

Decentring 1788: Beyond Biotic Nativeness

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Abstract

The usefulness of the concept of biotic nativeness has been challenged in both the social and natural sciences, for different reasons. This paper explores the particular construction of nativeness in Australia in relation to plants, showing that the definition builds on and inscribes more deeply the boundary between humans and the rest of nature seen in the wider literature. In this context two further boundaries are etched: between some humans and others, and before and after European colonisation. Such a use of nativeness as an axiom of environmental management is argued to be problematic, foreclosing a number of future options just when we need to increase our capacity to deal with contingency and unpredictability. But if Australia has experienced distinctive historical processes of entrenching these boundaries, it also has a distinctive heritage of destabilisation in a range of geographic work. The paper discusses how we might build on this heritage to imagine more open futures in which the problematic boundaries were removed. Some of these futures resonate with vernacular recombinations of plants from diverse origins.

KEY WORDS *biogeography; nativeness; alien; plant; indigenous; Australia*

Is wheat vegetation?

An important artefact for undergraduate biogeography students is the map in Figure 1, or a more detailed digital version in which each of the structural vegetation types shown there – woodland and grassland, for example – are further divided into floristic categories according to their dominant genera; *Eucalyptus*, *Acacia* and so on. When asked to analyse what is wrong with such a map, the good students can talk about the complexities of classification and boundary making, and issues of scale. It is much harder to get them to ask, what vegetation is missing? Where are the crops, the orchards, the gardens? How much of the Australian landscape would really look like that if you ground-truthed it? Consider the lack of connection between Figure 1, and Figure 2, a map of the Australian wheat belt. Is wheat not vegetation? Is it not a grass, as we thought, but a mixture of woodland and open forest in New South

Wales (NSW), or woodland and heath in Western Australia?

In the State of Victoria, the shrub *Pittosporum undulatum* (Native Daphne, Mock Olive), a native of wet forest environments, has contrasting categorisations in different parts of the *Flora and Fauna Guarantee Act 1988*, reflecting its dual status as both invasive and endangered species. Under Schedule 3 of the Act, *P. undulatum* invasion is listed as a ‘potentially threatening process’, and under Schedule 2, ‘*P. undulatum* is identified as a component of a rare plant community (Dry Rainforest [Limestone] Community)’ (Mullett, 2001, 120). This creates significant problems for environmental managers, who often respond by directing resources towards control of introduced species because they ‘have a clearer invasive status’ (Mullett, 2001, 120).

In his recent overview of Australian indigenous species, Bean (2007, 10) notes that ‘there

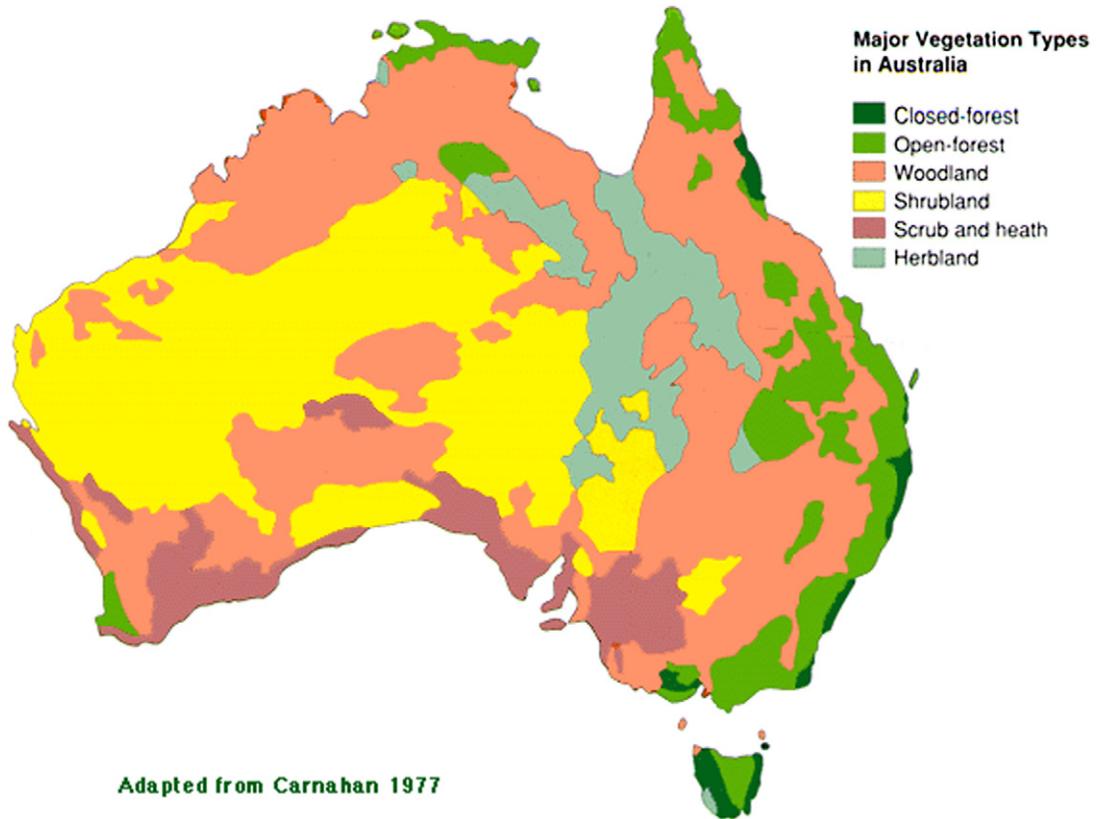


Figure 1 Major structural vegetation types in Australia (Adapted after Carnahan 1977 and Jeans 1986).

have been no research-based explicit definitions for indigenous (native) or alien (non-indigenous, exotic, introduced) plant species in Australia'. Rather most workers have used a 'timeline' approach focused on 1770 or 1788, the years marking the arrival of the British colonisers. He quotes Everist (1960, 51): 'if a plant was here when Banks and Solander landed, then I choose to regard it as native' (Bean, 2007, 10).

Recent scholarship has commented at length about the spatial and conceptual boundaries that are maintained in these three and related examples; between native and non-native, humans and the rest of nature, vegetation and food, invasive and well behaved, useful and not useful. The different ways in which *nativeness* has been constructed and understood is an important subset of the wider debates, with implications for the status of and actions towards humans, animals, plants, and other organisms. Work in both the social and natural sciences has shown that understanding these constructions requires an understanding of the spatial and temporal contexts in which they are formed.

In this paper I explore the particular construction of nativeness in Australia in relation to plants. Developing previous arguments about 1788 marking a 'temporal threshold of nativeness' (Head and Muir, 2004, 202), I focus here on the way that boundary interacts with and intensifies spatial bounding practices in the Australian context. Joseph Banks and Daniel Solander spent eight days collecting 132 plant species on the shores of Botany Bay in late April to early May 1770, 'spreading them upon a sail in the sun' (Benson and Eldershaw, 2007, 118) so that their samples did not spoil. This was the first scientific collection of Australian flora, an event and a collection of immense historical and scientific significance. But did this event usher in a new ontological state? Did the iconic *Banksia serrata* pass into a fundamentally different state of being by being pressed, dried and transported to England? Similarly, did the seed wheat brought by the First Fleet undergo an ontological change when it was planted at Farm Cove in 1788? I argue not, and that this presents a challenge we have yet to meet, despite being brought to the

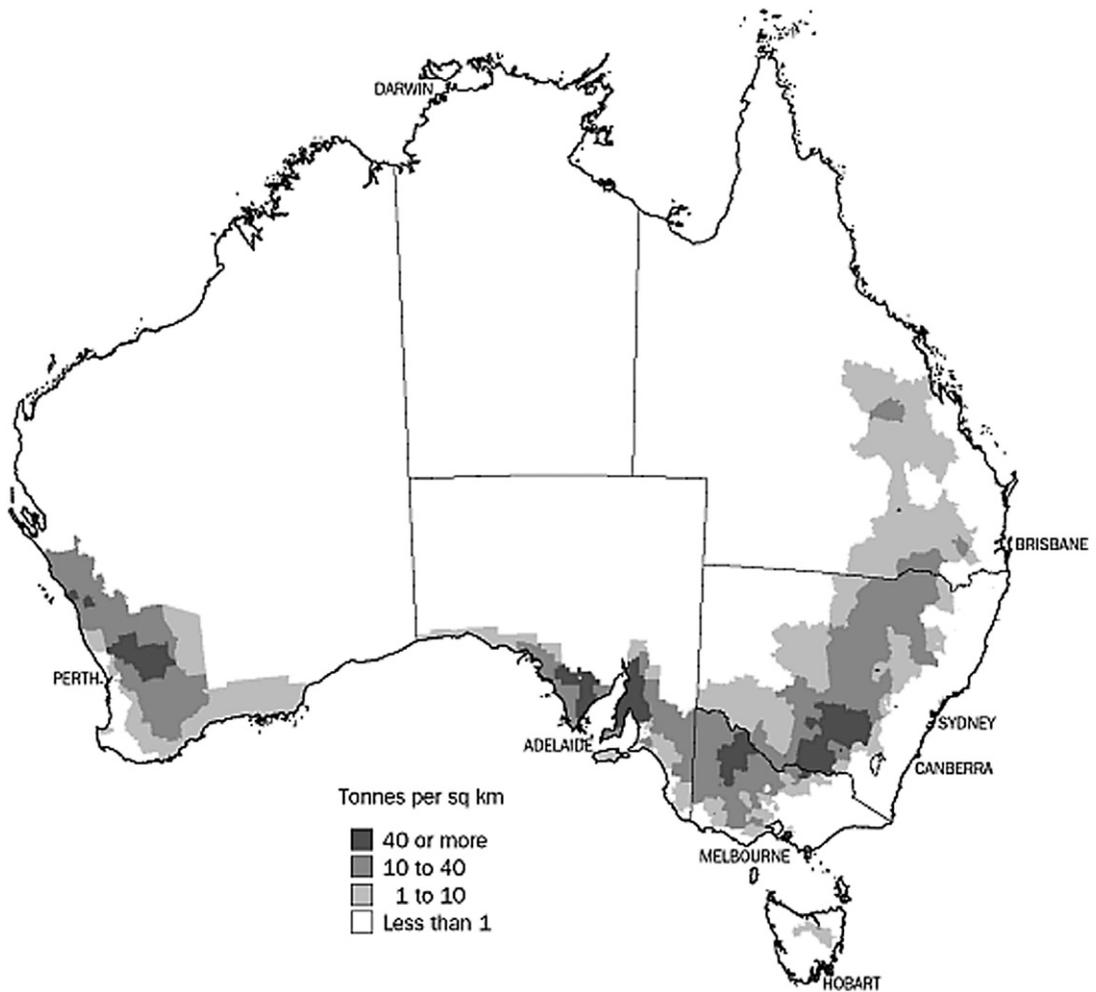


Figure 2 The Australian wheat belt (Source: ABS, 2006).

brink by work in both the social and natural sciences. That is, that the concept of nativeness in plants is constituted as a temporal boundary between before and after, and a conceptual boundary around humans, rather than arising from the properties of the plants themselves.

If the concept of biotic nativeness dissolves under empirical scrutiny in Australia as elsewhere, and is shown to be ‘theoretically weak and internally inconsistent’ (Chew and Hamilton, 2011, 36), a number of aspects of our attempted management of Australian biota and landscapes need rethinking. The paper goes on to contribute to wider discussions about how we might create more open ecological futures (Staddon, 2009) in a time of climate change. If Australia has experienced distinctive historical processes of entrenching these boundaries, it also has a

distinctive heritage of destabilisation that is arguably starting to take vernacular expression. However, as I will show, these more pragmatic approaches continue to sit somewhat uncomfortably with the binary narratives dominant in environmental management discourses.

As my focus on plants risks entrenching another division, I need to explain why the scope of the paper does not extend to humans and animals when the question of nativeness is clearly of much wider applicability. This decision is mindful of the danger of homogenising non-human difference (Lulka, 2009), and the need to take different kinds and groups of non-humans seriously in their own terms (Hall, 2011). Plants have particular characteristics and capacities – for example, they live in distinctive collectives and have particular patterns of

mobility – that affect how we as humans attempt to ‘manage’ them (Head *et al.*, 2012). Thus while I will argue that the boundary making around plants is intimately connected to boundaries around the human, and there is considerable value to be gained by extending this discussion comparatively to animals and people, it is beyond the scope of this paper to do so fully.

The structure of the paper proceeds as follows. First I briefly review concepts of nativeness as discussed in the social sciences and the natural sciences. Second I examine how nativeness is understood in relation to Australian vegetation. I then consider two main Australian contributions to destabilising the boundaries and suggesting how to do things differently – putting the human in, and loosening up spatiality. These contributions have been driven by Australian geographers’ encounter over the last few decades with the social spaces of Aboriginal people. This work has opened up more dynamic conceptualisations of spatiality. The present paper considers how we can do the same for time. In the concluding discussion I ask, what do we lose in ecological health and sustainability terms by ceding so much power to the temporal horizon of European colonisation? How can we imagine the future more openly if we let go of nativeness as a justifiable categorisation around plants?

Fluid boundaries in human geography

The critique of species nativeness in human geography sits within a wider social sciences discussion of the problematic boundaries around nature and culture (see Castree, 2005 for an overview), in which scholars have attempted to recognise more complex patterns of agency than of culture on nature or vice versa (Murdoch, 1997; Clark, 2002; Whatmore, 2002). Although in a scholarly sense these boundaries have been comprehensively dismantled, they show great resilience in many spheres of social life. In this voluminous and complex literature, three particular trends are relevant to the present discussion: the place of humanness in relation to boundaries, the influence of different temporalities, and the implications for management of loosening or removing the conceptual boundaries.

Warren (2007) reviewed diverse ways in which nativeness and alienness have been used in relation to non-human species, emphasising the role of humanness in the definitions: ‘In simple terms, native species are those which have auto-colonized an area since a selected time in the

past . . . and alien species are those which have been introduced by humans, intentionally or otherwise’ (Warren, 2007, 428, see also Preston, 2009, 703). Warren also discussed the ways in which temporal and spatial contexts affected these definitions, for example, the ways certain species might be considered native to Scotland. This question of definition illustrates an underlying ontological dilemma. As Lien and Davison (2010, 238) argued, ‘the biological classification of alien species . . . rests on an ontological distinction between human and non-human’.

The responses that Warren drew (Richardson *et al.*, 2008; Preston, 2009; Warren, 2009) illustrate the ways in which such critique is contentious in the natural sciences. One example is the disagreement between Warren and Preston on the role of humanness in the definition. For Preston (2009, 708):

The native/alien classification is one which distinguishes species on the basis of their dispersal to an area by human vectors; it does not make sense to apply it to humans themselves. . . . I find myself in agreement with Warren when he argues that the native/alien concept ‘can only be applied if we exclude ourselves from it’ but I do not regard this as something that ‘destabilizes the alien/native framework’. It is merely a feature of this particular classification.

The two seem to agree on the value of this understanding for interpreting historical patterns of biogeographic change – the question of how things came to be the way they are, or description – rather than as a prescription for conservation management decisions (Warren, 2009). Clark (2002, 107) identified another very specific manifestation of separating out the human:

as globally oriented eco-activists, it is our task to exercise our own mobility and interactive capacities in order that we might find new ways to keep nature inactive and at home . . . we have not in the least ceased to be concerned with contamination, nor given up the patrolling of ‘natural borders’ or abandoned the rituals of purification.

Temporal issues were identified by Hinchliffe (2008), who described conservation as something that comes ‘after’ nature, the rationale being to return things to pre-existing states. Also in the British context, Lorimer (2008) detailed the lure of the Clementsian climax as the temporal goal towards which management aspires. In

colonial contexts (e.g. Head, 2000 on Australia, Barker, 2008 and Ginn, 2008 on Aotearoa New Zealand) the temporal lure is instead backwards, to the baseline of pristineness.

Unfixing the boundaries (Hinchliffe *et al.*, 2005) opens up new possibilities for thinking about management in which matters are never settled once and for all, and any inside/outside relation can only be temporary (Hinchliffe, 2008, 94). Lorimer (2008) advanced the concept of fluid biogeographies. Nevertheless, these discussions have been more fully developed in relation to wildlife management than vegetation (e.g. Lulka, 2004; Hinchliffe *et al.*, 2005; Lorimer, 2010). Arguably they are also easier to advance in the 'brownfields' context of European conservation than in the postcolonial or New World context of 'green' perspectives on environmental issues.

Nativeness in biogeography and ecology

Within biogeography and ecology, many discussions of nativeness have taken place in the context of invasion ecology, influenced by the broader context of the so-called new ecology, or non-equilibrium ecology (Wu and Loucks, 1995; Stott, 1998; Scoones, 1999). Richardson (2011) provides a recent encapsulation of the field of invasion ecology, as its contributors include leading researchers and its chapters include a number of meta-analyses of recent literature. There is more to be said than can be said here about the conservation cultures of late modernity over the last 50 years, but it is important to remark on the close connection between invasion ecology and New World contexts such as North America, Australasia, and South Africa. This is not only because of the historic spread and interchange of different and previously disjunct peoples, animals, and plants (Crosby, 2004), although there is no doubt that these encounters resulted in many dramatic changes. It is also because of the temporal threshold that was crossed between nonhistory and history.

In their chapter in the Richardson volume, Chew and Hamilton (2011) analyse historical conceptions of nativeness, developed by the British botanists John Henslow and H.C. Watson in the 1830s from common law concepts of native and alien, and by the Swiss phytogeographer Alphonse de Candolle in the 1850s. Chew and Hamilton show how these nineteenth century conceptualisations provided the basis for contemporary understandings, with some modifications. Indeed they argue that 'it is remarkably

easy to unravel the conception of biotic nativeness' (p. 44) from its foundation in pre-Darwinian ideas; that 'biotic nativeness is theoretically weak and internally inconsistent, allowing familiar human desires and expectations to be misconstrued as essential belonging relationships between biota, places and eras' (p. 36).

In parallel with discussion in the previous section, the dominant biogeographic schemes in use today 'share the tradition of distinguishing natives from non-natives by evidence of human intervention and a resulting range expansion' (Chew and Hamilton, 2011, 40; see also Richardson *et al.*, 2000; Pysek *et al.*, 2004). 'Human dispersal is said to render populations, and indeed any successor populations, non-native. . . . Nativeness is therefore revocable, but non-nativeness is permanent. Being once human-dispersed accomplishes a mutagenic denaturing' (p. 36). Spatial and temporal complexity in what 'human intervention' means results in many exceptions – the categorisation is suspended for livestock and crops, as in the wheat example above, to whom are extended 'rights of occupancy'. Chew and Hamilton (2011, 40) list many other exceptions.

In summary, an olio of ideas from pre-Darwinian botany and pre-Victorian English common law still underpins even the most recent, expert conceptions of biotic nativeness. To the (wide) extent that biotic nativeness is considered actionable and presumed to rest on scientific findings, it is important for scientists, journalists, lawmakers, conservationists and other citizens to understand that those findings express some common beliefs about humans, but nothing about the essences of biota or of particular taxa.

Concluding that the label native is 'uninformative', 'deceptive', 'poorly founded', and 'hampering progress in ecological science', Chew and Hamilton have much in common with evolutionary ecologist Stephen Jay Gould's (1997, 17) argument that

'native' plants cannot be deemed biologically best in any justifiable way. . . . 'Natives' are only the plants that happened to arrive first and be able to flourish . . . while their capacity for flourishing only indicates a status as 'better than' others available, not as optimal or globally 'best suited' (see also Sagoff, 2009; Hattingh, 2011).

Chew and Hamilton's argument throws down the gauntlet to the rest of the Richardson book, which seems to have accorded them token presence. Some ecological writers consider that

one cannot understand the trajectories of particular invasions by drawing a categorical distinction between introduced and native species. Rather, each species must be studied in its own right by examining how it interacts with other species during succession (Simberloff, 2011, 20).

However, most other chapters proceed as if it had not been written. The book concludes with a glossary in which the unproblematised divide – on the basis of their human relations – is maintained. For example, *native species* are those 'that have evolved in a given area or that arrived there by natural means (through range expansion), without the intentional or accidental intervention of humans from an area where they are native' (Richardson *et al.*, 2011, 416), and *alien species* are those 'whose presence in a region is attributable to human actions that enabled them to overcome fundamental biogeographical barriers (i.e. human-mediated extra-range dispersal)' (p. 410). However, Davis (2009, 166) has pointed out that there are a range of views within invasion biology about whether native species are inherently more valuable than others (see for example, Brown and Sax, 2004; 2005; cf. Cassey *et al.*, 2005).

The Australian context

To consider the specifics of the Australian context, we return to the recent review by Bean (2007), who considers the widely used definition of native plants as 'plants that were not deliberately or accidentally introduced by man' as being 'succinct, but not of much practical use' (p. 1). For Bean, the impracticality of the definition lies in the difficulty of always knowing when and how a plant got to Australia, particularly if it was brought here in the few hundred years before European colonisation, a period of intense trade and exchange in the Indo-Pacific region, but providing no historical evidence, and limited archaeological evidence, of plant introductions to Australia. That is, he does not take issue with the definition, but seeks a means to make it more workable by bringing in ecological and phyto-geographical evidence to put together with that of history.

... the timeline system has its own set of problems. If the timeline is too recent, many invasive human-introduced species are included as indigenous; if the timeline is set much earlier (e.g. 1500 CE), there are no historical records that would allow one to determine which species belong in the indigenous set. No country in the world has used timelines as recent as those applied by Australian botanists, who are effectively ignoring hundreds (or even thousands) of years of plant exchange in regions very close to Australian shores (Bean, 2007, 11).

The reason, for Bean, to pay close attention to those years of plant exchange (of which he provides a useful and interesting overview) is not because they are intrinsically interesting and help explain contemporary distributions, but to correctly exclude from nativeness those that have been incorrectly included because some degree of human agency has remained invisible, for example, some species glossed as 'pantropical' or 'cosmopolitan'. In a hypothetical example, a species that was humanly transported from Africa to Java, and then disperses by 'natural' means along the island chain into northern Australia, is non-indigenous from the time it leaves Africa. Conversely a species that disperses naturally (without human agency) along the island chain between the Philippines and Australia into Cape York Peninsula retains its indigeneity at each point along the journey (Bean, 2007, figure 1). Bean's definition clearly recognises that some human introductions of plants occurred before European settlement; year zero for him is explicitly prior to 1788 or even 1770 (Bean, 2007, figure 9).

So, consistent with most international approaches, the boundary ostensibly being drawn around plants in Australia is in fact the boundary around humans, between humans and the rest of nature. But not only this; in the case of the Everist definition quoted above, it is even a boundary around the subset of humans who happen to be British colonisers and trained botanists. When analysed closely, characterisations such as nativeness tell us more about human bounding practices than anything inherent about the plants and their evolutionary processes. The complications and circularity of the concept of nativeness or indigeneity (Bean uses these terms as synonyms) become more apparent when Bean summarises reasons why it is important to determine whether plant species are indigenous or not.

For National Parks and other reserve managers, ‘because their aim is to preserve natural ecosystems and indigenous species, it is vital to know which species should be considered indigenous to the area, and those that are relatively recent introductions’ (Bean, 2007, 2). In biogeographical studies of the evolution, distribution, and dispersal of species, ‘clearly one wants to exclude species that have been introduced to an area by man’ (Bean, 2007, 3). That is no longer clear to me, particularly if we need to participate in an ecology that includes rather than excludes humans (Ellis and Ramankutty, 2008).

Australian contributions I – putting the human into nature

Hinchliffe *et al.*’s (2005) cosmopolitics, and Ellis and Ramankutty’s (2008) revision of traditional biome classifications to include humans and their activities are just two examples of how we can and must think differently about human relationships to the non-human world. It is worth reflecting briefly on two distinctively Australian contributions to the destabilised categories. Biogeographer Nigel Wace must surely have been one of the first scholars to put ‘natural’ in the scare quotes that would come to characterise discussions of the concept in the ensuing decades when, in the early pages of this journal, he commented that ‘... the determinist Clementsian monoclimate theory has been generally accepted in descriptions of “natural” vegetation’ (Wace, 1967, 21). Australian research in historical biogeography, palaeoecology, and archaeology would do much to challenge both Clementsian ideas of succession, and the concept of pristine nature, in its empirical documentation of Aboriginal use of fire and the long history of fire–climate–human–vegetation interactions on the continent (Head, 2000). This met part of the challenge laid down by Wace when he argued that ‘the student of landscape must ... concern himself with historical biogeography if he is to come to any understanding of the changes wrought by man’ (Wace, 1967, 24).

The interplay of processes shaping human–plant–animal configurations in Australia has also been explored within the human geographic tradition, and by historians and anthropologists, not usually brought together with physical geography under the rubric of ‘biogeography’. These have gone some way to meeting the other part of Wace’s (1967, 24) challenge:

We can perhaps expect from the orthodox taxonomists a continuation of the disdain with which weeds and aliens, and indeed all cultivars are treated – whether soursobs, sparrows or sheep; ragwort, rabbits or rice. However, such organisms display features of outstanding genetic and ecological interest, and the history of their spread and the reasons for their success are surely a legitimate field of biogeographic enquiry, but one much neglected by geographers. . . .

Examples of recent contributions in this vein include nuanced studies of the mobility of both plants and ideas (Franklin, 2006; Kull and Rangan, 2008; Carruthers and Robin, 2010), conceptualisations of nature and nativeness (Head and Muir, 2004; Mulcock and Trigger, 2008; Instone, 2010; Lien and Davison, 2010), and studies of gardens and urban nature (Power, 2005; Head and Muir, 2007; Kirkpatrick *et al.*, 2011). Sometimes methodological differences exacerbate the temporal boundary between prehistoric and historic geographies, but there are other examples of successful, if controversial, comparisons across that divide (e.g. Mooney *et al.*, 2011).

If there is a way to summarise the central combined contribution of this diverse work, it would be that no longer can we understand nature as being separate and apart from the conceptual and material influence of human activity. Coming from different directions, there is considerable convergence – if still contradictions of terminology – in posthumanist approaches in human geography, and the conceptualisation of the Anthropocene in physical geography and palaeoecology.

Australian contributions II – new thinking about space, time, and multiplicity

In another important paper in this journal, Richie Howitt argued that ‘Australian landscapes are plagued by multiple boundaries that seek to divide and subdivide places, people and resources into manageable units’ (Howitt, 2001, 233). He took issue with the tight boundedness of frontiers and borders, through which colonial approaches to the landscape continue to be reinscribed in the present, offering challenges to political perspectives of both Left and Right. Howitt suggested instead the constructive and creative use of edges (in an ecotone sense), giving us metaphors for the coexistence of Aboriginal and Euro-Australian engagements

with land and resources. He encouraged the discipline to go beyond its role in creating geographies of exclusion, and rather towards openness, multiplicity, and coexistence. With Sandie Suchet-Pearson (Howitt and Suchet-Pearson, 2006), the argument was extended into a critique of Western discourses of community and environmental 'management' that presumed the possibility of human intervention and control. In this and related work (Suchet, 2002) they started to imagine what 'ontological pluralism' might look like, and how it might take shape through a focus on process in environmental and development engagements.

Howitt drew on an emergent body of scholarship in which Australian geographers had been encountering Aboriginal communities, views of the world, and engagements with land, water, and fire (e.g. Jackson, 1995; Jacobs, 1996; Langton, 1998). The spatiality of coexistence and multiplicity were being thought through in cross-cultural work such as that by Bowman and Robinson (2002) on buffalo, Adams (2004; 2008) on conservation landscapes, Gibbs (2006; 2010) on water, and Muller (2008) on land and sea. Liminality, or betweenness, was explored in a variety of contexts including urban ones (Anderson, 1995; Head and Muir, 2006a; Gill *et al.*, 2009).

In extending Howitt's thinking around frontiers, borders, and edges to the temporal frame, it is not my intention to mark a fixed boundary between time and space. 1788 is not only a temporal horizon of significance, although it is that. Rather it is also inscribed in space, or in space/times of belonging and of nature. The concept of space-time (after Massey, 1999) is useful as well because the colonial frontier was itself mobile. (Hence I have kept a spatial metaphor in the title of the paper.) Further, Howitt and Suchet-Pearson argue there is also a temporal frame of reference in the Eurocentric dominance of management discourses, which 'orientate thinking towards a linear narrative – with a unidirectional, progressive, controlled movement towards a coherent strategic target presumed desirable' (Howitt and Suchet-Pearson, 2006, 332).

The temporal dimensions of colonialism are encapsulated in Rose's (1997) use of the terms 'Ground Zero' and 'Year Zero' to describe frontier time-spaces. 'Ground Zero is also the Year Zero: the moment at which history will begin with the arrival of the outriders of civilisation' (Rose's (1997, 26). Rose argues that this view of history is influenced by Biblical typologies of

time that start at the centre and work outward in both directions. It is not only that time is linear but that Zero is

a disjunctive moment when not just history, but a wholly different kind of life, is about to begin. I am contending that in settler societies the frontier is culturally constructed as precisely this moment: a disjunction between wholly different kinds of time. I suggest that we imagine the frontier as a rolling Year Zero that is carried across the land cutting an ontological swathe between 'timeless' land and historicised land (Rose, 1997, 28).

Thus the indigenous comes to be defined as 'the precursor to the invader' (p. 20), or in terms of the 'priority of the prior' (Povinelli, 2011), a temporal distinction I return to below in discussing plants. In introducing *Quicksands* (Neumann *et al.*, 1999), Denning took issue with the view of history that used the moment of cultural encounter to divide time into 'a Before and an After', arguing that 'BC/AD syndromes only work in a unicultural world, or worlds under the face of unicultural imperialism. When different times conjoin, "zero points" disappear' (Denning, 1999, xi). He quoted his own work as illustration that 'there is now no Native past without the Stranger, no Stranger without the Native' (Denning, 1992, 178).

Howitt, Rose, and most other authors cited above concentrated on the implications for people, particularly Indigenous people, of the colonial demarcations. It was however widely recognised that there were implications also for the non-human world. These have been explored further in more recent work. For example, Lavau (2011) analyses the Victorian River Health Strategy and the way it frames trade offs between a 'natural state' and 'human use' (p. 47).

What is meant by 'natural state' itself goes undefined. It is presumably self-evident or uninteresting to the reader, and does not warrant discussion. Nevertheless, the occasional reference to the 'original condition' . . . of these rivers confirms that the strategy does indeed consider rivers as they were prior to European settlement as the natural benchmark for restoration and management. (Lavau, 2011, 47)

The temporal threshold of 1788 is assumed as the baseline of naturalness and/or nativeness in Australian endangered species legislation (Lien and Davison, 2010), in government measures of

environmental health (Trigger, 2008), and in key government overviews such as the State of Environment reports (Beeton *et al.*, 2006). As Lavau argued, this is generally considered to be so self-evident that it is not worth discussing.

Beyond nativeness – management implications and research challenges

Undue focus on a single temporal boundary reinscribes the power of colonialism rather than dismantling it. It cedes more power to Banks and Solander's *Banksia* cones, or Governor Phillip's crops, than to swamp forests being compressed into coal millions of years ago, yams collected 10 000 years ago, or bok choy sitting on the supermarket shelf in 2011. None of this discussion is to deny the significant impacts on abiotic and biotic life that came with European settlement – far from it. But living with the consequences of those changes requires us to be open to the contingencies of both the past and the future. A single temporal bounding of nativeness, located in the past, forecloses future options, and limits our capacity to deal with an open, contingent, and unpredictable future (cf. Ginn, 2008; Staddon, 2009). How then should we act in the present, and what are the research challenges ahead? This section discusses emerging themes and advances ideas for further discussion.

If nativeness is not a robust concept in biological or ecological terms, its use as an axiom of management – supposedly founded on that science – is problematic. Its entanglement with other, connected themes (for example, the value of maintaining species diversity, or how to deal with problematic invasiveness), is hampering the management of those latter issues. There are many good reasons to continue to attempt to deal with invasive species, but the focus should be on the behaviours and effects of particular species and their interactions, rather than a pre-given status as native or not (see also Head and Muir, 2004; Chew and Hamilton, 2011). This is increasingly recognised in the natural sciences literature (Pejchar and Mooney, 2009; Schlaepfer *et al.*, 2011). For example, Davis *et al.* (2011) have argued that 'the practical value of the native-versus-alien species dichotomy in conservation is declining, and even becoming counter-productive' (p. 153). Although this group of authors includes Matthew Chew, the justification – perhaps mindful of the *Nature* readership – is not his careful historical demonstration that biotic nativeness was a concept that grew out of English case law, but rather a more pragmatic set

of concerns. Contrary to fears of a decade or two ago, the accumulation of data suggests that 'invaders do not represent a major extinction threat to most species in most environments – predators and pathogens on islands and in lakes being the main exception. In fact, the introduction of non-native species has almost always increased the number of species in a region' (Davis *et al.*, 2011, 153).

The effects of both natives and non-natives vary in both space and time, but it is not because of their nativeness or otherwise per se. In these 'novel ecosystems' (Hobbs *et al.*, 2006), many organisms are changing their behaviour. Hobbs *et al.* (2009) have pointed out that a number of non-native species now constitute important components of ecosystems, 'for example, many butterfly species in California now depend on non-native plants for some or all of their food resources' (p. 602). Non-native gorse in New Zealand provides important nursery plants and habitat for both plant and animal species (Barker, 2008). In turn, native plants have changed their behaviour in these new associations (Ginn, 2008). To the extent that humans can and should seek to intervene in managing ecosystems, we should focus on outcomes and processes rather than the imposition of prescribed categories of being.

A further pragmatic concern is accelerating global environmental change and the impracticality – even if it were desirable – of restoration to a baseline state (Ginn, 2008; Davis *et al.*, 2011). Recognising that these decisions are inextricably entwined with cultural dispositions, Hobbs *et al.* (2010, 483) argue that the concept of 'naturalness' 'is no longer suitable as a management objective in park and wilderness areas' because it has so many different meanings, each of which can be contested. Decisions that distinguish between the positive and detrimental impacts of invasive species, 'will depend significantly on cultural values toward nativeness and exoticism and the ways in which such beliefs change in the coming decades' (Hobbs *et al.*, 2009, 603), rather than being an outcome of science.

Acknowledging the cultural bases of decisions will become even more important if, as argued by some, increasing levels of human intervention – in the form of translocation, for example – will be needed to save some species from climate change (Hoegh-Guldberg *et al.*, 2008). A more honest acknowledgement of the cultural bases of historical decisions may also help us with the

profound ethical dilemmas that attend killing (Hall, 2011), as Ginn (2008, 15) has argued in the New Zealand context:

essentialising and fixing non-humans as either indigenous or exotic legitimates the systematic repression of many animals; exotics are poisoned or culled, while the quality of life of individuals is subsumed into a right to life discourse at the species level for certain native species, such as the kakapo. Acknowledging that such violence is done not to preserve any unique 'essence' of indigenous being, but instead has become necessary due to past contingent interactions might be more honest.

By the same token, a much wider suite of regenerative and coproductive human actions can be envisaged if they do not always have to be imagined as restoring past nativeness. Examples include bushcare activities, biodiversity conservation in agriculture, and adaptive management more generally. In practice, vernacular acceptance of the new, recombinant Australian natures (Low, 2002) is widespread. Garden research consistently shows that most urban Australians embrace an eclectic combination of species in their gardens; the most popular garden types including exotic plant species, either alone or in combination with natives (Zagorski *et al.*, 2004; Trigger and Mulcock, 2005; Head and Muir, 2007). For some this is a spatialisation of belonging, with a tolerance extended in the city that would not be acceptable in the bush (Head and Muir, 2006a; 2006b).

Trigger (2008) has reviewed the limited literature on diverse Aboriginal responses to introduced animals and plants, demonstrating 'an active intellectual incorporation of some species into Aboriginal cultural traditions' (p. 640), which are themselves subject to ongoing change. The examples cited by Trigger include a range of likes and dislikes, tolerance and active incorporation. He documents both negative and positive reactions to the environmental weed of arid zone pastoralism, buffel grass (*Cenchrus ciliaris*), and negative views of the invasive woody shrub mimosa (*Mimosa pigra*) in the Northern Territory. Mango (*Mangifera indica*) is designated as a whitefella tree in the Gulf Country and thus not strictly belonging, but it is still highly valued. Povinelli (1993) provides a contrasting example of mangoes being described as 'all blackfella food now this lot *miya* [plant food]' by Belyuen people near Darwin. In an example from Bundjalung country in northern NSW, Adams *et al.*

(2008) record ongoing collections of and connections to bush lemons and European honeybees, which, 'fit a particular Western nature conservation category of introduced species. For Bundjalung community members, they are living part of contemporary cultural heritage, as well as natural heritage, with clear links to the past' (Adams *et al.*, 2008, 36).

Trigger (2008, 640) concludes his analysis by arguing that

the matter of why certain species may be embraced more fulsomely than others must remain to be addressed in subsequent research; however, my conclusion is that while the general notion of indigeneity (or nativeness) is central to Aboriginal worldviews, the significance of cultural landscapes can be constituted through the presence of 'non-indigenous' species within the broader context of autochthonous Australian nature.

A single temporal delineation of belonging ratchets a range of other things – agriculture, cities, suburbs – into not belonging because not native. Such broad brushstrokes leave farms and food production landscapes – not to mention most human residents of Australia – in ambivalent or hostile space. For example, wheat is just one episode in a long and continuing discussion about whether, and how, agriculture belongs in Australia (Saltzman *et al.*, 2011). If we can imagine that neither wheat nor wheat people are unnatural in Australia, but instead participants in an evolutionary story that was co-produced by humans, plants, and others, we may be more realistically placed to manage the whole landscape.

Conclusions – against nativeness, but towards a more open future

Anderson (2008, 70) has argued that savages, especially Australian ones, challenged the ideal of human difference from animals, and human perfectibility:

the rise of biologised conceptions of human difference in the nineteenth century might productively be regarded as symptomatic of a crisis in the theses of human exceptionality and unity in the face of failed attempts to slot certain humans into a model of 'humanity' that presupposed that separation (see also Anderson this volume).

As we pause for a moment of historical reflection in this journal, we need to consider whether our

preoccupation with nativeness is the contemporary version of an equivalent crisis, one that will look similarly bizarre if *Geographical Research* makes it to volume 100. If we have gone beyond the crisis of human unity, we are nevertheless still experiencing one of human exceptionality. The boundary that we put around plants and animals is revealed by this analysis to be a boundary around the European human. The relevant questions in ecology and biogeography are bigger than the question of nativeness, but go to the extent to which humans are framed as separate from and outside nature.

I will resist the temptation to undo my argument by proclaiming ourselves on another temporal threshold, but I remain optimistic about Australian geography's capacities to continue making strong contributions in this field. The infusion of posthumanist perspectives into a more physical biogeography offers great promise. A subtext of this paper has been that Aboriginal views of the world – and geographic engagements with them – have provided an enormous and underutilised resource in helping us think through how to do things differently. The engagement, by an increasing diversity of human populations, with Australian landscapes and ecologies, offers as much to geographical research over the next 50 years as the last.

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