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INVITED ARTICLE

Bioproportionality: a necessary norm for conservation?[1]

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Abstract

In the early stages of the environment movement, one of the principal objects of conservation was wilderness. In the 1980s, the category of wilderness gave way to that of biodiversity: conservation was reconceived as biodiversity conservation. With this change of categories, the focus of conservation shifted from the saving of vast and abundant terrains of life to the saving of types of living thing, particularly species. A little-noted consequence of this reframing was a reduction in scale: ***minimum viable populations*** *of species, which set targets under the new biodiversity-based conception of conservation, were often orders of magnitude lower than the populations that might have occurred in wilderness areas. Exclusive focus on the value of diversity thus tended to lead conservationists to lose sight of the value of abundance. To correct this disastrous miscarriage of environmental intentions, a new*

1 This essay is adapted from a much longer paper, "From biodiversity-based conservation to an ethic of bio-proportionality" (Mathews 2016). Please refer to that paper for full bibliography and further details.

complementary category is here proposed: ***bioproportionality****. It is not enough to conserve minimum viable populations of all species. The aim should be to optimize such populations. Optimized targets will be estimated by reference to the principle of bioproportionality: the population of each species should be as abundant as is consistent with an ecologically proportionate abundance of adjoining populations of other species. Applied to the human population, this principle will require a dramatic reduction.*

Keywords: Anthropocentrism; biodiversity; bioproportionality; environmental ethics; optimal population; wilderness.

In our current era of ecological emergency, in which more than a million species have recently been deemed to be at imminent risk of extinction (IPBES 2019), how should we value the living matrix of our planet? How should we share the resources of this planet with our fellow creatures? How much do we owe them? What, if any, are the limits on the uses we may make of them and of the living systems in which they are embedded?

This has been the great ethical blind-spot of the Western tradition, and it is the blind-spot around which modernity - now exported, in the form of science-based industrial development, to most corners of the globe – has organized itself. From the perspective of modernity, 'nature' is a moral nullity, there for the taking. Of no ethical significance in itself, it merely sets the stage for ethics, which begins with the entrance of *el supremo*, the mighty human – the protagonist relative to whom the rest of reality acquires meaning.

The story of this blind-spot – which is known as anthropocentrism – has become familiar in recent decades thanks to environmental philosophy and cognate discourses. But in practice anthropocentrism has continued to define the project of modernization and industrial development throughout the world. This has led, as we all know, to a human population that is now splitting its ecological seams and progressively and inexorably annexing the habitats of all wild species.

To the limited extent that there has been moral pushback against this human annexation of the planet, it has been via the environment movement and its

correlative ethos of conservation. In the early stages of this movement, one of the principal intended objects of conservation was wilderness. Environmentalists campaigned in the 1970s and 1980s to save forests and other extensive tracts of relatively ecologically intact land, wherever these still remained. For conservation purposes, wildernesses were generally defined as large areas in which ecological and evolutionary processes were free to continue unfolding without undue human disturbance. (Devall and Sessions, 1984, 126-129; Rolston, 1988)[2] Implicit in the defence of wilderness was an anti-anthropocentric acknowledgment that wild communities were morally entitled to their own existence - that other beings and life forms were created not merely for the (human) taking but existed in a kind of parallel moral universe which it was not always our prerogative to appropriate or disturb.

The notion of wilderness was a legacy of 18th-19th century Romanticism, where Romanticism had been the first major episode of reaction against the regime of modernity instituted in Europe by the Scientific Revolution of the 17th century, followed by the triumphal 18th century Age of Reason. With its implied threat to anthropocentrism – and hence to the project of industrial development – Romanticism was historically short-lived, and, not surprisingly, so was the 20th century wilderness movement. The very category of wilderness, with its aesthetic and spiritual overtones, seemed out of place in the otherwise thoroughly modernist – scientistic and instrumentalist - discourses of governments and policy makers in the 1970s – 1980s. So, mid-1980s, a new, more congenial category came to the fore as a basis for conservation: *biodiversity*. (Mathews, 2016)

The category of biodiversity was scientifically respectable. It had a veneer of objective descriptiveness that 'wilderness', with its perceived, culturally idiosyncratic (and very Eurocentric) loadings – aesthetic, spiritual or otherwise subjective – patently lacked. The fact that when biodiversity was cast as a goal for conservation it too became subtly normatively loaded – incorporating an 'ought' as well as an 'is' – was often overlooked. Nonetheless, it seemed to be a norm to which scientists and policy makers could comfortably assent, and soon it became the avowed object of conservation: conservation came to be understood almost universally as biodiversity conservation.

2 See, for example, the landmark US Wilderness Act of 1964, Section 2.C. https://winapps.umt.edu/winapps/media2/wilderness/NWPS/documents/publiclaws/PDF/16_USC_1131-1136.pdf

With historical hindsight it is possible to see in this shift from wilderness preservation to biodiversity conservation a logical though unintended contraction in the scope of the conservation project. Where wilderness preservation had mandated the setting aside of vast and often abundant realms of earth-life for their own sake, biodiversity as a norm referenced only the *diversity* of the *bios* and not the size of its populations. In other words, when the object of conservation was defined exclusively in terms of *diversity*, its implied purpose was merely the saving of *types* rather than *instances*: if one hundred instances of type A and one hundred instances of type B exist, and fifty of A and fifty of B are lost, there has been no net loss of diversity. But if a hundred instances of A exist and a hundred of B, and a hundred instances of A are lost, then a net loss of diversity has indeed occurred. The same number of instances is lost in each case, but only in the latter case does a loss of diversity occur. In a conservation context, this means that huge reductions in the population of a given species may occur without this registering as a loss of biodiversity. Conservation focussed exclusively on the loss of biodiversity will accordingly serve to mask major absolute losses of earth-life.

In line with this reading, biodiversity conservation did become popularly understood as a project dedicated to the prevention of *extinctions*: the principal trigger for the activation of conservation measures was species endangerment. A social consensus seemed to obtain that extinctions ought to be averted. The implied locus of value, and hence moral considerability, in this new conservation scheme of things was thus not the individual organism, which could be dispatched at will, nor vast wildlands, which could properly be opened up for economic development, but the type or species, which alone warranted protection.[3]

Conservation biologists proceeded to estimate *minimum viable populations* for different species – the minimal population of a particular species required to avert local extinction. Official Minimum Viable Population figures of course varied from species to species, but were generally in the order of only hundreds or a few thousand: one meta-study of different estimates in the literature put the average

3 The diversity implied by the term 'biodiversity' is generally taken to include not only species diversity but genetic diversity within species and diversity of ecosystem types. (United Nations Convention on Biological Diversity, 1992, Article 2) But, for the purposes of this paper, I shall focus mainly on species, since it is species which figure most prominently in the rhetoric of conservation. Conservation campaigns are often headlined by a requirement to save particular threatened species.

figure at 4169 individuals (Traill et al., 2007). Such figures generally of course fell orders of magnitude below pre-disturbance populations or populations that might be present in large wilderness areas. Using such figures as targets thus drastically curtailed the potential scope of conservation.

Resort to estimates of minimum viability also made little ecological sense: ecology is generally premised on abundance. Tens of thousands of seeds are produced to replace a single organism; huge populations are required as buffers against environmental set-backs and unforeseeable contingencies. At the individual level, organisms may indeed compete for scarce resources, but at the population level, plenitude is the rule: nature operates with large numbers. If nothing is protected until it becomes endangered, and if it is then afforded no more than a minimal level of protection, consistent merely with its non-extinction, eventually only remnants will remain. Viable ecologies cannot, as studies in island biogeography have consistently shown, be constituted indefinitely out of such remnants: *attrition* will inevitably occur. (Quammen, 1997; Whittaker and Fernandez-Palacios, 2007)

A simple change of framing categories thus in effect historically transformed the arithmetic of conservation, putting the movement on the back foot, ultimately dooming its small victories to attrition in the face of inexorable human encroachment.[4]

At the same time as the transition from the category of wilderness to that of biodiversity was taking place, the category of *development*, in the sense of large-scale modernization and industrialization, was undergoing revision. Wherever development could be pursued consistently with the maintenance of minimum viable populations of species, it was now legitimated as 'sustainable'. Indeed the two terms, *biodiversity* and *sustainability*, became inter-defining, as evidenced first in the Brundtland Report of the World Commission on Environment and Development of 1987 and then in the United Nations Convention on Biological Diversity of 1992, in which biodiversity replaced wilderness, or earth-life under any of its other sovereign aspects, as the variable to be sustained. The category of

4 Note that a limited amount of wilderness legislation continued to be passed; in Australia, for example, the NSW and SA Wilderness Acts appeared in 1987 and 1992 respectively, while the Wild Rivers Act appeared in Queensland in 2005 – and was repealed in 2014. Conservation in general however became overwhelmingly defined in terms of biodiversity.

biodiversity was well adapted to the project of development not only on account of the minimalist population targets it set for developers, but also because, as a scientistic category amenable to reductive quantification, it precisely purged earth-life of the sovereign aspects that concepts such as that of wilderness had captured. Biodiversity as a category was consistent with images of earth-life subjugated and consigned to the fragmented interstices of human installations, subject to surveillance and control via scientific methods such as counting, culling and tagging, forced sterilization or test-tube reproduction. The conservation of biodiversity could arguably even be represented in terms of storage of DNA in laboratory freezers. Well might industry welcome conservation under a conception of earth-life so deeply attuned to instrumentalism and well might it endorse the injunction to 'sustain' such life reduced in this manner to a valuable resource. In the guise of 'sustainable development', as articulated in the United Nations Convention on Biological Diversity (1992), society was offered a moral inducement to co-opt the biosphere for its own use, subject only to the condition that other-than-human species, however reductively articulated, not be entirely extirpated.

It might have appeared to conservationists that they had little choice but to embrace the mutually defining categories of biodiversity-based conservation and sustainable development. Capitulation to the sustainability rhetoric served to bring conservation back into line with the anthropocentric outlook which held, and continues to hold, almost exclusive sway in the developed world and from which the wilderness movement had marked a temporary deviation. The claims of conservation, from the viewpoint of a biodiversity-based ethic, make minimal inroads into the entitlements of a privileged species, *homo sapiens*, which considers all living things, as individuals, subject to its will, and all the resources of the biosphere as properly its own, provided only that other species qua species are not by human appropriation entirely eliminated. Even this latter condition was arguably a precautionary one traceable to our uncertainty as to which species were dispensable, from the viewpoint of overall ecological functionality, and which were not. To assure overall ecological functionality for the sake of human amenity and survival, it might once have seemed prudent to place a general ban on extinctions. It is worth noting however that today this precaution no longer seems necessary: as we stare into the abyss of a million imminent extinctions (IPBES 2019), with biosphere functionality evidently still relatively intact, it no longer seems arguable that the entire net of the biosphere will unravel if individual

species are removed. It may be for this reason that new trends in policy are now retreating even from the bottom line of conservation, established in the 1980s: that extinctions must be prevented.[5]

Be that as it may, the historic shift from wilderness preservation to biodiversity-based norms of sustainability in practice validated populations in the billions for humans while mandating 'minimal' populations in the low hundreds or thousands for most wild species. Such a version of conservation was well placed to appease moral qualms about the destruction of the natural world while subtly reinforcing the human development imperative and the anthropocentric presumption on which it rests. This perhaps explains the routine if nominal incorporation of conservation into government policy since the 1980s – and the simultaneous collapse of biospheric systems since that time.

If a conservation ethic based solely on the category of biodiversity, with its implied exclusive valorization of types or species, is then ultimately self-defeating, what might a sounder basis for conservation look like? What further categories could be invoked to protect earth-life not merely as a vehicle for civilization – a vehicle that might become increasingly superfluous as geo-technologies and bio-technologies progressively mimic and replace ecological processes – but as a realm entitled to its own existence?

Arguably any such – bio-inclusive as opposed to merely anthropocentric - version of conservation must rest on a generalized respect and appreciation for all living things and for the naturally evolved relationships that knit them into the ecological systems that co-constitute them.6 Such respect and appreciation cannot readily translate into the kinds of ethical categories that as humans we apply to one another. It cannot, for example, translate as the *right to life* of every organism,

5 See, for example, the influential Ecomodernist Manifesto of 2015 that advocates, on both ethical and pragmatic grounds, the rooting out of bio-inclusive tendencies within conservation discourse in favour of an exclusively anthropocentric orientation. From this latter perspective, the independent moral considerability of earth-life, whether in the guise of individual organisms, ecosystems or species, will no longer be countenanced; only its value for human communities will be taken into account (Asafu-Adjaye 2015).

6 Of all the versions of environmental ethics developed in earlier decades, such "generalized respect and appreciation for all living things" perhaps equates most closely to that of Paul Taylor (Taylor 1986). For a convenient survey of the various versions, see Andrew Brennan 2008.

because all organisms live off the lives of other organisms, and hence are often entitled to take the lives of others in the interests of sustaining their own. But it does mean that no living thing is, ethically speaking, merely subject to our will, let alone to our whim. We, like all species, are entitled to make use of our fellow beings in order to preserve our existence, but we must devise moral categories that allow for this without cancelling a generalized respect and appreciation for life at large and recognition of the conditional entitlement of all living things to their own lifeways and existence.

If a generalized respect and appreciation for all life is taken not merely as *a* norm but as *the* ethical foundation for human life, as an alternative to anthropocentrism, then two complementary categories may be proposed which together would help to give ethical structure to this foundation. The first category is indeed that of biodiversity. Ecological diversity is, as is already so well recognized, a necessary condition for the adaptability, resilience and robustness of biotic communities and for their capacity to colonize new environments and recover from all manner of adversities. However, as we have seen, though biodiversity is a necessary condition for the flourishing of earth-life, it is not a sufficient condition, since taken as a stand-alone norm it exerts a downward pressure on conservation. A generalized respect for life must also acknowledge the tendency of life to proliferate, to make itself abundant, continually adapting itself to fill available niches and make the most of every opportunity (Crist, 2019). Since this expansiveness of the life process – upward, downward, sideways, along both quantitative and qualitative axes – is its very telos or intrinsic tendency, respect for life must honour this tendency, allowing the biosphere to continue its work of not only diversifying but also optimizing – optimizing the populations of all its constituent species. Such a process of optimization will be limited only by the internal constraints imposed by the (trophic and other) checks and balances inherent in ecosystems: the population of each species will be as abundant as is consistent with an ecologically proportionate abundance of adjoining populations of other species. (An optimal population of predators, for example, will be smaller than the correspondingly optimal population of the herbivores on which those predators prey.) Optimization is achieved, consistently with the maintenance of biodiversity, when ecological proportionality of populations – let us term it *bio-proportionality* – obtains across all species.

To acknowledge a generalized respect and appreciation for earth-life as a normative foundation for civilization then is not to insist on the sanctity of individual life, after the manner of human ethics. Rather, such an underlying commitment may be articulated via the two normative categories of biodiversity and bioproportionality. In line with the requirement of biodiversity, we must not eliminate individual organisms if doing so would place the future of a particular species at risk. But further to this – very minimal – requirement, the principle of bioproportionality enjoins us to allow populations of all species to optimize themselves in accordance with inherent ecological dynamics. These dynamics include, amongst other more overtly positive forms of collaboration and initiative, the strategies of predation and competition. To follow an ethos of respect and appreciation for earth-life then is not to rule out the mutual utilization of individual organisms as necessary but to accept that such utilization is only justified when it contributes to an overall pattern of population optimization.

Optimization of the populations of all species is an aspirational state that could be achieved only in the context of the like optimization of the human population. In order to optimize the human population we would need to bring human numbers into ecological proportion with those of other species. Such optimization of the human population would of course entail dramatic reduction, since the size of our present population has been achieved at massive cost to other populations. Such reduction would not be a matter merely of actual numbers however, but of offsetting the ecological costs of human activity against any positive ecological contributions that a prospective environmentally reformed civilization might make to the biosphere[7]. In the absence of any environmentally reformed civilization on the planet today however, the principle of bioproportionality does call for major reductions in the human population, by whatever consensual or incentive-driven methods might be available.

Since no methods commensurate with this task have as yet materialized, this might seem an unsatisfactory point at which to conclude the essay. But in fact my aim has been less a practical one than a conceptual or philosophical one. I have sought to show that organizing conservation exclusively around the

7 Architect William McDonough points out that the combined biomass of ants on earth is greater than the combined biomass of humanity. But the ant population is still optimal because ant activity contributes more to ecosystems than it costs them. (McDonough and Braungart 2002).

category of biodiversity has sold conservation disastrously short. When we look at conservation exclusively through the lens of biodiversity, the only evident constraint on the population of *homo sapiens* is that it should not be so large as to leave no room on earth for (minimum populations of) other species. Otherwise biodiversity specifies no limit. Bioproportionality as a norm, by contrast, sets a very definite limit: it specifies (in the sense of rendering calculable in principle) optimal population sizes for all species, including ours. To entertain a population in the billions for us, while countenancing populations in the hundreds and low thousands for most other species, flagrantly violates bioproportionality as a precept. This precept thus helps to show up a critical normative blind spot at the core of our conservation thinking.

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