**Chapter One**

**The spectre of catastrophe**

(8771 words)

The news is not good. It feels as though we are hurtling down a hill without any brakes, through an unfamiliar landscape, to an uncertain destination. The evidence is mounting that we are well past the point where climate change response can be a planned, gradual transition. It is much more likely that profound and unwanted change in the next few years will make a mockery of current policies on climate change and other issues. We need to deal with at least the possibility of catastrophe. Yet daily life continues more or less unchanged, in varying combinations of struggle and contentment. We are in collective denial. We are grieving.

<FIGURE 1.1 ABOUT HERE>

A central argument of this book is that an under-acknowledged process of grieving – with all its complexity, diversity and contradiction – is part of the cultural politics of responding to climate change and associated environmental challenges. Specifically, I argue that grieving helps explain the denial we face and experience in accepting the scale of the changes required in ways of living. My perspective is Australian, but it is increasingly apparent that these conditions are shared across much of the affluent West (Randall 2009, Doherty & Clayton 2011). This is the converging, congealing grief at the loss of the conditions that underpin contemporary western prosperity. It is grief for the approaching demise of the conditions underpinning life as we know it – the thing most of us did not know was called the Holocene. It is grief for the loss of a future characterised by hope. A Swedish colleague with a young child put it to me in this way: 'I would be completely OK with living a much simpler life, but it's deeper than that… I feel as if I can never be completely happy ever again'.

These are difficult issues to discuss in contemporary western society. We debate climate change at length, mostly framed in the spurious terms of whether the science is settled enough for us to make some long-term decisions. But even those who know the science most intimately face strong social pressures to be optimistic about the future. There is deep cultural pressure in the West not to be 'a doom and gloom

merchant'. Hence, even when the evidence points towards the strong possibility of some catastrophic scenarios, the tendency is to focus policy and action on the most optimistic end of the spectrum of possibilities. But at least some of us should be thinking systematically about worst-case scenarios. In this book I attempt to do this, engaging carefully with what the implications might be. If we have at least the possibility of catastrophic outcomes, what should our response be? I reject the cultural assumption that even to canvass these issues is to give in to them, to give up, or to assume the worst. Rather I argue that a relentless cultural disposition to focus disproportionately on positive outcomes is itself a kind of denial. I argue that grief is a companion that will increasingly be with us. It is not something we can deal with and move on from, but rather something we must acknowledge and hold if we are to enact any kind of effective politics. Or, to put it differently, it needs to become an explicit part of our politics.

The challenges facing us have been well rehearsed elsewhere. Climate change is not a stand-alone issue, but interacts with long-standing negative human impacts; biodiversity loss, land and water degradation, pollution (Sutherland et al. 2014, Whitehead 2014). This combination of processes has come to define the Anthropocene, as a geological age in which human activities dominate earth surface processes. Nevertheless, the most urgent implication of climate change science is that we need to keep 60-80% of the fossil fuel reserves already listed on world stock exchanges in the ground to have a chance of avoiding global warming of 2$^{o}$C (Carbon Tracker 2014). Specifically, this requires that a third of global oil, half the gas and over 80% of current coal reserves need to remain unused to meet the 2$^{o}$C target (McGlade & Ekins 2015). Pricing in the risk to current investments of these 'stranded assets' would lead to a significant financial crisis. Put another way, we need to decarbonise at the rate of 9-10% per year for at least a decade to avoid two degrees of warming. There is no historical analogy for how to do this; the 2008 Global Financial Crisis led to only a 1.4% decrease, which was quickly reversed. If business as usual continues – and many scientists think it is already too late to avoid two degrees of warming, due to the lag effects of emissions already in the atmosphere (Anderson & Bows 2011) – then we are on track for 4-6 degrees of warming with an increase in extreme events, and fundamental changes in underlying conditions. It does not sound

like much, but that is the temperature difference between now and the last ice age, in the opposite direction.

The ‘unburnable carbon scenario’ poses significant challenges to human survival, and thus to the scale of socioeconomic transformation that we face. The possibilities seem to include ‘planned economic recession’ (Anderson & Bows 2008 p. 3880) or economic collapse forced by climate change. Either way, we must imagine that drastic changes to everyday life are in the offing. Transformational rather than incremental change refers not only to the possibility of a 4$^{o}$C warmer world (StaffordSmith et al. 2011, Park et al. 2012), but also to the increased level of surprise associated with rapid change in complex systems. These are terrifying thoughts, given that humans are not good at voluntary restraint, and given the way all our lives and wellbeing in the more affluent parts of the world are tied into and dependent on a fossil fuel economy. We do not yet know how much transformation will proceed deliberately and how much will be forced on us, but it is likely that we will be forced as much as governed to low carbon pathways.

This scale of transformation should shift our thinking in diverse ways, including from scarcity to abundance. For a number of decades now, we have thought of resource crises in terms of how to make non-renewable resources last longer. We were taught, and have taught our students, that the fossil fuel age must necessarily end because the resources were non-renewable. We did not know what they would be replaced with, nor when it would happen, but the exponential growth curves of the second half of the twentieth century, spinning out into the future, have always been presented as signals of impending scarcity – of food, energy, land and water, fuelled by population growth and increasing affluence. Many, if not most, of our environmental debates have been framed in terms of scarcity and running out of things – peak oil, peak phosphorous, peak lots of things, loss of biodiversity. Because of the challenge of keeping coal and oil in the ground, it now looks to be abundance, not scarcity, that we must address first, and in our own lifetimes rather than an unimaginable future time. Yet we do not really have a vocabulary, conceptual or otherwise, that links abundance and excess with environmentally good outcomes.

Of course, these issues have been around for several decades now. Re-reading overviews of climate change response such as Rayner and Malone (1998), one is struck by how much of the debate and knowledge was well established more than fifteen years ago. However, one big thing has changed, arguably due to the failure of society to deal with climate change issues when they were still potentially manageable – the sense of urgency is much stronger today, together with increasing awareness of likely non-linear changes whose specifics will be impossible to predict. In contrast, Rayner and Malone depicted the situation as still possible to deal with via deliberate and incremental change:

> In the grand scheme of things, climate change is probably not the deciding factor in whether humanity as a whole flourishes or declines. The resilience of human institutions and their ability to monitor and adapt to changing conditions seems to be more important. (1998, p. 29)

These days Rayner works on geoengineering[1], as a potential response to worst-case scenarios. If we are at the point of systematically considering 'deliberate large-scale intervention in the Earth's natural systems to counteract climate change'[2], my contention is that we need to systematically consider the concept of catastrophe, and the way in which our socioeconomic systems could potentially unravel. In the case of geoengineering most of us would prefer to avoid such considerations, and many would be concerned by, and want to contest the hubris implicit in, the idea that humans could 'manage' the climate. In the case of a potentially catastrophic dismantling of the basis of much everyday life in the twenty-first century, we need to be able to think about this without the easy charge of 'doom and gloom merchant'. My aim here is to find a calm and hopeful way to think and talk about these painful issues[3].

**Which Anthropocene are we talking about?**

There are many Anthropocenes in current discussion; Dibley (2012) has identified seven. Broadly speaking, we can distinguish between a scientific discussion over whether we have entered a new geological age, and a wider social debate in which #Anthropocene has entered the public discourse as an emblem of the way humans pervade all dimensions of the Earth. The former is currently being debated by the International Geological Commission, and the latter can be seen in social media discussions.

The discussion in this book shifts between the two arenas. I am not seeking to intervene in the geological debates over whether and when we have a golden spike, but I am interested in those debates for what they tell us about how scientists understand the human relations to the more-than-human world. The evidence of the Anthropocene requires us to rebuild its own conceptual scaffolding in order to imagine and enact the world differently (Sayre 2012). This will be a long-term project, in which the maintenance of critical perspectives is essential. It is also urgent!

Such paradoxes seem to lie at the heart of the Anthropocene concept. It challenges the ideal of economic growth that helped propel it, particularly its manifestation over the second half of the twentieth century (Steffen et al. 2011). If human impact on the earth can be translated into human responsibility for the earth, the concept may help stimulate appropriate societal responses and/or invoke appropriate planetary stewardship (Ellis 2011, DeFries et al. 2012). Even so, while the concept has emerged out of palaeoecological, archaeological and historical perspectives on earth systems, there is great uncertainty about the future, and how we can apply any lessons of the past, since 'Earth is currently operating in a no-analogue state' (Crutzen & Steffen 2003 p.253).

Much of this book will focus on the paradox of the human. The Anthropocene is presented as a time period defined by the activities and impacts of the human, yet it is paradoxically also a period that is now out of human control, due to rapid, unpredictable and nonlinear change. Conceptualisations of human-nature relations must recognise both human power and its embeddedness within material relations. We separate out humans at the same time the evidence shows how deeply embedded we are. Exactly what 'conceptual scaffolding' we can best use to live in a world of nonlinear change is explored further below.

Several authors have argued that the emergence of the Anthropocene concept is productively a moment of convergence between 'Earth System natural science and post-Cartesian social science' (Malm & Hornborg 2014 p.62, Lorimer 2012, Oldfield et al. 2014). This convergence is characterised by: seeing outcomes as contingent, acknowledging the demise of nature as a realm separable from culture, emphasising non-linear changes and uncertainties, and attending to the material basis of

interspecies interactions including those within and between humans and others. The convergence thus provides a historical opportunity to challenge the modernist framing of humans as separate from and superior to nature, and of human history as a progress of continuous improvement.

In order to make the most of this moment, it is necessary to forestall two attendant risks. The first is abandoning contingency to teleology and essentialism. The second its to reify the Anthropocene too quickly reified as just another phase in human history. That will not only be historically inaccurate, but also have limited potential to mobilise the kinds of political action that its constituent evidence demands. It is more likely to lead to fatalistic responses. I argue that we should use the period when the Anthropocene concept is still emergent in the public consciousness, and informal as a geological epoch, to craft an articulation that is more consistent with contingent understandings of history and science, attuned to variability and (as it happens, in the process) generative of political possibility.

So the emerging concept of the Anthropocene contains both risks and opportunities in the possibility of conceptual reframing. In this book I aim to contribute constructively to that project. In what follows I outline what I see as the key rethinking required, including about the Anthropocene itself, and explain the structure of the book.

**Grief**

The grieving we will discuss is twofold: first, grieving for the modern self, a process discussed in Chapter Two. Grief is manifest across society in our denial of the scale of the necessary changes to our socioeconomic underpinnings. In a sense this is grief for what we understood as our future – hitherto a time and place of unlimited positive possibility.

We are hampered in our response to these challenges by a second manifestation; grief for a stable, pristine and certain past. This is particularly the case for contemporary environmental thought, much of which has a linear framing in which the past is the baseline and everything that follows is loss. So, at a time when we face the most profound environmental challenges ever, environmental thinking that grew out of modernism finds itself under-equipped to provide new tools. In Chapter Three I show

how the pristine past continues to provide a benchmark against which many environmental ideals are measured. Loss and mourning have been an explicit part of biodiversity conservation debates *because* of their temporal reference point against a past baseline. But that reference point has not necessarily helped them deal with the grief. This chapter also identifies some of the ways environmental management is shifting. To the extent that we have any control over things, the past should only be part of how we think about environmental protection and management. We need symbols and themes that allow us to work towards possible futures as well as acknowledge a grieved-for past.

There are parallels in this thinking about stability with the way climate itself is understood, as Hulme has argued:

> And it is perhaps this ideology of wildness, the idea of world climate as the ultimate refuge of the natural, which has driven much of the thinking which lies behind the fourth example I use of how we load climate with our ideologies. If an untouched climate, a pure and natural climate, is to be valued, then maintaining its stability becomes of prime, even sacrosanct, importance. Climate thus becomes freighted with the ideology of stability and order in Nature, as opposed to ideas of change and chaos. (2009, p.26)

Hulme does not use the word grief, but he goes on to argue that this is 'Lamenting Eden' (p. 342). In parallels with Romantic thought in Western environmentalism, 'climate becomes something that is fragile and needs to be protected or 'saved'' (p. 343). The fact that the past has never been static, and the future has never been assured, is irrelevant to their nostalgic and aspirational power respectively.

Grief and mourning are generally seen as negative emotions, or at least ones we would choose not to experience if we have the choice. Often in discussion about the challenges facing the world, people are very quick to block off negative thoughts and focus on the positive. My argument here is that this switch is itself part of a collective denial and that we need to urgently find ways for society to bear, and bear witness to, the painful emotions around climate change. The argument is illustrated in Chapter Five through a group of climate scientists. They distance themselves from stress and anxiety by downplaying the negative emotions and playing up the positive ones (love of their job, passion for science). This double move enables them to keep going, but in ways that systematically downplay worst-case scenarios and embody a kind of everyday denial – an unjustified bias towards positive scenarios. By rationalising

emotions they systematically avoid the worst possibilities, even where they are as statistically likely to occur as not. This empirical study provokes important questions for all of us in a context of strong social and cultural pressure to be positive rather than negative. Rational, embodied responses suggest we will need to bear painful emotions (fear, grief, anxiety) if we are to be effective and truthful. We need to ask, in a profound cultural and psychological sense, why painful or difficult emotions might sometimes be paralysing? And can we find ways to bear such emotions without paralysis, and thus better manage the emotional labour of addressing climate change?

**The Anthropocene as a modernist concept**

The Anthropocene is an ostensibly radical concept, identifying humans as the dominant factor in global processes, and demanding major changes to the way we interact with the natural world. But in other ways it is more of the same, and risks perpetuating a modernist understanding of human domination over nature; 'there is a hyper-humanism which seeks to manage and ultimately master the ecological crisis' (Roelvink & Zolkos 2015 p. 47).

The emerging narrative tends to present human history in a linear, deterministic and teleological frame at odds with both scientific and social scientific understandings of evolutionary and historical contingency (De Landa 1997). The Anthropocene is presented as just another stage of human history, sometimes with a sense of inevitability about it. This may be an inadvertent by-product of the geological framing of the concept. The geological history of the earth is one of great contingency, but the visual representations of geological history, as strata and ages, accumulating towards the present, suggest a much more progressivist metaphor. The way discussions around the Anthropocene continue a view of history as linear and teleological – as something of an inevitable stage in human history – are explored in Chapter Three. It is important to emphasise, as does De Landa (1997), that a progressivist view of the unfolding of life and human history was always inaccurate. Yet this narrative is even more at odds with the uncertainty and nonlinear change – some of it potentially very rapid – that will characterise the Anthropocene.

Both the humanities and the sciences are implicated here, or should we say that both the humanities and the sciences are a product of the deep cultural distinction between

humans and the rest of nature that has pervaded western thought since classical times (Glacken 1967). Glendinning shows how the Anthropocene has been framed as an extension of classical humanism as well as modernity:

> This classical anthropology, this great humanism, which sees a natural but fundamental division between human beings and other living things, lies at the heart of the thinking about human history which tells of the special heading of man. (2000 p. 25)

**Who is this we, the Anthropos?**

Who then is this 'we', the *anthropos*? Is it the human species, the undifferentiated human subject? If so, its experience of the social and environmental changes under discussion already vary widely, to the extent that a shared human experience may be a rather small lens. And who is this 'we', who grieve for modernity? The modern subject in this discussion is all of us who live with the ideal of progress, however that is imagined. It is imagined differently in both left and right political orientations, which have worked towards different utopias, but both share the aspirations of modernity. The modern subject values autonomy and individual freedom, and connects the future with the possibility of improvement.

If we moderns have had the hope of progress and improvement, the reality has been dramatically unequal. As the histories of capitalism and colonialism have shown us, the hopes of many have been built on other people's suffering. In no country have we managed to build societies with both low per capita ecological footprints and the highest levels of human wellbeing, as measured by the human development index (Steffen et al. 2011). So we must acknowledge the western-centrism of our catastrophic scenarios – for many people in many parts of the world, daily life is already, and has always been, infused with catastrophe and grief.

As others have argued, the 'species' concept may be a category mistake in the way we think about the Anthropocene: if 'some humans introduced steam-power *against the explicit resistance of other humans*, then it would be hard to maintain a notion of it as an expression of a species-wide 'human enterprise'' (Malm 2014 p. 41, emphasis in original). For Malm and Hornborg (2014), the concept of an undifferentiated human in its impacts is impossible to reconcile with the huge historical and contemporary differentials in access to resources. Indeed, they argue:

> uneven distribution is a condition for *the very existence* of modern, fossil-fuel

> technology... The affluence of high-tech modernity cannot possibly be universalized – become an asset of the species – because it is predicated on a global division of labour that is geared precisely to abysmal price and wage differences between populations. (Malm and Hornborg 2014, p. 64)

Other differentiations that similarly draw attention to more particular social and political drivers include the Capitalocene (Huber 2009, Malm 2013, Moore 2013) and the Econocene (Norgaard 2013).

To the question, 'what characterizes the Anthropocene?', Zalasiewicz et al. start their answer in the deep time of human prehistory:

> The use of tools was once thought to distinguish humans from all other animals, and among the earliest people who lived at 2Ma in Africa were *Homo habilis*, the 'handy man'. From that time, people have been modifying the Earth. For much of that human story, these changes were achieved by muscle and sinew, supplemented first by primitive tools, largely for hunting, and later by fire. Traces of humans in the Pleistocene rock record are rare, and stay rare until the Holocene. (2011 p. 836)

For the *anthropos* to hold at a species level, it has to encompass all of the relevant time and space of *Homo sapiens*. This it demonstrably does not do – despite widespread recognition of human influences on fire and fauna in the Pleistocene, there is not a serious suggestion that the Anthropocene is a late Pleistocene phenomenon (although note Foley et al.'s 2013 argument for a Palaeoanthropocene). Nevertheless, Zalasiewicz et al. in the quote above hark back even further, and to a genus level.

As Malm and Hornborg (2014) have shown, the long evolutionary path is a common trope in the standard Anthropocene narrative. A key component is the manipulation of fire. Even for the most common Anthropocene chronology, attached to James Watt's eighteenth-century mobilisation of the steam-engine, the evolutionary precursor of fire is framed as the ultimate cause because the transition to fossil fuels in the Industrial Revolution needs to be:

> deduced from human nature. If the dynamics were of a more contingent character, the narrative of an entire species – the *anthropos* as such – ascending to biospheric supremacy would be difficult to uphold: 'the geology of mankind' must have its roots in the properties of that being. (Malm & Hornborg 2014 p. 63)

Consider the *cene* as well as the anthropos. In the narratives referred to above, the Anthropocene origin is located not only with a human ancestor, but also very deep in time. I agree with Malm and Hornborg that this is more by default than design, as

scientists have sought a hook for a complex narrative. The linear view of history and prehistory is inadvertently embedded within the dominant modes of visual representation – timelines and stratigraphic diagrams (Head 2000). But the result is a teleological view of human history in which the (negative) outcome is inevitable, a visual trajectory further reinforced by the many exponential curves that characterise the Anthropocene (e.g. Steffen et al. 2011: Figure 1).

The evidence of humans and their processes being embedded into earth systems at all scales is widely understood to represent 'a very public challenge to the modern understanding of Nature as a pure, singular and stable domain' (Lorimer 2012 p. 593), separable and separated from humanity (Oldfield et al. 2014). Despite the claims, it seems that such a view of Nature is only half dead since, as Proctor (2013 p. 90) argues, Nature survives in most invocations of the Anthropocene: 'It appears typical, when confronted with the complexities that are the Anthropocene, to sharpen the conceptual boundary separating these domains [nature and culture] so as to render this complexity understandable'. Robbins and Moore (2013) go so far as to name the scientific anxiety involved as a disorder. The notion of socio-ecological systems, in which the two separate domains are now mixed, is another example of reinforcing rather than rethinking the dualism (Head 2012). It is not surprising that the human-nature dualism is so deeply embedded in the narrative, given its deep historical roots in western thought (Glacken 1967, Sayre 2012), embedding of the associated concept of nature in contemporary life (Castree 2015), and the fact that industrial capitalism is itself partly constitutive of both the dualisms that we now wrestle with and the Anthropocene itself (Sayre 2012, Malm & Hornborg 2014).

There are insights to be gained here from the collection of social science approaches referred to as posthumanist, an important theme of Chapter Four. These contest persistent human exceptionalism by tracing:

> the materialities of interspecies interaction – including genetic, microbial, haptic, digestive and ecological connections – to demonstrate the ontological impossibility of extracting a human body, let alone intentional mind, from the messy relations of the world. (Lorimer 2012 p. 595 on Haraway 2008)

As Gibson and I (Head & Gibson 2012) have argued at greater length, there are both opportunities and challenges here. There is a major and ongoing challenge in elaborating human and non-human continuities and differences (part of which,

following Lulka (2009) is to resist homogenising the non-human). As scholars we need to be eternally vigilant in applying the analytical impulse to questions of human difference and power, and the ways they are conceptualised in climate change debates. Plumwood's (1993) analysis of the deep structures of mastery buried in our intellectual frameworks is still apposite, and her theory of mutuality, which acknowledges both continuity and (non-hierarchical) difference between humans and nonhumans, continues to be helpful here. And of course it is in some ways an inescapable dilemma; 'Our life condition appears to be 'both/and' rather than 'either/or', obliging us to use the contradictory ideas of nature as 'external' and 'universal' when discussing ourselves' (Castree 2015, p. 29). A key point is that these debates and tensions are a fundamental aspect of how and whether we conceptualise the Anthropocene, not concerns to be sidelined as a simple definitional footnote.

So, the anthropos at the core is a slippery concept – at once too large and too separated to really understand what is going on. The divide between anthropos and other (usually thought of as humans and nature) is one of the many connected dualisms that must be undone and rethought.

Let me be clear – this is not an argument to get rid of the concept of the human, but to consider more carefully differentiations of concept and practice both within this category, and between it and others. We have to think differently about how human and other life and materials are mutually embedded, while at the same time accounting for clear evidence of different power relations within such assemblages (Head & Gibson 2012). The challenge of rethinking the human in associationist rather than separationist terms (see also Glendinning 2000, Anderson 2007) is addressed in Chapter Four. In the process we can start to re-imagine humans as a force for environmental good, or at least not essentially bad or damaging, as some of the Anthropocene framing suggests.

This should not involve undoing dualisms to reinsert others – the most notable of recent binaries is that between the good and bad Anthropocene. I disagree with Lynas (2011 p. 22) who goes from the naturalness of humans to the inevitability of technical solutions. It is my belief that the evidence is actually much messier than that, and so the categorisations should be messed up. Like Leduc (2014 p. 248) I want to ask,

‘What if a sustainable response to climate change requires questioning modernity’s still persistent implicit ontology by rendering ‘explicit the prevailing conception of being’ and how it is maladaptive in the context of an interconnected reality’?

**Who is this we, the reader?**

The book is situated firmly as a social science contribution to debates around the Anthropocene and climate change. In pointing to many points of intersection with the natural sciences, I hope it will also find a readership there. The ‘we’, the reader and writer together, are usually from the affluent parts of the world who have benefited so clearly from the fossil-fuel economies that now constitute our most pressing problem. To be able to have these conversations presumes much; in particular we have presumed an expectation of happiness, or at least its possibility. That is not a universal expectation, and for many people in the world the present day is already and always a situation that we would call catastrophic. Being beneficiaries in such a drastically unequal world brings responsibilities to help construct things otherwise.

**Hope**

The ‘hope’ in the title is messy, fraught and uncertain. The argument I make about hope, and where it might be found, consists in decoupling it from the emotion of optimism. Hope savours the life and world we have, not the world as we wish it to be. If the relationship between grief and denial challenges us to acknowledge and bear negative emotions without becoming paralysed, the corollary is that we should not depend on positive emotions (e.g. optimism) to provide the basis for hope. The concept of hope I advance here, drawing on various attempts to theorise hope in human geography, is thus found in practices rather than particular emotions.

Hope can also be found in unexpected places. An important source of this gritty, keeping-going kind of hope is found in diverse sets of vernacular practices, as outlined in Chapters Five to Nine. The broad argument here is that widening our horizons to diverse practices allows us to imagine alternative possibilities, in the way outlined by Gibson-Graham (2008), and to identify the existing cultural resources that we have to facilitate change. De Landa thinks about this in a related way, by suggesting that profound historical change tends to come from the points of flexibility outside the concentrations of power: ‘the creation of *novel* hierarchical structures

through restratification is performed by the most destratified element of the *previous* phase' (1997 p. 266). Further, in a context of distributed agency and nonlinear change, it is impossible to predict where all the good or bad things will happen, or even which processes and states are likely to be more adaptive (or not). As Hulme (2009 p. 84) argues, for most of human history we have assumed uncertainty, whereas now we often think of it as an obstacle to collective action.

In a context where we have to keep the coal in the ground, unseat fossil capitalism and remake our modernist identities, Chapters Five to Nine talk about some apparently very small things. What is the purpose of dealing with these apparently 'small' issues of culture (sometimes individual, sometimes household, sometimes society-wide) when revolution is needed? The contribution of in-depth qualitative and ethnographic research on which these chapters draw often needs more explanation and defence than that of quantitative methods (Head et al. 2005), and the findings do not necessarily sit easily with policy connections (Adger et al. 2013). An important strength is that such methods allow in-depth approaches to the everyday, and to common sense or taken for granted understandings and practices. The potential contributions of this kind of research are summarised in Table 1.

<Table 1 HERE>

At a time when top-down intergovernmental action seems not to be up to the task, survival may depend on more localised vernacular understandings and practices. Important intellectual resources come from places understood as marginal to environmental preservation; indigenous engagements, gardens, suburbs, farms, domestic homes. We can revisit empirical evidence from these to consider capacity and vulnerability in new ways. If everything goes catastrophic, practices imagined as sustainability practices can be reframed as survival skills (Gibson et al. 2015).

These examples help us discuss abundance and excess as well as scarcity (Chapters Six and Nine). They contribute to ontological framing, of how to think things differently; Chapter Six uses the concept of agriculture. I show how people change their understandings – through practice – of very binary concepts such as nativeness, and learn to live with weeds (Chapters Seven and Eight). In Chapter Nine I argue

from our collaborative work on households that green subjectivities are not the point – we do not need to direct people into what we understand as 'environmental' thinking. Rather we can identify and celebrate everyday practices that are associated with other subjectivities, but contribute through, for example, frugality and a hatred of wasting things.

It should be clear from all this that I do not understand climate change and the dilemmas of the Anthropocene as single processes that demand single, mega solutions. So let me clear some elephants from the room – technology, nuclear, population – all of these are too big, and there is no magic bullet. Advocates or optimists tend to gloss over the complexities in operationalising such concepts, and elide the politics implicit in their use (Hornborg 2014, Swyngedouw 2014, Taylor 2015).

**The Australian contribution**

The examples in the second half of the book are taken from different collaborative projects I have worked on over the last few years; climate scientists (Chapter Five), debates over Australian prehistoric and contemporary agriculture (Chapter Six), the social lives of invasive plants (Chapters Seven and Eight), and sustainability and climate change in households and suburbs (Chapter Nine).[4] On the face of it this is an eclectic mix of subject matter, and risks the reflection of self discussed by Sara Ahmed:

> To name one's archive is a perilous matter; it can suggest that these texts 'belong' together, and that the belonging is a mark of one's own presence. What I offer is a model of the archive not as the conversion of self into a textual gathering, but as a 'contact zone'. (2004 p. 14)

Three things hold this particular contact zone together in a state of creative friction. First, it was assembled over time through projects that sought to understand the cultural dimensions of human/environment relationships in diverse contexts. This central geographic concern with the way in which humans interact – both materially and conceptually – with the more-than-human world connects both prehistoric and contemporary timescales. Second, some of the studies have an empirical focus on plants and their human entanglements. This has been a particular interest shared with colleague Jenny Atchison. It provides an insight into different human lifeways, and has also led us into exploring questions of human-plant difference and otherness.

The details of course could have been otherwise. Colleagues are examining equally relevant issues in Australia with similar methods; for example the future of making and manufacturing (Gibson & Warren 2014, Carr & Gibson 2015), human relations with oceans (Gibbs & Warren 2015) and animals (Adams 2013), and preparedness and management of bushfire (Eriksen 2014, Gill et al. 2015).

So the third and perhaps the strongest thing that holds this 'contact zone' together is its situatedness in and from Australia. Australia is an affluent Minority World country but with a distinctive colonial heritage that still infuses contemporary society, notwithstanding the huge ethnic diversity that has accompanied its migrant experience. It is usefully a combination of the Centre and the Other. As Gibson and I (in press) have argued, Australia is 'an exemplary place to contemplate everyday life on an increasingly volatile earth'. The Australian continent is arid and fire-prone, with low soil fertility and low relief. It has a diversity of habitats - tropical, temperate, arid, and alpine - and its climate regimes are characterised by high variability. Australia occupies a fraught place in contemporary climate change debates and practices; historical dependence on fossil fuels such as coal and iron ore has given us high per capita greenhouse gas emissions. We are both strong contributors to climate change, and particularly vulnerable to its impacts. At the same time, a combination of factors is keeping us in the kind of collective denial discussed in this book. These include vested financial interests, recalcitrant governments and the national myth of vernacular stoicism – the capacity to cope with 'droughts and flooding rains'[5] - in the face of environmental adversity.

We still have work to do in coming to terms with the rage and grief of Australia's colonial heritage. But if we misdirect this work as nostalgia for a lost paradise we are also disabling constructive engagement with our future. If Australia has particular problems with binaries we may also have the means to move beyond them, arguably to make a contribution to reframing modernity that will extend beyond our shores. In our everyday engagements with the messiness of our cultural and ecological hybridity we are all sowing the seeds of that crop. We do not yet know what it will look like, but its unruly possibilities might enhance the practice of hope.

The Australian experience and engagement have in the past been constitutive of particular views of international history; Anderson (2007) shows the role of the colonizing encounter with the Indigenous Australian, in challenging nineteenth century understandings of the human. She ponders further whether Australia can thus be constitutive of a radical undoing. It is something of a stretch to argue that Australian evidence from the twenty-first century might similarly challenge persistently binary framings of the human, and contribute to a more positive framing of the human for the challenges of the Anthropocene. More modestly and accurately, all perspectives come from somewhere (to paraphrase Donna Haraway (2008)), and we need to consider this context, particularly against grand and universalising claims such as those of the good or bad Anthropocene. We can make positive contributions to destabilising unduly normative concepts by illustrating the depth of their colonial heritage and embedding – the concept of nativeness in relation to plants and animals is one example here. We can illustrate cultural diversity as a resource for imagining things otherwise.

The specificity of my examples reminds us that the Anthropocene is always somewhere, that it emerged at different times, and it will take different expression in different places. It is important to be alert to spatial and temporal variability, and what it means for phases of history. The process by and rates at which both agriculture and the Anthropocene became global in scale are clearly matters for ongoing empirical analysis. The point is that detailed analysis of such change is important for understanding causal processes, for example in disentangling drivers and effects, and imagining how and where to intervene. For example Steffen et al. (2011) clarify the possibilities of intervention with their demonstration that the post-1950 Great Acceleration 'was disproportionately driven by consumption patterns in the Global North, *even* in the context of increased population growth throughout the rest of the world' (Ogden et al. 2013 p. 342, emphasis in original). This invites interventions around consumption rather than population per se. It is particular groups of humans doing particular things that generate particular historical processes, in assemblage or constellation (Ogden et al. 2013) with many nonhuman others, whether we are talking about Pleistocene fire and megafaunal hunting, methane emissions from rice agriculture in China, Watt's steam engine and the parallel engines of industrialisation

and colonisation, or the post WWII great acceleration.

**Generating political possibility**

We are living in the Anthropocene as we work on it. We necessarily have to work all this out as we go along, only partially with hindsight. We are discussing a category, built out of a body of evidence, which demands that we also engineer political, social and economic change. As it happens, a contingent, messy, nonlinear view will likely serve us better politically, given the failure so far of large governance categories such as nation states and intergovernmental agreements to curb emissions.

In the concluding Chapter Ten I tie the threads of the previous arguments together, and summarise some of the likely characteristics of citizens of the Anthropocene, the Anthropoceneans. As scholars we are in and of this history, and need to attend to the processes of category and thought construction just as much as the historical evidence of concern. A more contingent understanding of the Anthropocene is not only more historically accurate, it also provides more realistic and less fatalistic pathways to the future. If we are assuming humans will be part of the future, how can we articulate and enact the necessary creative human interventions – the creative destruction of dismantling the fossil fuel economy, and a variety of restoration and repair activities? It may be out of the practice of these interventions that new concepts and practices of the *anthropos* emerge.

**References**

Adams, M. 2013. " 'Redneck, barbaric, cashed up bogan? I don't think so': hunting and nature in Australia". *Environmental Humanities* 2: 43-46.

Adger, W. N., Barnett, J., Brown, K., Marshall, N. and O'Brien, K. 2013 Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change* 3: 112-117.

Ahmed, S.2004. *The Cultural Politics of Emotion*. New York: Routledge.

Anderson, K. 2007. *Race and the Crisis of Humanism*. London: UCL Press.

Anderson, K. and A. Bows. 2008. "Reframing the climate change challenge in light of post-2000 emission trends." *Philosophical Transactions of the Royal Society A* 366: 3863–3882.

Anderson, K. and A. Bows. 2011. "Beyond 'dangerous' climate change: Emission scenarios for a new world." *Philosophical Transactions of the Royal Society A* 369: 20–44.

Carbon Tracker. 2014. "Unburnable carbon 2013: Wasted capital and stranded assets." Accessed 26 October 2014. Available at http://www.carbontracker.org/report/wasted-capital-and-stranded-assets/.

Carr, C. and C. Gibson. 2015.

Castree, N. 2015. *Making Sense of Nature: Representation, Politics and Democracy*. Abingdon: Routledge.

Crutzen, P. J. and W. Steffen. 2003. "How long have we been in the Anthropocene era?" *Climate Change* 61: 251–257.

De Fries, R. S., E. C. Ellis, F. S. Chapin III, P. A. Matson, B. L. Turner II, A. Agrawal, P. J. Crutzen, C. Field, P. Gleick, P. M. Kareiva, E. Lambin, D. Liverman, E.Ostrom, P. A. Sanchez, and J. Syvitski. 2012. "Planetary opportunities: A social contract for global change science to contribute to a sustainable future." *BioScience* 62(6): 603–606.

De Landa, M. 1997. *A Thousand Years of Nonlinear History*. New York: Zone Books.

Dibley, B. 2012. "'The shape of things to come': Seven theses on the Anthropocene and attachment." *Australian Humanities Review* 52: 139–153.

Doherty, T. J. and S. Clayton. 2011. "The psychological impacts of global climate change." *American Psychologist 66*(4): 265–276.

Donna Haraway needs a quote?

Ellis, E. C. 2011. "Anthropogenic transformation of the terrestrial biosphere." *Philosophical Transactions of the Royal Society A* 369: 1010–1035.

Eriksen, C. 2014. *Gender and Wildfire: Landscapes of Uncertainty*. New York: Routledge.

Foley, S. F., D. Gronenborn, M. O. Andreae, J. W. Kadereit, J. Esper, D. Scholz, U. Pöschl, D. E. Jacob, B. R, Schöne, R. Schreg, A. Vött, D. Jordan, J. Lelieveld, C. G. Weller, K. W. Alt, S. Gaudzinski-Windheuser, K-C. Bruhn, H. Tost, F. Sirocko and P. J. Crutzen. 2013. "The Palaeoanthropocene – The beginnings of anthropogenic environmental change." *Anthropocene* 3: 83–88.

Gibbs, L. and A. Warren. 2015. "Transforming shark hazard policy: Learning from ocean-users and shark encounter in Western Australia." *Marine Policy* 58: 116–124.

Gibson and Head in press

Gibson, C., L. Head and C. Carr. 2015. "From incremental change to radical disjuncture: Rethinking everyday household sustainability practices as survival skills." *Annals of the Association of American Geographers* 105(2): 416–424.

Gibson, C. and A. Warren. 2014. "Making surfboards: Emergence of a trans-Pacific cultural industry." *Journal of Pacific History* 49(1): 1–25.

Gibson-Graham, J. K. 2008. "Diverse economies: Performative practices for 'other worlds'." *Progress in Human Geography* 32(5): 613–632.

Gill, N., Dun, O., Brennan-Horley, C. and Eriksen, C. 2015. Landscape Preferences, Amenity, and Bushfire Risk in New South Wales, Australia. *Environmental Management* 56: 738-753.

Glacken, C. J. 1967. *Traces on the Rhodian Shore*. Berkeley: University of California Press.

Glendinning, S. 2000. "From animal life to city life." *Angelaki: Journal of the Theoretical Humanities* 5(3): 19–30.

Hamilton, C. 2010. *Requiem for a Species: Why We Resist the Truth About Climate Change.* Sydney: Allen and Unwin.

Haraway, D. J. 2008. *When Species Meet.* Minneapolis: University of Minnesota Press.

Head, L. 2000. *Second Nature: The History and Implications of Australia as Aboriginal Landscape.* New York: Syracuse University Press.

Head, L. 2012. "Conceptualising the human in cultural landscapes and resilience thinking." In *Resilience and the Cultural Landscape: Understanding and Managing Change in Human-Shaped Environments,* edited by T. Plieninger and C. Bieling, 65–79. Cambridge: Cambridge University Press.

Head, L. and C. Gibson. 2012. “Becoming differently modern: Geographic contributions to a generative climate politics.” *Progress in Human Geography* 36(6): 699–714.

Head, L., D. Trigger and J. Mulcock. 2005. “Culture as concept and influence in environmental research and management.” *Conservation and Society* 3(2): 251–264.

Head, L. and M. Stenseke.2014. “Seven contributions of cultural research to the challenges of sustainability and climate change.” *Conversations with AUSCCER.* Accessed 13 November 2014. Available at https://www.uowblogs.com/ausccer/2014/11/13/seven-contributions-of-cultural-research-to-the-challenges-of-sustainability-and-climate-change/#more-2533. Published 13.11.14 (Published in Swedish as Head, L. and Stenseke, M. 2014 Humanvetenskapen står för djup och förståelse In E. Mineur and B. Myrman (eds) *Hela vetenskapen! 15 forskare om integrerad forskning.* Stockholm: Vetenskapsrådet. ISBN: 978-91-7307-245-8, pp. 26-33.)

Hornborg, A. 2014. “Why solar panels don’t grow on trees: Technological utopianism and the uneasy relations between Marxism and ecological economics.” In *Green Utopianism: Perspectives, Politics and Micro-Practices*, edited by K. Bradley and J. Hedrén, 76–97. New York: Routledge.

Huber, M. T. 2009. “Energizing historical materialism: Fossil fuels, space and the capitalist mode of production.” *Geoforum* 40(1): 105–115.

Hulme, M. 2009. *Why We Disagree About Climate Change: Understanding Controversy, Inaction and Opportunity*. Cambridge: Cambridge University Press.

Leduc, T. B. 2014. “Climates of ontological change: Past wisdom in current binds?” *WIREs Climate Change* 5(2): 247–260.

Lorimer, J. 2012. “Multinatural geographies for the Anthropocene.” *Progress in Human Geography* 36(5): 593–612.

Lulka, D. 2009. “The residual humanism of hybridity: Retaining a sense of the earth.” *Transactions of the Institute of British Geographers* 34(3): 378–393.

Lynas, M. 2011. *The God Species: Saving the Planet in the Age of Humans*. London: Fourth Estate.

Malm, A. 2013. “Steaming into the Capitalocene.” At the *Institute of British Geographers Conference*. 28 August–30 August. Royal Geographical Society, London.

Malm, A. 2014. *Fossil Capital: The Rise of Steam-Power in the British Cotton Industry, c. 1825-1848, and the Roots of Global Warming*, PhD Thesis. Lund: Lund University.

Malm, A. and A. Hornborg. 2014. "The geology of mankind? A critique of the Anthropocene narrative." *The Anthropocene Review* 1: 62–69.

McGlade, C. and P. Ekins 2015. "The geographical distribution of fossil fuels unused when limiting global warming to 2°C." *Nature* 517: 187–190.

Moore, J. W. 2013. "Anthropocene, Capitalocene and the myth of industrialization II." *World-Ecological Imaginations: Power and Production in the Web of Life*. Accessed 17 January 2014. Available at https://jasonwmoore.wordpress.com/2013/06/.

Norgaard, R. B. 2013. "The Econocene and the delta." *San Francisco Estuary and Watershed Science* 11(3): 1–5.

Ogden, L., N. Heynen, U. Oslender, P. West, K-A. Kassam, and P. Robbins. 2013. "Global assemblages, resilience, and Earth Stewardship in the Anthropocene." *Frontiers in Ecology and the Environment* 11(7): 341–347.

Oldfield, F., A. D. Barnosky, J. Dearing, M. Fischer-Kowalski, J. McNeill, W. Steffen and J. Zalasiewicz. 2014. "The *Anthropocene Review*: Its significance, implications and the rationale for a new transdisciplinary journal." *The Anthropocene Review* 1(1): 3–7.

Park, S. E., N. A. Marshall, E. Jakku, A. M. Dowd, S. M. Howden, E. Mendham and A. Fleming. 2012. "Informing adaptation responses to climate change through theories of transformation." *Global Environmental Change* 22(1): 115–126.

Plumwood, V. 1993. *Feminism and the Mastery of Nature*. London: Routledge.

Proctor, J. 2013. "Saving nature in the Anthropocene." *Journal of Environmental Studies and Sciences* 3(1): 83–92.

Randall, R. 2009. "Loss and climate change: The cost of parallel narratives." *Ecopsychology* 1(3): 118–129.

Rayner, S. and E. L. Malone. 1998. *Human Choice and Climate Change: vol. 4– "What Have We Learned"*. Columbus: Battelle Press.

Robbins, P. and S. A. Moore. 2013 . "Ecological anxiety disorder: Diagnosing the politics of the Anthropocene." *Cultural Geographies* 20: 3–19.

Roelvink, G. and M. Zolkos 2015. “Affective ontologies: Post-humanist perspectives on the self, feeling and intersubjectivity.” *Emotion, Space and Society* 14: 47–49.

Sayre, N. F. 2012. “The politics of the Anthropogenic.” *Annual Review of Anthropology* 41: 57–70.

Stafford Smith, M., L. Horrocks, A. Harvey and C. Hamilton. 2011. “Rethinking adaptation for a 4ºC world.” *Philosophical Transactions of the Royal Society A* 369: 196–216.

Steffen, W., J. Grinevald, P. Crutzen and J. McNeill. 2011. “The Anthropocene: Conceptual and historical perspectives” *Philosophical Transactions of the Royal Society A* 369: 842–867.

Sutherland, W. J., R. Aveling, T. M. Brooks, M. Clout, L. V. Dicks, L. Fellman, E. Fleishman, D. W. Gibbons, B. Keim, F. Lickorish, K. A. Monk, D. Mortimer, L. S. Peck, J. Pretty, J. Rockstrom, J. P. Rodriguez, R. K. Smith, M. D. Spalding, F. H. Tonneijck, and A. R. Watkinson. 2014. “A horizon scan of global conservation issues for 2014.” *Trends in Ecology and Evolution* 29: 15–22.

Swyngedouw, E. 2014. “Anthropocenic politicization: From the politics of the environment to politicizing environments.” In *Green Utopianism: Perspectives, Politics and Micro-Practices*, edited by K. Bradley, and J. Hedrén, 23–37. New York: Routledge.

Taylor, M. 2015. *The Political Ecology of Climate Change Adaptation: Livelihoods, Agrarian Change and the Conflicts of Development*. Abingdon: Routledge.

Whitehead, M. 2014. *Environmental Transformations: Geography of the Anthropocene*. Abingdon: Routledge.

Zalasiewicz, J., M. Williams, A. Haywood and M. Ellis.2011. “The Anthropocene: A new epoch of geological time?” *Philosophical Transactions of the Royal Society A* 369: 835–841.

[1] The Oxford Geoengineering Programme (http://www.geoengineering.ox.ac.uk/) has developed a set of principles (‘The Oxford Principles’ http://www.geoengineering.ox.ac.uk/oxford-principles/principles/) intended to guide the development of geoengineering techniques. These include for example that ‘any decisions with respect to deployment should only be taken with robust governance structures already in place, using existing rules and institutions wherever possible’.

[2] This is the definition of Geoengineering used by the OGP (see website in above note).

[3] My take on these issues has some things in common with cultural responses such as The Dark Mountain Project, ‘a network of writers, artists and thinkers who have stopped believing the stories our

civilisation tells itself. We see that the world is entering an age of ecological collapse, material contraction and social and political unravelling, and we want our cultural responses to reflect this reality rather than denying it' (http://dark-mountain.net/about/the-dark-mountain-project/). However my discussion is more with those who are choosing to remain engaged with the mainstream rather than withdrawing from it.

[4] Most of these projects have been collaborative. The publications from these projects are cited throughout the text, where the co-authors can also be identified. In this book I extract some key examples from different projects and attempt to bring them into conversation with one another. To enhance the narrative flow, details of methods are removed to endnotes. Further information about the original data and interpretive discussion can be found in the referenced publications.

[5] Dorothea Mackellar was an Australian poet best remembered for her poem My Country. It contains the lines:
I love a sunburnt country,
A land of sweeping plains,
Of ragged mountain ranges,
Of droughts and flooding rains.
I love her far horizons,
I love her jewel sea.
Her beauty and her terror –
The wide brown land for me!
(http://www.dorotheamackellar.com.au/) The description of Australia as a land 'of droughts and flooding rains' is often used in public discourse to normalise climatic variability. It is arguably in increasing use to deny the significance of anthropogenic climate change. See further discussion in Chapter Six.