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NATURE CONSERVATION IN THE ANTHROPOCENE: PRESERVATION, RESTORATION AND THE CHALLENGE OF NOVEL ECOSYSTEMS

Nature and the Anthropocene

No sooner had we entered the twenty-first century than new words appeared to express an emerging re-conception of our place in the world. Foremost among these is the term 'anthropocene'. Since first proposed in 2000 (Crutzen and Stoermer, 2000), this neologism has been increasingly employed to designate a new planetary epoch wherein the influence of humans has pushed global ecological and geological attributes beyond reversible thresholds (Castree, 2014; Crutzen, 2002). In this new environmental world order of climate change, shifting nutrient cycles and dynamic biogeographies, the idea of an anthropocene 'challenges the modern science-politics settlement, where natural science speaks for a stable, objective Nature' (Lorimer, 2012, 593). This challenge is particularly relevant for the ecological sciences. While acknowledging stochastic processes is not new in ecology, what the concept of the anthropocene proposes is that such dynamic environments are the hallmark of a new global era, rather than just temporary phenomena on a predictable trajectory towards ecological stability (Corlett, 2015). This poses significant problems for traditional forms of conservation practice that are primarily focused on preserving the species composition of 'healthy' ecosystems or restoring 'degraded' ecosystems to a 'natural state' of acceptable historic variability (Clewell and Aronson, 2013). The difficulty presented by the anthropocene concept arises because such forms of nature conservation look to restore historic ecosystems configurations in an age where the climatic, geological and ecological envelope facilitating such historical conditions has been superseded. This in turn calls into question the current corpus of environmental law and policy grounded in mid-twentieth century perspectives when the feasibility of restoring ecosystems to historic referents seemed a more achievable endeavour (Bridgewater and Yung, 2013). These issues are relevant for planning theory and practice as 'The fate of natural and semi-natural ecosystems is irrevocably bound up with the use of land. It should therefore be a matter of foremost concern for all those involved with land use change' (Owens and Cowell, 2011, 110). Accordingly, in this *Policy and Planning Brief* I outline a battle of perspectives waging at the frontiers of ecological theory where new understandings of species interactions challenge the legitimacy of institutionalised perspectives on governing valued ecosystems with potential consequences for how planning 'ought' to approach nature conservation in the anthropocene.

Nature in the Anthropocene

Traditional approaches to nature conservation focus on the preservation of sites to maintain species composition within a particular historic range (Alexander, 2013; Ausden, 2007). Where it is perceived that areas have become damaged, usually as a consequence of human activities, effort may then be invested in returning such areas to a pre-disturbance reference point (Woodworth, 2013). In this sense, historical conditions are perceived as ‘the ideal starting point for restoration design’ (SER, 2004, 1). This focus on historical fidelity is normally understood to entail more than a general attempt to recreate the broad functional attributes of what may have existed in a past ecosystem. Instead, ‘what is crucial is that this function be performed by the same kinds of components, or entities, that did so in the past’ (Garson, 2014, 98). Such preservation and restoration focused approaches underpin the institutionalised governance perspectives most commonly advanced in nature conservation policy at the international, supranational and national scales (CBD, 2010; CEC, 1992, 2000; DAHG, 2011).

However, recent years have witnessed a growing number of dissenting voices (Hobbs et al., 2013b; Marris, 2013; Thompson and Bendik-Keymer, 2012). These contest the appropriateness of expending significant effort on what is considered to be a Sisyphean act of preserving the ecological status quo of sites designated for nature conservation (Seastedt et al., 2008). Such critics also question the viability of creating historical analogue ecosystems which are perceived as misdirected efforts at ‘fossilizing an ecosystem in which the manager is essentially married to an infinite resource commitment’ (Mascaro et al, 2013, 51). While this constellation of scientists, philosophers and journalists does not reject outright traditional approaches to nature conservation (Marris, 2014), concerns are explicitly expressed on the merits of employing an historical reference model for conservation activities in an era distinguished by global environmental change and a continuing trajectory away from previous conditions. Accordingly, critics of traditional approaches to conservation argue that the irrevocable alterations in the biophysical environment characterising the anthropocene, such as species extinctions and human facilitated expansion of species ranges, render inappropriate conventional preservation and restoration activities focused on replicating species composition (Harris et al., 2013). In this sense, many of those disapproving of such traditional conservation interventions seek to ‘embrace more dynamic and pragmatic approaches to the conservation and management of species – approaches better suited to our fast changing planet’ (Davis et al., 2011, 153).

The concept of 'novel ecosystems' has increasingly garnered support among such critics of traditional approaches and is fast becoming a disruptive topic of debate in nature conservation theory and practice. Those promoting this concept conceive such novel ecosystems as composing 'non-historical species configurations that arise due to anthropogenic environmental change, land conversion, species invasion or a combination of the three. They result as a consequence of human activity but do not depend on human intervention for their maintenance' (Hallett et al., 2013, 17). Such novel ecosystems are thereby understood as a self-evolving response of the biosphere to human influence. Here, human activity may establish the initial conditions upon which novelty subsequently develops, but do not deliberately manage the ecosystem to maintain current species composition. Thus, for example, 'a working tree plantation doesn't qualify; one abandoned decades ago does' (Marris, 2009, 450). The essential differences between traditional approaches and the novel ecosystems concept thereby centre on what is valued in conservation theory, and hence what should be retained and enhanced in formulating nature conservation policy and practice. For those wedded to traditional approaches, historical fidelity with species composition is paramount and directs management efforts. But for those sympathetic to the novel ecosystems concept, greater value is located in the evolutionary dynamism of natural processes, such that the complexity of interactions and the functional benefits accruing to both humans and non-human species is prioritised (Hobbs et al., 2009).

A key line of contention between the historically orientated compositional emphasis of traditional conservation approaches and the future orientated functional concerns of the novel ecosystems perspective is the divergent position of each regarding the ontological status of non-native species (Tassin and Kull, 2015). For preservation focused approaches, non-native species are conceived as undesirable human introductions that threaten the intrinsic value of autogenic dynamics. Similarly, 'Since ecological restoration of natural ecosystems attempts to recover as much historical authenticity as can be reasonably accommodated, the reduction or elimination of exotic species at restoration project sites is highly desirable' (SER, 2004, 9). In contrast, those advocating the concept of novel ecosystems content that 'nativeness is not a sign of evolutionary fitness or of a species having positive effects' (Davis et al., 2011, 153). They reason that anthropocene conditions render unavoidable the presence of non-native species in ecosystems. Accordingly, it is argued that instead of seeking to eliminate species branded 'exotic' or 'invasive', managers should formulate frameworks for intervention based on a distinction 'between those non-native species that are likely to foreclose options for management and those that are not' (Standish et al, 2013, 297). Advocates of the novel ecosystems concept view non-historic ecosystem configurations as a consequence of

the anthropocene rather than a primary driver of change. As such, they assert that the recognition of ecological novelty in new species interactions should not be confused with what is causing the loss of the intrinsic value placed on historical species composition by those aligned to traditional nature conservation approaches (Standish et al., 2013). In essence, those supporting the novel ecosystems perspective see it as more attuned to the new nature of the anthropocene by supplying the 'foundation for both realistic and optimistic conservation actions' (Hallett et al, 2013, 25).

It is unsurprising that the concept of novel ecosystems is unsettling for those schooled in traditional forms of nature conservation management that ground their activities in a dualism between the 'natural' and the anthropogenic. Indeed, the concept has drawn reproach from a constellation of scientists and journalists (Blignaut et al., 2014; Clewell and Aronson, 2013; Murcia et al., 2014; Woodworth, 2013) who view it as an idea in which 'a new ecological world is proposed without the necessary substance and supporting evidence, but with potentially disturbing policy implications' (Murcia et al., 2014, 548). Critics of the concept maintain that discussions regarding the delineation of irreversible thresholds in the shift from degraded to novel ecosystems confuse socio-economic, cultural and political priorities with the ecological feasibility of restoration. As such, it is questioned if accepting the existence of novel ecosystems may involve 'a lowering of the bar for rehabilitation and restoration' (Perring et al., 2014, 2) such that 'it allows humans to think that species invasions are inevitable and not problematic and may open the floodgates to human manipulation of species assemblages' (Caro et al., 2012, 186). From this perspective, it is contended that those advocating novel ecosystems have succumbed to the enormity of the problem posed by the anthropocene to nature conservation in assuming that 'there is no choice but to surrender and accept novel ecosystems as substitutes and the new norm', a capitulation viewed as a 'Faustian bargain of enormous proportions' (Clewell and Aronson, 2013, 244-245). Such strongly expressed sentiments indicate the depth of feeling in this debate as the newly emerging ontology of nature proffered by the novel ecosystems concept not only threatens to unwind profoundly interwoven epistemological and metaphysical concepts of 'nature', but also potentially imperils the careers of those entangled in such webs of meaning. Hence, the constructs of nature advanced in this dispute serve a double duty: 'they are both descriptive (scientific) and prescriptive (political); they are used to describe what is and to prescribe what ought to be' (Hull and Gobster, 2000, 98). Consequently, the opposing positions in this debate seek to pronounce on the legitimacy of concepts of nature 'in' the anthropocene concurrent with a direction on what forms of nature is appropriate 'for' the anthropocene.

Nature for the Anthropocene

To date, policy is largely silent on the perspectives advanced by the novel ecosystems concept. Indeed, official approaches most often actively resist the changes to nature conservation represented by this ontological re-conceptualisation of where value lies in ecosystems (Bridgewater et al., 2011). Within the European Union, for example, traditional perspectives on the ‘invasiveness’ of non-native species are institutionalised at the level of supranational governance and given continental scale applicability through a series of Directives (CEC, 1992, 2000), that place ‘great stress on the use of protected areas as cornerstones for conservation, and strongly emphasize the perception of a constant unchanging world’ (Bridgewater and Yung, 2013, 276). As the stipulations of these Directives are transposed into national and subnational policy, an institutionally pervasive and spatially expansive approach to nature conservation is actuated. This approach seeks to maintain species populations deemed native by eradicating exotic interlopers and conditions that lead to ecosystem degradation (Grumbine, 1997), and thereby ‘return ecosystems to their pre-disturbance trajectories or states’ (Hulvey et al, 2013, 158). Set against this backdrop, a significant challenge for those endeavouring to give traction to the novel ecosystems concept in the governance of nature is that it dissolves sedimented binaries permeating conservation discourses by re-conceiving spaces for nature that are ‘new but natural, anthropogenic but wild’ (Yung et al, 2013, 248). A further challenge is to provide guidance on how to rethink the goals of conservation activity consequent on accepting the legitimacy of new natures for the anthropocene. This is because, ‘identifying an ecosystem as novel signals that management is restricted to goals associated with novelty, and that recourse to hybrid or historical ecosystems is no longer practical’ (Hobbs et al, 2013a, 59). As such, giving representation to novel ecosystems in nature conservation policy entails a move away from the traditional objectives that ground existing preservation and restoration practices.

At the heart of this debate is a struggle for privilege between competing value frameworks in nature conservation policy. Accordingly, the sciences drawn upon to substantiate opposing positions operate with an implicit normativity, such that ‘facts are interpreted through the filter of an assumption that implies an inherent policy preference’ (Lackey, 2001, 439). Consequently, those engaged in planning theory and practice should remain vigilant to how knowledge claims concerning nature are constructed and deployed. Hence, it is important to remember that novel ecosystems are not inherently ‘good’ or ‘bad’ (Morse et al., 2014). Rather, they represent an expanding and

contended conceptual space with material implications that reveal the often concealed blurred boundaries between metaphysics, science and politics (Chapin and Fernandez, 2013). In this way, analytically attending to debated concepts of nature 'in' and 'for' the anthropocene highlights the importance of keeping pace with the rapidly changing social and environmental parameters which shape, and are shaped by planning theory and practice.

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