* (pp. 260–283). Cambridge University Press.
- Smith, J., & Burke, L. (2010). Managing the New Forest’s Crown lands. In A. C. Newton (Ed.), *Biodiversity in the New Forest* (pp. vii–x). Pisces Publications.
- Smout, T. C. (2003). The alien species in 20th-century Britain: Constructing a new vermin. *Landscape Research*, 28(1), 11–20.
- Sontag, S. (1979). *On photography*. Penguin Books.
- Soulé, M. E. (2013). The ‘New Conservation’: Editorial. *Conservation Biology*, 27(5), 895–897.
- Soulé, M. E., & Noss, R. (1998). Rewilding and biodiversity: Complementary goals for Continental Conservation. *Wild Earth*, 8(3), 18–28.
- Sousa, W. P. (1984). The role of disturbance in natural communities. *Annual Review of Ecology and Systematics*, 15(1), 353–391.
- Spencer, J. (2002). Managing wood pasture landscapes in England; the New Forest and other more recent examples. In B. Redecker, W. Härdtle, P. Finck, U. Riecken, & E. Schröder (Eds.), *Pasture Landscapes and Nature Conservation* (pp. 123–136). Springer.
- Spencer, J. (2016). *Knepp Castle Estate Wildland Project Conservation Area Audit for VCA*. Unpublished manuscript.
- Srinivasan, K. (2014). Caring for the collective: Biopower and agential subjectification in wildlife conservation. *Environment and Planning D: Society and Space*, 32(3), 501–517.
- Srinivasan, K. (2017). Conservation biopolitics and the sustainability episteme. *Environment and Planning A*, 49(7), 1458–1476.
- Stagg, D. (1986). *Commoners of the New Forest*. New Forest Association.

- Steffen, W., Crutzen, P. J., & McNeill, J. R. (2007). The Anthropocene: Are humans now overwhelming the great forces of nature. *AMBIO: A Journal of the Human Environment*, 36(8), 614–621.
- Stokstad, E. (2017). Last stands. *Science*, 358(6368), 1240–1243.
- Stover, S. L. (1985). Silviculture and grazing in the New Forest: Rival land uses over nine centuries. *Journal of Forest History*, 29(1), 32–42.
- Streeter, D. (2007). Francis Rose 1921-2006. *Watsonia*, 26, 515–526.
- Stride, L. (2018, December 19). Great colt-hunting ponies are born – not made. *Commoning Family*. <https://commoningfamily.wordpress.com/2018/12/19/great-colt-hunting-ponies-are-born-not-made/>
- Sullivan, S. (2018). On possibilities for salvaged polyphonic ecologies in a ruined world. *Dialogues in Human Geography*, 8(1), 69–72.
- Sumner, H. (1910). *Cuckoo Hill: The Book of Gorley*. Chiswick Press.
- Sumner, H. (1999). The New Forest Deer Removal Act, 1851, and afterwards. *Hampshire Studies: Proceedings of the Hampshire Field Club and Archaeological Society*, 54, 75–87.
- Svenning, J.-C. (2002). A review of natural vegetation openness in North-Western Europe. *Biological Conservation*, 104(2), 133–148.
- Swanson, H. A. (2017). Methods for Multispecies Anthropology: Thinking with salmon otoliths and scales. *Social Analysis*, 61(2), 81-99.
- Sykes, N., Ayton, G., Bowen, F., Baker, K., Baker, P., Carden, R. F., Dicken, C., Evans, J., Hoelzel, A. R., Higham, T. F. G., Jones, R., Lamb, A., Liddiard, R., Madgwick, R., Miller, H., Rainsford, C., Sawyer, P., Thomas, R., Ward, C., & Worley, F. (2016). Wild to domestic and back again: The dynamics of fallow deer management in medieval England (c. 11<sup>th</sup>-16<sup>th</sup> century AD). *STAR: Science & Technology of Archaeological Research*, 2(1), 113–126.

- Sylvén, M., Widstrand, S., Schepers, F., Birnie, N., & Teunissen, T. (2012). *Rewilding Europe: Making Europe a wilder place*. Rewilding Europe.
- Taylor, L. (2011). No boundaries: Exurbia and the study of contemporary urban dispersion. *GeoJournal*, 76(4), 323–339.
- Taylor, P. (2005). *Beyond Conservation: A wildland strategy*. Earthscan.
- Taylor, P. (2006). Home Counties wildland—The new nature at Knepp. *ECOS*, 27(3/4), 44–51.
- Taylor, P. (2011a). Introduction. In P. Taylor (Ed.), *Rewilding: ECOS Writing on wildland and conservation values* (pp. 9–11). BANC/Ethos.
- Taylor, P. (Ed.). (2011b). *Rewilding: ECOS Writing on wildland and conservation values*. BANC/Ethos.
- Thom, D., & Seidl, R. (2016). Natural disturbance impacts on ecosystem services and biodiversity in temperate and boreal forests. *Biological Reviews*, 91, 760–781.
- Thorpe, B. (Ed.). (1861). *The Anglo-Saxon chronicle, according to the several original authorities* (Vol. 2). Longman, Green, Longman, and Roberts.
- Thrift, N. (2004). Movement-space: The changing domain of thinking resulting from the development of new kinds of spatial awareness. *Economy and Society*, 33(4), 582–604.
- Todd, Z. (2014). Fish pluralities: Human-animal relations and sites of engagement in Paulatuuq, Arctic Canada. *Études/Inuit/Studies*, 38(1–2), 217.
- Toogood, M. (1995). Representing ecology and Highland tradition. *Area*, 27(2), 102–109.
- Toogood, M. (2003). Decolonizing Highland conservation. In W. M. Adams & M. Mulligan (Eds.), *Decolonizing nature: Strategies for conservation in a post-colonial era* (pp. 152–171). Earthscan.
- Torres, A., Fernandez, N., Helmer, W., Revilla, E., Saavedra, D., Perino, A., Mimet, A., Rey-Benayas, J. M., Selva, N., Schepers, F., Svenning, J.-C., & Pereira, H. M. (2018). Measuring rewilding progress. *Philosophical Transactions of the Royal Society B*, 373, 1–14.

- Tree, I. (2018a). *Wilding: The return of nature to a British farm*. Picador.
- Tree, I. (2018b). Creating a Mess – The Knepp Rewilding Project. *Bulletin of the Chartered Institute of Ecology and Environmental Management*, 100, 29–34.
- Trees for Life. (2019). *Wild boar project*. <https://treesforlife.org.uk/into-the-forest/trees-plants-animals/mammals/wild-boar/wild-boar-project/>
- Tsing, A. L. (2005). *Friction: An ethnography of global connection*. Princeton University Press.
- Tsing, A. L. (2014). Blasted landscapes (and the gentle arts of mushroom picking). In E. Kirksey (Ed.), *The Multispecies Salon* (pp. 87–109). Duke University Press.
- Tsing, A. L. (2015). *The Mushroom at the end of the world: On the possibility of life in capitalist ruins*. Princeton University Press.
- Tsing, A. L. (2017a). A threat to Holocene resurgence is a threat to livability. In M. Brightman & J. Lewis (Eds.), *The Anthropology of Sustainability* (pp. 51–65). Palgrave Macmillan US.
- Tsing, A. L. (2017b). The buck, the bull, and the dream of the stag: Some unexpected weeds of the Anthropocene. *Suomen Antropologi: Journal of the Finnish Anthropological Society*, 42(1), 3–21.
- Tsing, A. L. (2018). Getting by in terrifying times. *Dialogues in Human Geography*, 8(1), 73–76.
- Tsing, A. L., Mathews, A. S., & Bubandt, N. (2019). Patchy Anthropocene: Landscape structure, multispecies history, and the retooling of anthropology - An introduction to Supplement 20. *Current Anthropology*, 60(S20), S186–S197.
- Tsing, A. L., Swanson, H., Gan, E., & Bubandt, N. (Eds.). (2017). *Arts of living on a damaged planet: Ghosts of the Anthropocene*. University of Minnesota Press.
- Tsouvalis, J. (2000). *A critical geography of Britain's state forests*. Oxford University Press.
- Tubbs, C. R. (1965). The development of the smallholding and cottage stock-keeping economy of the New Forest. *The Agricultural History Review*, 13(1), 23–39.
- Tubbs, C. R. (1974). Heathland management in the New Forest, Hampshire, England. *Biological Conservation*, 6(4), 303–306.

- Tubbs, C. R. (1986). *The New Forest: An ecological history*. Collins.
- Tubbs, C. R. (1997). The ecology of pastoralism in the New Forest. *British Wildlife*, 9(1), 7–16.
- Turner, G. J. (Ed.). (1901). *Select pleas of the forest*. Bernard Quaritch.
- Turner, M. (2010). Disturbance and landscape dynamics in a changing world. *Ecology*, 91(10), 2833–2849.
- Urquhart, J., Courtney, P., & Slee, B. (2012). Private woodland owners' perspectives on multifunctionality in English woodlands. *Journal of Rural Studies*, 28(1), 95–106.
- van Dooren, T. (2014). *Flight ways: Life and loss at the edge of extinction*. Columbia University Press.
- van Dooren, T., Kirksey, E., & Münster, U. (2016). Multispecies Studies: Cultivating arts of attentiveness. *Environmental Humanities*, 8(1), 1–23.
- van Dooren, T., & Rose, D. B. (2012). Storied-places in a multispecies city. *Humanimalia*, 3, 1–27.
- van Maanen, E., & Convery, I. (2016). Rewilding: The realisation and reality of a new challenge for Nature in the twenty-first century. In I. Convery & P. Davis (Eds.), *Changing Perceptions of Nature* (pp. 299–316). Boydell and Brewer.
- Vannini, P., & Vannini, A. S. (2019). Wildness as vitality: A relational approach. *Environment and Planning E: Nature and Space*, 2(2), 252–273.
- Vera, F. (2000). *Grazing ecology and forest history*. CABI Publishing.
- Vera, F. (2009). Large-scale nature development – the Oostvaardersplassen. *British Wildlife*, June, 28–36.
- Verderers' Court. (2011). *Minutes of the Court of Verderers held on Wednesday 20<sup>th</sup> April 2011 at 9.30 a.m. In the Verderers' Hall and the Library, the Queen's House, Lyndhurst*. Unpublished manuscript.
- Verderers' Court. (2013). *Minutes of the Court of Verderers held on Wednesday 15<sup>th</sup> May 2013 at 9.30 a.m. In the Verderers' Hall and the Library, the Queen's House, Lyndhurst*. Unpublished manuscript.

- Verderers' Court. (2017). *Minutes of the Court of Verderers held on Wednesday 22<sup>nd</sup> March 2017 at 9.30 a.m. In the Verderers' Hall and the Library, the Queen's House, Lyndhurst*. Unpublished manuscript.
- Verderers of the New Forest. (2015). *Education*. <http://www.verderers.org.uk/education.html>
- Verderers of the New Forest. (2018). *Animal accidents and stock numbers*. Unpublished manuscript.
- Vermeulen, R. (2015). *Natural Grazing: Practices in the rewilding of cattle and horses*. Rewilding Europe.
- Vesey-Fitzgerald, B. (1966). *Portrait of the New Forest*. Robert Hale.
- Viveiros de Castro, E. (1998). Cosmological Deixis and Amerindian Perspectivism. *The Journal of the Royal Anthropological Institute*, 4(3), 469.
- Wagner, S., Nocentini, S., Huth, F., & Hoogstra-Klein, M. (2014). Forest management approaches for coping with the uncertainty of climate change: Trade-offs in service provisioning and adaptability. *Ecology and Society*, 19(1), 32.
- Walters, C. J., & Holling, C. S. (1990). Large-scale management experiments and learning by doing. *Ecology*, 71(716), 2060–2068.
- Ward, K. (2019). For wilderness or wildness? Decolonising rewilding. In N. Pettorelli, S. M. Durant, & J. T. du Toit (Eds.), *Rewilding* (pp. 34–54). Cambridge University Press.
- Warren, C. R. (2007). Perspectives on the 'alien' versus 'native' species debate: A critique of concepts, language and practice. *Progress in Human Geography*, 31(4), 427–446.
- Watson, A., & Till, K. E. (2010). Ethnography and Participant Observation. In D. DeLyser, S. Herbert, S. Aitken, M. Crang, & L. McDowell, *The SAGE Handbook of Qualitative Geography* (pp. 82–93). SAGE Publications.
- Whatmore, S. (2002). *Hybrid geographies: Natures cultures spaces*. SAGE Publications.
- Whatmore, S. (2003). Generating materials. In M. Pryke, G. Rose, & S. Whatmore (Eds.), *Using Social Theory: Thinking through research* (pp. 90–104). SAGE Publications.

- Whatmore, S. (2006). Materialist returns: Practising cultural geography in and for a more-than-human world. *Cultural Geographies*, 13(4), 600–609.
- Whatmore, S. (2013). Earthly powers and affective environments: An ontological politics of flood risk. *Theory, Culture & Society*, 30, 33–50.
- Whatmore, S., & Landström, C. (2011). Flood apprentices: An exercise in making things public. *Economy and Society*, 40(4), 582–610.
- White, C. (2017). The working wilderness. In G. van Horn & J. Hausdoerffer (Eds.), *Wildness: Relations of People and Place* (pp. 75–88). University of Chicago Press.
- White, P., & Pickett, S. (1985). Natural disturbance and patch dynamics: An introduction. In S. Pickett & P. White (Eds.), *The ecology of natural disturbance and patch dynamics* (pp. 3–13). Academic Press.
- Whitehead, A. N. (1964). *The concept of nature: The Tarner Lectures delivered in Trinity College, November 1919*. Cambridge University Press.
- Whittaker, J., & Mercer, D. (2004). The Victorian bushfires of 2002–03 and the politics of blame: A discourse analysis. *Australian Geographer*, 35(3), 259–287.
- Wightman, A., Higgins, P., Jarvie, G., & Nicol, R. (2002). The cultural politics of hunting: Sporting estates and recreational land use in the Highlands and Islands of Scotland. *Culture, Sport, Society*, 5(1), 53–70.
- Williams, E. (2008a, November 27). Anger over plans for New Forest. *BBC News*.  
<http://news.bbc.co.uk/go/pr/fr/-/1/hi/england/hampshire/7741197.stm>
- Williams, E. (2008b, November 27). Forest dwellers fight draft plans. *BBC News*.  
<http://news.bbc.co.uk/go/pr/fr/-/1/hi/england/hampshire/7741303.stm>
- Williams, R. (1973). *The country and the city*. Oxford University Press.
- Willis, K. J., Gillson, L., & Brncic, T. M. (2004). How “virgin” Is virgin rainforest? *Science*, 304, 402–403.

- Wilson, G. A. (2001). From productivism to post-productivism... And back again? Exploring the (un)changed natural and mental landscapes of European agriculture. *Transactions of the Institute of British Geographers*, 26(1), 77-.
- Woods, M. (1997). Researching rural conflicts: Hunting, local politics and actor-networks. *Journal of Rural Studies*, 14(3), 321–340.
- Woods, M. (1998). Mad cows and hounded deer: Political representations of animals in the British countryside. *Environment and Planning A*, 30(7), 1219–1234.
- Woods, M. (2009a). Rural geography. In R. Kitchin & N. Thrift (Eds.), *International Encyclopedia of Human Geography* (pp. 429–441). Elsevier.
- Woods, M. (2009b). Rural geography: Blurring boundaries and making connections. *Progress in Human Geography*, 33(6), 849–858.
- Woods, M. (2012). New directions in rural studies? *Journal of Rural Studies*, 28(1), 1–4.
- Worster, D. (1989). The Ecology of Order and Chaos. *Environmental History Review*, 14(1/2), 1–18.
- Worster, D. (1992). *Nature's Economy: A history of ecological ideas*. Cambridge University Press.
- Worster, D. (1994). Nature and the Disorder of History. *Environmental History Review*, 18(2), 1–15.
- Wright, R. N., & Westerhoff, D. (2001). *New Forest SAC Management Plan*. English Nature.
- Wu, J., & Loucks, O. L. (1995). From balance of nature to hierarchical patch dynamics: A paradigm shift in ecology. *The Quarterly Review of Biology*, 70(4), 439–466.
- Wuerthner, G. (2014). Why the working landscape isn't working. In G. Wuerthner, E. Crist, & T. Butler (Eds.), *Keeping the Wild* (pp. 162–173). Island Press.
- Wuerthner, G., Crist, E., & Butler, T. (Eds.). (2014). *Keeping the wild: Against the domestication of Earth*. Island Press.
- WWF. (2018). *Living Planet Report—2018: Aiming Higher*. WWF.

- Wynne-Jones, S., Strouts, G., & Holmes, G. (2018). Abandoning or reimagining a cultural heartland? Understanding and responding to rewilding conflicts in Wales—The case of the Cambrian Wildwood. *Environmental Values*, 27(4), 377–403.
- Wynne-Jones, S., Strouts, G., O’Neil, C., & Sandom, C. J. (2020). Rewilding—Departures in conservation policy and practice? An evaluation of developments in Britain. *Conservation and Society*, 18(2), 89–102.
- Youatt, R. (2008). Counting species: Biopower and the global biodiversity census. *Environmental Values*, 17(3), 393–417.
- Young, C. R. (1978). Conservation policies in the Royal Forests of medieval England. *Albion: A Quaterly Journal Concerned with British Studies*, 10(2), 95–103.
- Young, C. R. (1979). *The Royal Forests of Medieval England*. Leicester University Press.
- Young, D. W. (1969a). The Commoners’ animals and the Court of Verderers. In H. L. Edlin (Ed.), *New Forest: Forestry Commission Guide* (pp. 63–68). Her Majesty’s Stationery Office.
- Young, D. W. (1969b). The history of the forest woodlands. In H. L. Edlin (Ed.), *New Forest: Forestry Commission Guide* (pp. 33–41). Her Majesty’s Stationery Office.
- Zimmerer, K. S. (1994). Human Geography and the ‘New Ecology’: The Prospect and Promise of Integration. *Annals of the Association of American Geographers*, 84(1), 108–125.
- Zimmerer, K. S. (2000). The reworking of conservation geographies: Nonequilibrium landscapes and Nature-Society hybrids. *Annals of the Association of American Geographers*, 90(2), 356–369.