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The natural capital myth; or will accounting save the world?

Preliminary thoughts on nature, finance and values

Sian Sullivan

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The Leverhulme Centre for the Study of Value
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The Leverhulme Centre for the Study of Value

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Sian Sullivan[1]

Abstract. The contemporary moment of global crisis in both ecological and economic spheres is also the moment wherein 'nature' is being consolidated as 'natural capital'. Through this, key interlocking elements are systematically joining the previously rather distinct domains of economics, business and finance with ecology, environmentalism and conservation. The emerging 'green economy' assemblage of discourses, actors, institutions and calculative technologies underpins the creation of markets for ecosystem services, including carbon, and is critical in constituting the logic of REDD+ and associated financing. Following approaches in economic sociology that emphasise performative elements in creating what becomes treated as economic, and with particular reference to some proposed financing mechanisms for REDD+ and to strategies for materialising environmental risk, this paper delineates four key shifts enabling external nonhuman natures to become legible and leverage-able as 'natural capital'. These are: 1. a discursive shift, through which both conservation practice and understandings of nonhuman natures are reframed in economic and financial terms (amongst which 'natural capital' and 'ecosystem services' are paramount); 2. an institutional shift, in which networks and alliances are becoming constituted as an interlinked assemblage organised around making the core metaphor of nature as natural capital into the materialised reality of accounted for natural capital; 3. a calculative and accounting shift, through which relatively untransformed and restored natures are becoming technically inscribed through numerical signifiers of capital, such that these can be added to and offset against other forms of (ac)counted capital; and 4. a material shift, through which businesses and financiers are turning to accounted for conserved nonhuman nature as 'natural capital' assets that can be leveraged as the underlying asset on which financial investment is secured. In the concluding section I draw on selected works by theorists Bruno Latour, Mary Midgley, Michel Foucault and Paul Feyerabend to aid interpretation of these shifts and their world-making characteristics. In doing so, my aim is to enhance understanding regarding the structuring effects of these interventions and the occlusions they may necessitate.

Keywords. nature, natural capital, green economy, carbon offsets, REDD+, discourse, calculative technologies, institutional assemblage, financialisation, economic sociology, Bruno Latour, Mary Midgley, Michel Foucault, Paul Feyerabend

[1] This LCSV working paper is based on a pre-submission version, completed in August 2013, of a now much shorter paper currently under revision for a proposed themed issue of *Environment and Planning A* on 'Carbon offsetting: new frontiers of resistance and accommodation', edited by Esteve Corbera and Adrian Martin. Shorter versions of the paper have been published as an invited piece for the Public Political Ecology Lab (http://ppel.arizona.edu/blog/2013/03/15/natural-capital-myth) and in *The Land Magazine* (2013, 14:49-53). I am currently extending the views and arguments expressed here into a longer book manuscript with the working title *The Natural Capital Myth: Nature*, *Finance*, *Values*, and I welcome comments and reality checks as I proceed with this work – to s.sullivan@bathspa.ac.uk.

capital noun (MONEY) money and possessions, especially a large amount of money used for producing more wealth or for starting a new business.[i]

natural adjective (NOT ARTIFICIAL) as found in nature and not involving anything made or done by people.[ii]

nature noun (LIFE) all the animals, plants, rocks, etc. in the world and all the features, forces, and processes that happen or exist independently of people, such as the weather, the sea, mountains, the production of young animals or plants, and growth... the force that is responsible for physical life...[iii]

The global ecosystem (the natural environment) provides a vast array of indispensible resources and services to human beings. Viewed in this way, the environment is a form of capital, here called "natural capital." (Prugh et al., 1999: xvi)

Natural Capital The elements of nature that produce value (directly and indirectly) for people, such as the stock of forests, rivers, land, minerals and oceans.[iv]

1. Introducing 'natural capital'

Increasingly, it seems, 'nature' *is* actually money. The contemporary moment of global crisis in both ecological and economic spheres is thus also the moment wherein 'nature' is being consolidated, metaphorically and literally, as 'natural capital'. This metaphorical device has a long pedigree (see, for example, Boulding, 1966; Schumacher, 1973). As I argue below, however, its current uptake in service to a 'green' but nonetheless normatively growth-oriented economics is something of a departure from its early usage. Little mentioned now, for example, is that E.F. Schumacher, in the chapter on 'The problem of production' that opened his rather counter-cultural 1973 text *Small is Beautiful: Economics as if People Mattered*[v], argued for a valuing of 'natural capital' precisely so as to *downsize* economic production such that the (re)productive life of the 'irreplaceable capital' of nature - which he termed 'natural capital' – would remain abundant (Schumacher, 1973: 4). Asserting instead that modern economies were committing the grave error of consuming their capital - a phenomenon he attributed to the observation that '[m]odern man does not experience himself as a part of nature but as an outside force destined to dominate and conquer it' (*ibid.*: 3) - he went on to argue that:

> One reason for overlooking this vital fact is that we are estranged from reality and inclined to treat as valueless everything that we have not made ourselves. Even the great Dr Marx fell into this devastating error when he formulated the so-called "labour theory of value". Now, we have indeed laboured to make some of the capital which today helps us to produce – a large fund of scientific, technological, and other knowledge; an elaborate physical infrastructure; innumerable types of sophisticated capital equipment, etc. – but all this is but a small part of the total capital we are using. Far larger is the capital provided by nature and not by man – and we do not even recognise it as such. This larger part is now being used up at an

> alarming rate, and that is why it is an absurd and suicidal error to believe, and act on the belief, that the problem of production has been solved. (Schumacher, 1973: 3-4)

Table 1. Selection of organisations attending the inaugural World Forum on Natural Capital, 20-21 November 2013

Financial institutions (Banks and investment funds)	The Royal Bank of Scotland Inter-American Development Bank Asian Development Bank European Investment Bank Grupo Financiero Banorte Alliance Trust
Accounting firms / auditing & ratings organisations	PwC KPMG Chartered Professional Accountants of Canada Standard & Poor's Ratings Services
Multinational corporations	Rio Tinto BP Shell Nestle Coca Cola Kering (parent company of brands including Puma and Gucci) Mondi Procter & Gamble Weyerhaeuser
Utilities	Scottish Power
International organisations / networks	World Business Council for Sustainable Development (WBCSD) International Union for the Conservation of Nature (IUCN) GLOBE International (the global legislators' organisation)
Environmental conservation organisations	World Wildlife Fund The Nature Conservancy
Governments	The Scottish Government The Swiss Government The South African Government The Turkish Government
Corporate Social Responsibility (CSR) consultancies	CSR Asia

Source: http://www.naturalcapitalforum.com/who-should-attend

Fast forward four decades and we arrive at the inaugural World Forum on Natural Capital[vi] held in Edinburgh in November 2013, amidst a technological and global context that would have

been unrecognisable to Schumacher writing in 1973. Established with the support of now powerful international organisations including the United Nations Environment Programme (UNEP), the International Union for the Conservation of Nature (IUCN), and the CEO-led network of corporations that is the World Business Council for Sustainable Development (WBCSD), the Forum website claimed that 'a revolution is taking place in how businesses and governments account for natural capital', and that 'there has never been a better time for senior decision makers to exercise leadership for the benefit of business and the planet'[vii]. In its intention to be 'a focal point for business leaders and others to explore the full implications of this rapidly evolving issue [i.e. how to factor 'natural capital' values into business practice]', and 'with the aim of turning the debate into practical action', the forum captured the attention of an array of major international corporations and financial institutions (see Table 1). The Forum's *raison d'être* was announced with website taglines such as 'how can companies account for, and ultimately report on, their returns from natural capital'? (from Peter Bakker, current president of the WBCSD), thus enhancing the value visibility of nature as natural capital in company accounts. An invite- or application-only CEO's club that offered high-level networking over drinks and breakfast for the Forum's most senior delegates was sponsored by Alliance Trust Plc.[viii], a self-managed investment company whose top invested companies at the time of writing include oil companies such as Royal Dutch Shell, BP, and Gulf Keystone Petroleum, financial institutions such as Lloyds' banking Group and HSBC Holdings, and construction companies such as Barrett Development Plc[ix]. So whilst the Forum was held against a background of concern regarding global environmental degradation and the roles of corporate and financial investment in contributing to this, the emphasis here was less on approaches to downsize economic activity, as urged by Schumacher in the 1970s, and more on how corporate and financial worlds might account for environmental costs and assets within their economic practices so as to both maintain and enhance profits within this context of global environmental concern.

This discursive and material capturing of 'natural capital' by corporate and financial worlds is contested. The 'formal' Forum on Natural Capital thus was accompanied by a 'Counter-Forum on Natural Commons' held by an association of social movements and civil society organisations, who think that this 'revolution' in accounting for natural capital in fact 'is the first step to creating financial markets in water, air, soil and forests' and thus 'effectively privatising nature'[x]. The associated 'value struggles' (cf. de Angelis, 2007) between those for and against 'natural capital thinking' are illustrated by some of the many tweets made during this moment of Natural Capital/Commons Forums that tug on the concept of 'natural capital':

> **NatCapForum**
> People abuse nature if they think it is free, they'll value it better if they see its value – @AlexSalmond #NatCap13 21/11/2013 17:25
>
> **bmatulis**
> Concept of #naturalcapital has more to do with the expansion of capitalism than sound ecological management #natcap13 21/11/2013 16:49

NatCapForum
If CEOs and CFOs get it, things happen – @andyheald on embedding #naturalcapital accounting. #natcap13 21/11/2013 16:07

wdmuk
1question no longer on the table @ #natcap13 is how 2 reduce environmental impact. Why should you if you can offset it? via @counter_balance 21/11/2013 15:26

nickdearden75
Restoring ecosystems is good but not if it 'allows' destruction elsewhere. So how do you pay for it? Tax the polluters #natcap13 #notforsale 21/11/2013 14:17

And so on.

This, then, is a pivotal moment in contemporary struggles over how nature is best valued, accounted for, managed and allocated. In this paper I seek to speak to this moment through extending earlier analyses of the metaphorical work (cf. Maasen and Weingaart, 1995) performed by conceptualising 'living nature' as if it is 'capital', highlighting in particular the recent and rapidly expansionary uptake of the metaphor into accounting, business and financial spheres of influence. Following economic sociologists Çalişkan and Callon (2009, 2010), I emphasise and illustrate the corresponding 'economization' of both 'nature' and people that this is producing, through the systematic conceptual aligning, entraining and assembling of external natures with economic technical and evaluative spheres (cf. Sullivan 2012; 2013a). In doing so I hope to indicate some possible implications of this economization in terms of supporting the further capitalisation of nature and the likely extension of associated socioeconomic equities (cf. O'Connor, 1994), as well as marginalising other culturally-resonant evaluative criteria (cf. Foster, 1992; O'Neill, 1997, 2007; Sullivan, 2006).

Following a section on method and interpretive framework, the paper is structured so as to trace a series of consolidating, if also contested, 'shifts'[xi] (cf. MacDonald, 2013: 49). Through these shifts the domains of economics, business and finance are interlocking systematically with the previously rather distinct domains of ecology, environmentalism and conservation, around the stabilising and materialising of the category 'natural capital'. In the third section I trace the *discursive shift* that has reframed both conservation practice and understandings of nonhuman natures in economic and financial terms (amongst which 'natural capital' and 'ecosystem services' are paramount); as well as the corresponding *institutional shift* that has occurred so as to constitute organisations, networks and alliances as an interlinked assemblage organised around making the core metaphor of nature as natural capital appear as the materialised reality of accounted for natural capital. This section thus documents some ways in which 'natural capital' thinking has been proclaimed and promoted by specific actors and organisations that are aligning to become a powerful global institutional assemblage folded around the technical calibration, calculation and accounting of 'nature' as banked 'natural capital'. In the fourth section I draw into focus the *calculative and accounting shift* that is enabling relatively untransformed and restored nonhuman natures to become technically inscribed as numerical signifiers of capital, such that these can be added to and offset against other forms of accounted capital and in economic models more generally. I suggest that the metaphorical construction of nature as natural capital presents something of a 'double-edged sword'. On the

one hand, it may indeed encourage strategies of wise use and the saving of 'natural capital stocks', as suggested by its proponents. On the other hand, it is worth noting that actual financial banking practices are built on massive indebtedness and the proliferation of capital through splitting practices, both of which would be problematic if applied to material natures made legible as monetised 'natural capital'. In the fifth section I move on to consider some of the materialising possibilities of the conception and construction of nature as natural capital (i.e. the fourth shift noted above). I do this by working through some examples of how the increasing legibility of nature as natural capital is being translated into the literal leveraging of natural capital as a monetary asset. Here I focus on 1. proposals for leveraging 'valued natural capital' as the underlying asset for new bond structures connected with the 'natural capital' value of tropical forests, and 2. strategies for materialising the risk to investor profiles of environmental decline. The fifth section thus traces some ways in which the technical accounting for nature is facilitating a *material shift* through which 'external nature' is being calculated as if 'it' literally is, and can be leveraged as, money capital, thus becoming able to act as a financial asset that multiplies financial accumulation. I close with a concluding section that offers some theoretical and interpretive reflections on the phenomena traced here.

But first, a word on 'nature'. Raymond Williams, in his 1976 discussion of 'keywords' is credited with describing 'nature' as 'the most complex word in the English language' (p.213) (see also Castree, 2005, 2013; Descola 2013). I am coming from a position that for humans 'the natural' is always also 'the social'. We can only approach 'the natural' through social categories, socialised practices and, indeed, *myths*, and so it is perhaps more appropriate to always speak of 'socionature', or 'culturenature'. Indeed, our 'socialising' of 'the natural' has culminated in the geological epoch of the 'Anthropocene' – in which by definition 'nature' today is very much entangled with the modern industrial human. Clearly it is problematic to think in terms of there being some sort of dividing line between the social and the natural (cf. Latour 2004; Descola 2013). Having made this disclaimer, in what follows I will nonetheless use the term 'nature' to refer to *emplaced ecosystems* whose *immanent vitality*, i.e. whose ability to *self*-regenerate, appears to be relatively intact.

2. On method and interpretive framework

My starting point for this paper is a view that the metaphorical noun and category of 'natural capital' is taking hold in productively interesting ways that can be diagnosed and documented empirically. As such, the observations and reflections on which my analysis is based derive from the following:

1. A close reading of key public domain policy documents, in particular:

   i. The WBCSD's *Guide to Corporate Ecosystem Evaluation: A Framework for Improving Corporate Decision-Making* (2011);

   ii. The World Bank's WAVES *Moving Beyond GDP: How to Factor Natural Capital into Economic Decision-Making* (2012);

iii. The *System of Environmental-Economic Accounting: Central Framework* by the EC, FAO, IMF, OECD, WB (European Commission, Food and Agriculture Organisation, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations and World Bank) (2012), plus the *Revision to the System of Environmental – Economic Accounting (SEEA): SEEA Experimental Ecosystem Accounting, Consultation Draft.* By the Dept. of Economic and Social Affairs, UN Statistics Division (2013);

iv. *The Natural Capital Declaration (NCD) Roadmap: Implementing the Four Commitments of the Natural Capital Declaration* of the UNEP Finance Initiative (UNEP FI), Geneva, and Global Canopy Programme, Oxford (2013);

v. Cranford et al.'s (2011) *Unlocking Forest Bonds: A High-Level Workshop on Innovative Finance for Tropical Forests*;

vi. UNEP-FI and Global Footprint Network's *E-RISC: A New Angle on Sovereign Credit Risk* (2012);

vii. the Wentworth Group of Concerned Scientists (2008) paper entitled *Accounting for Nature: A Model for Building the National Environmental Accounts of Australia* (www.wentworthgroup.org).

These particular texts have been selected because frequently they refer to each other and, in the context of the array of policy materials advocating natural capital accounting practices (e.g. see Figure 2 below), can be seen as representative of the broader move towards accounting for nature as natural capital that is approached in this paper.

And,

2. 'Observant participation' (cf. S Sullivan, 2005) and 'event ethnography' (cf. Brosius and Campbell, 2010; MacDonald and Corson, 2012) conducted as an invited participant in, and occasional speaker at, so-called 'high-level' policy events regarding strategies for biodiversity conservation under 'green economy' policy influences.

Participation in these policy events has enabled direct observation and discussion regarding the uptake of, and struggles over, 'natural capital' thinking in these contexts. They include speaking on 'Markets for biodiversity and ecosystems: reframing nature for capitalist expansion?' at the 4th IUCN World Park's Congress in Barcelona (October 2008); presenting at a policy workshop on *Markets for Biodiversity and Ecosystem Services: Challenges and Opportunities* at Chatham House, London (November 2011); participating in a 'Dialogue Seminar' on *Biodiversity and Finance*, organised by the Secretariat of the United Nations Convention on Biological Diversity and donors in Quito, Ecuador (March 2012); and speaking on a plenary panel at the 7th Trondheim Conference on Biodiversity focusing on *Ecology and Economy for a Sustainable Society*, Norway (May 2013). In November 2013, and with the generous support of the Leverhulme Trust as part of the LCSV, I also attended as a non-corporate delegate the Inaugural World Forum on Natural Capital mentioned above.

Throughout, I have sought to be sensitive to the ontological implications of knowing 'nature' as 'natural capital' through bringing to bear ethnographic experiences with people assuming often rather different culturenature assumptions and associated value practices. This work has been with KhoeSan (Damara / ≠Nū Khoen) peoples in west Namibia (since 1992), as well as briefly with individual shamans in Mexico, Ecuador and Peru (in 2008) and in activist, animist and pagan subcultures in varied contexts in the West (since 1999) (see, for example, Sullivan, 2006a; 2006b; 2013).

In delineating and understanding the 'shifts' noted above, my interpretive framework shares kinship with a range of cognate analyses, as identified in Table 2. These include Tania Murray Li's analytics of 'practices of assemblage' (e.g. 2007a; after Foucault, 1991), and work by Ken MacDonald, Catherine Corson and colleagues on key policy events and discourses as orchestrations that align nature-as-natural-capital with market logics and socio-technical devices (see, for example, MacDonald and Corson, 2012; Corson et al., 2013; MacDonald, 2013; Suarez and Corson, 2013; also Büscher et al., 2012). As such, my framework also connects with the emerging conceptual approach to value creation proposed by the LCSV (see Bracking et al., 2014; Fredriksen et al., 2014). This approach owes much to work by economic sociologist Michel Callon and colleagues who emphasise the ways in which the application of technical calculative devices, discourses and institutional practices calculate and constitute entities and people as formally economic, and thus able to participate in and perform what becomes enrolled in the economic sphere (see, for example, Çalişkan and Callon, 2009, 2010; Callon, 2006; Callon and Muneisa, 2005; Mackenzie and Millo, 2003; MacKenzie et al., 2007). As such, the creation of natural capital accounts, bonds associated with the calculated value of 'natural capital', and devices for calculating environmental risk, as detailed below, can be understood as significant calculative devices that through their discursive and practical application perform 'nature' in diverse ways as economic. Understanding the 'performativity' of economic practice in this way is further influenced by: 1. Marxian value theory, particularly the quantification and abstraction processes that conjure equivalences through 'exchange value' and the 'labour theory of value' (cf. Marx 1974[1967]); 2. Foucault's theorising of 'governmentality' and the technical work required to produce the 'conduct of conduct' that sediments, via heterogenous 'discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions', into particular and empowered institutional apparatuses or *dispositifs* (e.g. Foucault, 1980: 194); and 3. Deleuze and Guattari's (1987[1980]) theorisation of dynamic and rhizomatically connected arrangements (*agencements*) that nonetheless may persist in time and space through the momentum and specific agency facilitated by the coming together of particular actors, organisations, framings and technical devices (also see Murray Li, 2007a: 274).

At the same time my emphasis is somewhat distinct from an analytics of particular practices of assemblage (as in Murray Li 2007a), or of the orchestration strategies observed in key policy events such as those associated with TEEB and the UN Convention on Biological Diversity (CBD)[xii] (as in MacDonald and Corson, 2012; Corson et al., 2013; MacDonald, 2013; Suarez and Corson, 2013). These analyses share an understanding of how citizens are encouraged 'to engage in debate' while the agenda is in fact limited to approved scripts (Murray Li, 2007a:

Table 2. Correspondences between the 'shifts' highlighted in this paper and cognate analyses of practices of assemblage and policy orchestrations for aligning multiple interests with conservation and 'green economy' agendas conceptualising nature as 'natural capital'

Note: The bracketed numbers in each column refer to the orderings of framings used in each of the analyses referred to here.

Key 'shifts' identified in this paper	Cognate analyses and framings		
	Li (2007) on 'practices of assemblage'	**Corson et al. (2013)**	**Callon-inspired conceptual framework and research protocol for Leverhulme Trust funded research project on value creation for which I am a Co-Investigator (see www.thestudyofvalue.org)**
(1) Discursive	(3) Authorising knowledge	(1) Logics, as cognitive and interpretive schemes that provide a system of shared assumptions	(1) Discursive framings
(2) Institutional	(1) Forging alignments	(2) Systemic dimensions, produced by alignment and articulation, as well as homogenisaton of logics within institutional field	(2) Institutional assemblages, *dispositifs* (cf. Foucault), *agencements* (cf. Deleuze and Guattari). Occurs through alignments of actors, labour and policy mechanisms through efforts of articulation and orchestration, so as to build market 'agencement' and facilitate institutional reproduction (also MacDonald and Corson, 2012)
(3) Calculative and accounting	(2) Rendering technical, which includes (5) 'anti-politics' or depoliticisation (cf. Ferguson 1994)	(3) Mechanisms, instruments and techniques, including the development of new metrics	(3) Calculative and market devices that *perform* i.e. bring into being, the entities that are thereby calculated. Thus it is important to delineate the metrics designed to work in the world, their assumptions and associated effects (also see MacDonald and Corson, 2012: 163). These devices contribute to and emphasise 'economization' (Çalişkan and Callon, 2009, 2010), such that the normative evaluative framework and/or calculative rationality (cf. Weber, 2010(1930)) becomes one based on an economic calculus that can marginalise other evaluative criteria (cf. Foster, 1992).
(4) Material	-	-	-

274). They consider in relatively less detail the roles of specific technical inscriptions and calculative devices or the actual materialisations currently or projected to arise from these. With Murray Li my consideration of the productive metaphorical transformation of 'nature' as 'natural capital' is not singular, but emphasises different directions towards which this transformation pulls, the tensions and frictions that thereby arise, and the contingent and historicised nature of current shifts – thus, 'interventions are assembled from an existing repertoire, a matter of habit, accretion, and bricolage' (2007a: 274).

My suggestion is that the 'shifts' identified above are combining to produce what Deleuze and Guattari (1988[1980]) might conceive as a 'machinic assemblage': that is, a multiplicity of dynamically stable connections between bodies, scales, discourses and affects, which in combination are generating effects in the world. Significantly, whilst entering the discursive and policy stage as rather depoliticised phenomena (cf. Ferguson, 1994) – whereby analysis is declared 'to be independent of choices, desires, [and] social tendencies' (Feyerabend, 1999: 72) – these shifts are also effecting an *ideological* intensification, through which 'nature' is being furthered entrained with, subsumed by, and created so as to work for a particular political economic system, namely capitalism (cf. Bracking, 2012). As Hawken asserts, 'capitalism cannot be fully attained or practiced [*sic*] until... we have an accurate balance sheet' that places 'natural capital' on 'on the balance sheets of companies, countries, … [and] the world' (1999: xiii). More recently, Fletcher (forthcoming) reports Peter Bakker, current president of the WBCSD, stating in a session at the latest IUCN World Conservation Congress (in Jeju, South Korea, 2012) devoted to the UN and EU programme on The Economics of Ecosystems and Biodiversity (TEEB)[xiii] that:

> I'm from business. That means—and I apologize—I'm a capitalist. But let me explain [to] you what a capitalist is. A capitalist is somebody who optimizes returns from capital. The mistake we've made in our economic model is that capitalists only optimize returns from financial capital. What we need to do, is we need two more elements of capital—natural capital and social capital—and tell the capitalists to go and optimize that… And that's going to be the way forward.

Capitalism, however, is a particular ideological paradigm associated with persistent and deepening inequality between rich and poor (see, for example, Vitali et al., 2011; OECD, 2013),[xiv] as well as with the various apocalyptic environmental change scenarios associated now with the Anthropocene. The strategic support of capitalism through the making of nature as natural capital thus seems worthy of what Castree (2003: 275) refers to as 'systematic normative theorising' so as to generate diagnostically critical and perhaps even resistant analytical engagement. It is in this engaged spirit that I intend this paper. I proceed by summarising some key moments in the entrance onto a world policy stage of 'natural capital' as a key discursive mechanism for entwining other-than-human-natures[xv] with economistic and accounting domains (i.e. shifts 1 and 2 above).

3. Equating 'natural capital' with 'finance capital' – two histories

As noted above, the term 'natural capital' was introduced in at least the 1970s, but its ascendancy into common and popular, as well as analytical usage has intensified in the last two decades. In this section I trace two parallel and connected histories that tell the tale of the proliferating use of the term. The first draws attention to the stabilising of 'natural capital' as a category embodying all of 'external nature' within the disciplines of environmental and ecological economics, and highlights some of the tensions present from the start in the uptake of the term in these disciplines. The second traces a growing tendency to conceive of nature as a 'bank of (natural) capital' as business and financial actors and organisations have become increasingly entwined with environmental policy actors and organisations and with 'eco' or 'green' agendas.

'Natural capital' in environmental and ecological economics

A conceptualising of 'nature' as 'natural capital' has been ascendant in environmental and ecological economics for the last two decades. The term tends to be attributed to the late Professor David Pearce, as, for example, in Foster and Gough's 2005 volume on *Learning, Natural Capital and Sustainable Development* (e.g. see Åkerman, 2005). Pearce was an influential environmental economist and former advisor to Prime Minister Margaret Thatcher's UK Conservative government, who wrote several defining environmental economics texts with titles such as *Blueprint for a Green Economy* (1989, with Markandya and Barbier), *Economic Values and the Natural World* (1993) and *The Economic Value of Biodiversity* (1994, with Dominic Moran). In 1988 (page 598), Pearce stated that '[s]ustainable development is categorised by economic change subject to "constancy of natural capital stock"', such that, and as Åkerman (2005: 35) describes, 'natural environments are thought of as a stock of natural assets serving economic functions'. In the then emerging discipline of *ecological* economics, this notion of 'natural capital' as a stock of value-generating assets was confirmed in statements such as, 'what natural capital and manufactured capital have in common is that they both conform to the working definition of capital as a stock (collection, aggregate) of something that produces a flow (a periodic yield) of valuable goods or services' (in The International Society for Ecological Economics text *Natural Capital and Human Economic Survival,* Prugh et al., 1999: 49). This 'stock of natural capital' is conceived as all of 'external nature': the 'nonhuman nature' constituting 'the environment' that in conventional economic models have tended to be treated as 'externalities', i.e. non-costed resources whose use frequently becomes overuse and degradation (Smith 1984; Castree 2003). More recently, in Daily et al.'s (2011: 3) introduction to the Oxford University Press volume *Natural Capital: The Theory and Practice of Mapping Ecosystem Services*, 'living natural capital' encompasses 'Earth's lands and waters and their biodiversity' and provides the 'ecosystem services' that flow from these. 'Nature' as 'natural capital' is thus framed in environmental and ecological economics as physical stocks of 'nature', both

renewable (i.e. living) and nonrenewable (i.e. 'fixed', as in stocks of mineral wealth), that produce 'natural resources' as definable 'goods' and 'services'.

Table 3. 'Natural capital' tendencies in environmental and ecological economics, after Åkerman (2005)

	Environmental economics	Ecological economics
Key original protagonists	David Pearce	Herman Daly, Robert Costanza
Key disciplinary influences	Neo-classical economics, natural resource economics	Ecosystem science, evolutionary systems theory, biophysical economics
Key calculative practices	Accounting, i.e. monetary valuation of environmental services, cost-benefit analysis, theory of externalities, intergenerational distribution of income given use of exhaustible resources, capital theory and monetary valuation	Ecosystems modelling, material and energy flows, ecological-economic joint modelling, biophysical valuation - nonetheless opened to market valuation
Versions of 'sustainability'	'weak', i.e. maintenance of aggregate stock of capital required, but commensurability and substitutability between different forms of capital are possible, thus manufactured capital can replace natural capital	'strong', i.e. natural capital cannot be substituted by other forms of capital: '[n]atural capital can never be entirely replaced by any combination of human labor, wealth, and technology' (Prugh et al., 1999, xvi)
Ecology and economics relationships	The accountant's view of nature is underlined through an emphasis on value-generating 'environmental assets'. Economic theory is shown as able to integrate 'environment' into its core	Focus is on ecosystem processes and ecological knowledge as informed by the ecosystem modeller's view of nature
Goals	Preservation of 'natural capital' to solve other goals of 'sustainable development' such as interspecies rights and intragenerational equity in income distribution	Interdisciplinary bridge between economics and ecology; need to find new solutions to environmental problems; fruitful interaction with mainstream economics through developing common conceptual and analytical tools

As argued by Åkerman (2005: 37, 39), however, 'natural capital' is a polysemic metaphor that is analytically weak whilst metaphorically strong and heuristically powerful. This enables its use to perform different work for different groups of people in diverse contexts, permitting its

disparate mobilisation so as to act in the world with varying effects. Indeed, in its inauguration in both environmental and ecological economics it already meant contrary things, and was used for varied ends and with diverse outcomes (as summarised in Table 3). Åkerman thus states that in environmental economics 'the accountant's view of nature' was underlined through an emphasis on 'natural capital' as value-generating 'environmental assets', while in ecological economics 'ecosystem processes and ecological knowledge', informed by 'the ecosystem modeller's view of nature', provided the underlying focus (2005: 36).

Popular environmental literature and media are increasingly embracing and publicising versions of the metaphor, indicating an accelerated and accepted configuration of 'nature' in these terms, as well as the growing reach of this metaphor into popular domains. Daily and Ellison, in *The New Economy of Nature: The Quest to Make Conservation Profitable*, for example, write that 'environments of interacting plants, animals, and microbes, from coastal tide pools to Loire Valley vineyards to expanses of Amazonian rain forest – can be seen as capital assets, supplying human beings with … "ecosystem services"' (2002: 5). Noticeable in this popularisation is an increasing association and even elision between 'natural capital', 'finance capital' and accounting. Former Friends of the Earth director Tony Juniper, in *What Has Nature Ever Done for Us? How Money Really Does Grow on Trees*, thus states that '[t]he ecosystems that naturally renew themselves, and which supply us with the huge range of commercially valuable services and benefits, are sometimes seen as analogous to financial capital, and are increasingly referred to as "natural capital"' (2013: 268). And in his foreword to Juniper's text, HRH The Prince of Wales refers to 'what is known in the jargon as "natural capital" … a set of economic assets which … can produce dividends that flow from these assets indefinitely' (Juniper, 2013: xi).

Increasingly it seems as though a normative conceptualisation of 'nature' as 'natural capital' is in itself becoming synonymous with notions of environmental care (Carver and Sullivan, 2014). Entrepreneur Paul Hawken, for example, writes in the foreword to Prugh et al. (1999), that '[t]he concept of natural capital, when it is intelligently linked to the concepts of human and manufactured capital, provides the critical nexus between the satisfaction of human needs and the preservation – some might even suggest the restoration – of our living systems'. Juniper writes that we have been 'consuming [natural] capital rather than living from the dividends' – treating natural capital 'rather like a planetary Ponzi scheme' wherein interest is fraudulently paid out of capital, instead of prudently saving and investing in the capital assets from which dividends ideally should derive (2013: 268, 272). In the UK's environmental policy arena, Howard et al. note that 'in the same way that society has to reinvest in human-made capital to take account of depreciation, we must also consider the level of reinvestment in our natural capital needed to sustain the output of ecosystem services' (2011: 7).

In these statements and initiatives, then, the metaphorical functioning of 'natural capital' is working to extend both an environmental economics preference for calculative practices of accounting for nature, and a growing elision between 'natural' and 'financial' spheres of capital. As discussed below, this normalising of a conception of 'nature' as a dividend-generating capital asset is coming further into focus through initiatives that seek to account for and materialise these 'dividends', as well as the projected risk of their loss through environmental

degradation. This legibility and leverage-ability of 'natural capital' has received a large boost through a parallel history of the term which conceives 'nature' more systematically as 'a bank of natural capital'. It is to this history that I now turn.

'Nature' as a 'Bank of Natural Capital'

The post-WWII era has become known for the establishment of cogent social movement critique regarding the detrimental effects on environmental parameters of extractive and industrial production and consumption practices. Linked in part with the treatment of environmental aspects as 'externalities' in conventional economic models, a number of international meetings and policy statements – from the UN Stockholm Conference on the Human Environment in 1972,[xvi] to the 1980 *World Conservation Strategy*[xvii] of the World Wide Fund for nature (WWF), International Union for the Conservation of Nature (IUCN) and Food and Agricultural Organisation (FAO) – drew attention instead to the limits to economic growth posed by environmental parameters, and thus to the need for a 'sustainable development' that more consciously and systematically combines economic agendas with environmental means.

In the years since, these proposals for limits to economic practice and production have been re-choreographed as a 'green economy' agenda that places corporate and financial leaders at the forefront of environmental policy and practice, and that reinvents sustainability as a new frontier for economic growth. This has become possible not so much by a reskilling of business leaders as ecologists and natural scientists, as by the remaking of nature as 'natural capital' (cf. Corson et al., 2013), through which environmental parameters can be known, technically approached and embedded within economics and accountancy spheres of knowledge production. This is relevant since 'the label flags an identifiable terrain of action and debate' (Murray Li, 2007a: 275), acting to conjure the vast diversity of other-than-human natures as amenable to new forms of entrainment with, and investment by, financial capital (cf. Tsing 2005; Robertson, 2006; Sullivan, 2009, 2010, 2013a; Bracking, 2012; MacDonald, 2013).

Two global moments stand out in this financial and corporate institutionalising of nature as 'natural capital'. The first is the establishment of the World Business Council for Sustainable Development (WBCSD), at the first United Nations (UN) Earth Summit in Rio de Janeiro in 1992. This network was initiated by millionaire Maurice Strong, formerly an entrepreneur in the Alberta oil patch and president of the Power Corporation of Canada, in his capacity as Secretary General for the 1992 Earth Summit (and previously for the 1972 UN Stockholm Conference on the Human Environment). As I have observed elsewhere (S Sullivan 2010, 2013a), one of the first key assertions of nature as akin to a 'bank of natural capital' can be traced to this powerful player in global environmental governance. In various speeches in the early to mid-1990s (see Carper 1992; Strong, 1994, 1996a, 1996b) he asserts that: [i]n addressing the challenge of achieving global sustainability, we must apply the basic principles of business. This means running "Earth Incorporated" with a depreciation, amortization and maintenance account. This sentiment has rapidly become almost a truism in environmental governance. It is used, for example, as a marketing hook by private sector organisations such as the US-based

Environmental Consultancy Agency[xviii] and by the global investment fund Eko Assets Management[xix] (discussed further in Sullivan, 2010, 2013a). And it is echoed by former UNEP official Don de Silva, who states that:

> much of what we regard as wealth creation has in fact represented a running down of our common capital. Like any other business, Earth Incorporated, simply cannot function for long on that basis. In fact, if we were to present its accounts on a business basis, Earth Incorporated would be, in a very real sense, like the current banking crisis, heading steeply in the process of liquidation: bankruptcy'. (2008)

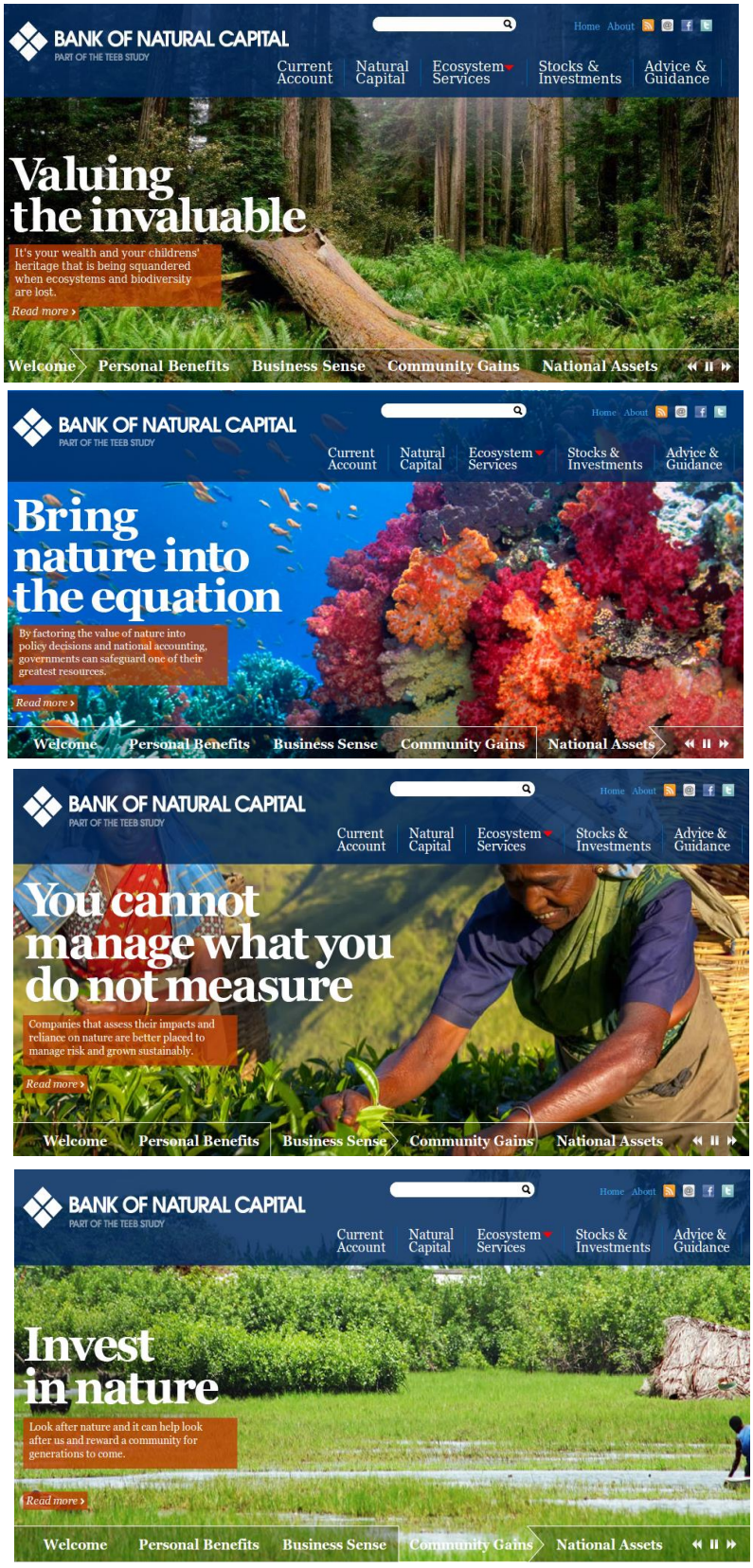
More recently, Caroline Spelman, as Environment Minister for the UK's Conservative coalition government and simultaneously co-owner of a lobbying firm for the food and biotechnology industry, launched DEFRA's 2011 Natural Environment White Paper *The Natural Choice: Securing the Value of Nature*[xx] by stating that: '… if we withdraw something from Mother Nature's Bank, we've got to put something back to ensure that the environment has a healthy balance and a secure future'.[xxi] This metaphor of nature as 'a bank of natural capital' is presented in rather literal form by the celebrated TEEB programme, whose website tagline is 'making nature's values visible'. Led by a career banker from Deutsche Bank and current consultant for GIST Advisory Ltd[xxii] – 'a specialist consulting firm which helps governments and corporations discover, measure, value, and manage their impacts on natural and human capital'[xxiii] – in 2011 TEEB launched its *Bank of Natural Capital* website.[xxiv] In this, nature's stocks and flows are depicted such that they accord with the format of a standard online current bank account, accompanied by prominent messages: 'valuing the invaluable', 'bring nature into the equation', 'you cannot manage what you do not measure' and 'invest in nature' (see Figure 1).

Twenty years on, a second key moment in the instituting of this 'nature-as-natural-capital' discourse occurred with the UN Rio+20 Earth Summit on 20-22 June 2012. At this event, and amidst an array of interventions resisting a corporate-led 'green economy' orientation, powerful networks (including the WBCSD) and institutions further declared and consolidated nature as natural capital. Here a 'Natural Capital Declaration' (NCD) was presented as a private sector finance response signed by the CEOs of financial institutions and committing the financial sector to mainstream 'natural capital' considerations into all financial products and services.[xxv] This has been promoted in significant meetings since. As Fletcher (forthcoming) writes of the 2012 IUCN World Conservation Congress, WBCSD President Peter Bakker stated that:

> there's a new language which is emerging, which is called "natural capital." For a businessperson that is much easier to understand; you have financial capital, you have social capital, and now you have natural capital. And so if you're a modern business leader, of course you manage for natural capital just as you would manage your financial capital.

In June 2013, the UNEP Finance Initiative and Global Canopy Programme published the NCD 'Roadmap' providing further details and advice regarding implementation of the commitments made in the declaration (Mulder et al., 2013). A core objective of this roadmap is to '[d]evelop practical tools and metrics to integrate natural capital into all asset classes and relevant financial products' so as to increase the visibility of 'natural capital' 'on the balance sheets of financial institutions' (Mulder et al., 2013: 4). But what sort of understanding of 'nature' does this accounting-for-nature-as-natural-capital promote? And alternatively, what

Figure 1. Screenshots from the 'Bank of Natural Capital' website created by the UN and EU research and advocacy programme on The Economics of Ecosystems and Biodiversity (TEEB)



Source: http://www.teeb4me.com/

sorts of natures (and peoples) are thereby privileged and performed? These questions underscore the enquiry in the next section.

4. Accounting for 'nature' as 'natural capital' – Or, 'accountants will save the world (sorry, civil society)'[xxvi]

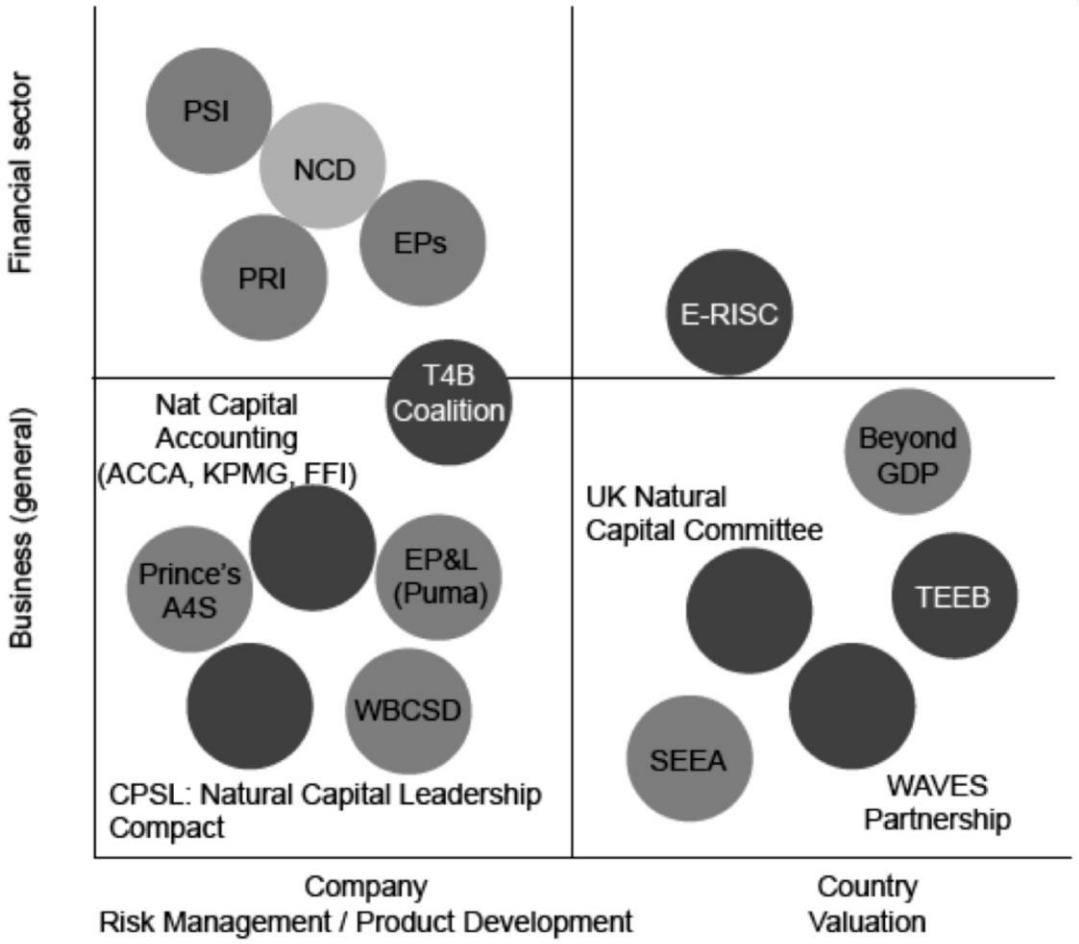
A series of endeavours to actually account for nature-as-natural-capital on corporate, national and international accounts is now underway (see Figure 2). These extend an older social accounting and 'full cost accounting' impetus to account for those social – and now environmental – costs that have been external to financial transactions (see discussion in Milne, 2007). In the run-up to the Rio+20 event, significant global interventions thus were publicised for better 'green accounting' that incorporates non-manufactured environmental elements. The WAVES (Wealth Accounting and Valuation of Ecosystem Services) initiative of the World Bank Group (WBG), for example, is a key element of its recently published 'Environment Strategy', and is a methodology for incorporating 'natural capital' and ecosystem measurements into national 'wealth accounts', in part 'to establish the true value of biodiversity' (World Bank Group, 2012a: 48, 51; WAVES, 2012). WAVES is set within the context of a substantially energised System of Environmental-Economic Accounting (SEEA), agreed in 2012 by the UN Statistical Commission as an international standard for combining economic and environmental data, including 'ecosystem services' and 'natural capital', into a single global accounting system (EC et al., 2012; UN, 2012; WAVES, 2012: 10). At a regional level, the Director of the European Environment Agency affirms '[t]he need to account for natural resources as capital, in the same way as we account for economic and financial resources' (in Weber, 2011: 6). And at a national level, the Green Accounting of Indian States Project, funded by Deutsche Bank India, Centurion Bank of Punjab and Green Indian States Trust and co-authored by TEEB's director, affirms that 'biodiversity should be treated as an asset and its loss should be adequately represented in the national accounts', at the same time as functioning as 'natural capital' that can represent 'genuine net additions to the national wealth' (Gundimeda et al., 2006: 3, vii). In 2012 the UK established a 'Natural Capital Committee' precisely 'to ensure that Government has a better informed understanding of the value of Natural Capital, and ... [to] help it to prioritise actions to support and improve the UK's natural assets'.[xxvii] Here, '[e]conomists have begun preparing to include a value for "natural capital" in Britain's GDP calculations by 2020, a move that promises to be the greatest change in national accounting practices since their creation 70 years ago' (Whipple, 2012). With reference to the corporate world, the WBCSD (2011) urges 'Corporate Ecosystem Evaluation', whilst natural capital accounting is also being mobilised to demonstrate the extent to which economic activities create immense costs in the form of running down the value of 'natural capital' (e.g. Trucost Plc and TEEB for Business, 2013).

Space does not permit an exhaustive survey of how exactly nature-as-natural-capital is calculated so as to become legible in these accounts (a topic ripe for in-depth research), but a couple of examples provide a flavour of the technical and calculative practices being promoted

to account for 'living natural capital'. The UN's invigorated System of Environmental-Economic Accounting (SEEA), thus intends to include 'the perspective of ecosystems' in its accounting of national environmental assets, via Experimental Ecosystem Accounts (SEEA EEAs) that will 'describe the measurement of the flow of benefits to humanity provided by

Figure 2. A graphical representation of the range of current initiatives that account for nature as natural capital

Note: dark grey signals initiatives or organisations with a specific focus on 'natural capital', lighter grey indicates those that include 'natural capital' accounting but have an emphasis on broader social and environmental issues). National/government valuation initiatives are in the bottom right of the graph, whilst business and financial sector initiatives for calculating natural capital risks and opportunities are towards the left of the graph.



Source: Mulder et al., 2013: 38.

ecosystems, and measurement of environmental conditions in terms of the capacity of ecosystems to provide benefits' (EC et al., 2012: 3). Published in the wake of the European Environment Agency's report on *An Experimental Framework for Ecosystem Capital Accounting in Europe* (Weber, 2011), it is intended that '[t]he SEEA Experimental Ecosystem Accounts [EEAs] will describe both the measurement of ecosystems in physical terms, and the valuation of ecosystems in so far as it is consistent with market valuation principles' (EC et al., 2012: 3).

The draft consultation document for designing the SEEA EEAs affirms this as a new area of accounting and delineates proposed methodological practices for integrating ecosystem measures into national accounts more generally. To provide examples of emphasis, the document speaks of: using ecosystem accounting to assess trade-offs between different ecosystem uses; of using measurements of spatially defined ecosystems to generate insights into how ecosystems can be conceptualised as 'natural capital' and considered in relation to measures of other forms of capital; and of the need to define ecosystem measures from a statistical perspective and in ways amenable to the monetary valuation of currently unpriced ecosystem services (SEEA, 2013).

As befits the devising of an immensely complex, multi-authored and international methodology for bringing environmental phenomena into a globally relevant national accounting methodology, the SEEA and associated documents are weighty, technically rich, extensive and authoritative. To provide an alternatively flavoured example, a model for the National Environmental Accounts of Australia is presented and popularised rather differently, but is basically seeking to pursue a similar calculating of nature in terms amenable to the integration of numerical and monetarily valued units of nature in national natural capital accounts. To quote at length, the Wentworth Group of Concerned Scientists proposed procedure for assigning numerical values to nature observations so as to create 'a common currency to measure our landscape' reads as follows:

> Indicators for each environmental asset class are selected on the basis of their cost effectiveness in measuring the health of that environmental asset. Benchmarks are based on the best available science. They represent the standard for describing each environmental asset in a 'healthy' condition.Once benchmarks have been established for all indicators, standard accounting practices can then be used to convert each indicator into a common metric (a scale of 0 to 1). This creates a common currency to allow an unweighted comparison:
> - between environmental assets in each region;
> - between the same environmental asset in different regions; and
> - changes within and between each asset over time.
>
> An environmental asset in each region would receive an:
> - A, where the data measures an indicator at or above the benchmark
> - B rating, for data at or above 84% of the benchmark;
> - C rating, for data between 67% and 83% of the benchmark;
> - D rating, for data between 50% and 66% of the benchmark; and an
> - F rating, for an indicator less than 50% of benchmark.
>
> In the same way economic ratings agencies use + and – to create finer categories, so too can the environmental monitoring scheme create sub-classes of A+, B-, C+, etc.
> A positive change in condition, for example from a C+ to a B - would score a B - with a ... ☺ if it's getting better! If the condition changes in the negative, for example, from a C+ to a C, it would score a C with ... a ☹. No change, no smile: 😐
> (2008: 8)

The WBCSD's (2011) *Guide to Corporate Ecosystem Valuation* or CEV, is a glossy brochure produced with the assistance of PricewaterhouseCoopers,[xxviii] Environmental Resources Management (ERM)[xxix] and IUCN to introduce a detailed accounting methodology to facilitate 'better-informed *business decisions* by explicitly *valuing* both *ecosystem degradation* and the *benefits*

provided by *ecosystem services*', defined as flowing 'from natural capital' (page 4, emphasis in original). Influenced by TEEB, and 'Road tested' by 14 firms including Rio Tinto, Syngenta and Eskom, CEV is described as offering 'a "value-based" lens through which associated environmental, social, economic and financial issues can be quantified, and the complex trade-offs between them compared' (WBCSD, 2011: 4). This is usually achieved by 'converting ecosystem dependencies and impacts into a single (and influential) metric – money' (WBCSD, 2011: 12). CEV comprises a five-staged methodology split into: 1. 'scoping', for identification of specific business goals and 'the preparation of terms of reference for ecosystem valuation'; 2. 'planning', for 'the implementation of ecosystem valuation' and 'determining the internal and external resources required'; 3. 'valuation', involving nine identified steps, including the monetization of changes to 'ecosystem services'; 4. 'application' of ecosystem valuation results so as to 'influence internal and external change'; and 5. 'embedding', of 'the CEV approach' in 'existing companies and procedures' (WBCSD, 2011: 6, 47).

As I have described elsewhere (Sullivan 2012: 8-9; also Castree, 2003; Robertson, 2006), the accounting procedures illustrated in these three examples, are acting via two key layers of abstraction. First, they conceptually cut up 'nature' – in all its diversity, relationality, interconnectedness and nonlinear complexity – into individualised units that can be represented and scored numerically. These numbers or 'metrics' are then vested with the power to act as surrogate or proxy measures that represent the productive 'nature' aspect under consideration. They require the mapping and reduction of complex ecological and non-linear parameters into socially-determined numerical scores considered to adequately capture (i.e. to represent and 'value') particular dimensions of nature. As such, calculative expertise is privileged as the most appropriate way of knowing and managing nature, even though this technical knowledge relates predominantly to the layers of numbers that come to represent those selected nature aspects that can be thus symbolised. Numerical representation acts further to create the appearance of equivalence and commensurability between different aspects of nature, between different locations and times, and between different categories of capital (thus permitting the corresponding emergence of 'offsetting' mechanisms between sites of environmental harm and sites of environmental health and conservation, cf. Robertson 2006; Pawliczek and Sullivan 2011; Sullivan 2013b).

Once symbolised as numbers, it becomes conceptually relatively easy for these to be further denoted as monetised entities, and thus to become conceived and treated as capital and tradable assets. This is the second layer of abstraction. It makes possible the enfolding of diverse, self-regenerating natures into the particular value sphere of money. Monetised values for 'natural capital' and 'ecosystem services' tend to arise through methods such as contingent valuation, involving estimates of 'willingness to pay' for specified aspects of nature, or 'benefit transfer', whereby valuation is projected from unit values (dollar estimates of economic value on a per-unit basis) derived from particular use and non-use values measured at specific different sites (for overviews of such techniques, see Pearce et al., 1989; Pearce and Turner, 1990; Pearce, 1998; WBCSD, 2011). These accounting and valuation techniques generate numbers for nature units that are in monetary terms, and thus can be used in cost-benefit analyses and cognate economic and accounting models. The use of metrics for turning aspects of nonhuman nature

into numerical scores thus facilitates 'economization' and 'marketization', as expansionary and productive applications of economic valuation methodologies (Çalişkan and Callon 2009, 2010). As Åkerman describes:

> when nature was named as capital, it not only meant the representation of nature as a monetary asset. It furthermore defined humans, the subjects and objects of environmental policy as rational, calculative economic actors – consumers and investors. (2005: 41)

As noted by economists, however, accounting and valuation methodologies may also produce monetary values that are *ad hoc*, unreliable and even deceptive (see discussion in Robertson, 2006; Spash, 2008; Plummer, 2009; Fourcade, 2011). As Castree states, 'monetary values placed on things like ecosystem services are completely arbitrary and unable to deal with their "real" ecological value' (2003: 285). This is in part because a foundational category error is being made by treating immanent, material and living natures as if ontologically they are the same as the simple numbers used to (ac)count in money. Nonetheless, by virtue of the enactment of these abstractions that become 'a process of "definition" or social construction in a substantive sense' (Fourcade, 2011:e 1769), 'living nature' is indeed made and performed as a 'bank of natural capital'. The extent to which this abstraction appropriately reflects the immanent and vital materialities constituting 'real nature' in specific places is another question entirely.

A Double-edged sword?

Arguably, then, the metaphor of nature as a 'bank of natural capital' perhaps is something of a double-edged sword. A benign reading is that it will amplify nature care through encouraging practices that ensure that 'nature', conceived as accounted for and banked 'natural capital', is kept in the black rather than the red in the 'bank of natural capital'. As detailed above, this is what protagonists speak of in using the metaphor. Many environmental and ecological economists thus assert that 'properly valuing natural capital resources and services' and accounting for 'the indispensable contribution natural capital makes to economic production' so as to 'get the prices right', will help generate 'true economic efficiency' and thus amplify 'the first and most important step toward sustainability' (Prugh et al., 1999: vii). As noted above, others go further with this bank of natural capital metaphor to state that 'natural capital, like financial capital, can yield dividends' (Juniper, 2013: 268), thus invoking 'a comparison between conservation of nature and investment savings' (Åkerman, 2005: 38). Fund managers Earth Capital Partners draw on exactly this notion of dividends in their Earth Dividend™ system, a scoring procedure across five categories of Environment, Social and Governance issues that provides an annual calculative assessment of the sustainable development impact of the fund's operating assets.[xxx] And as the examples summarised above illustrate, a massive push is now underway to calculate and account for nature as akin to the assets of a business, or as a bank of natural capital.

It may indeed be that 'valuing natural capital' in this way will effect societal change so as to serve the maintenance of nature as 'natural capital'. Patrick Bond (2013), for example, maintains that this logic might halt resource extraction so as to preserve the long-term wealth of a nation, by demonstrating that as a country's nonrenewable 'natural capital' resources are

extracted, its calculated natural capital wealth is diminished. Nonetheless, and particularly for so-called developing economies, it is difficult to persuade that this is an economically viable alternative to exploiting the shorter-term value of such natural resources now, under the justificatory discourse of being able to reap and reinvest the income to provide for future needs. In a move with which I am in broad sympathy, Bond and Sharife (2013) also argue that natural capital accounting and associated calculations might be mobilised in the course of reckoning ecological debt reparations, whereby retributive payments for 'ecological debt' are based on both 'loss and damage' accounting and environmental justice, and made through fines for damages and prohibitions on further pollution.

At the same time, there seems to be something strange in the increasingly popular equation of natural with financial capital. This is that in finance it is in fact *debt* that tends to constitute banked capital assets, and that also creates the possibility for businesses to innovate and expand through investment. It is debt that generates seemingly endless 'value' through its securitisation and financialisation, and for which careless behaviour and cynical manipulation have recently been rewarded by massive bailouts from public sources. In other words, the metaphor of nature as 'a bank of natural capital' might be rather *in*appropriate if it is the better relationship with, and wise use and 'saving' of, embodied 'nature health' that is to be promoted by this thinking. Banks are sustained by and associated with a variety of practices that split actual stored capital so as to create more financial value and thus greater liquidity or flow of money in the system over all. These practices include: fractional reserve lending, in which the total value commanded by a bank is a vast multiplication of the value it actually houses; the splitting of debt into complex tradable packages that turn it into assets on the portfolios of 'securities' managers; and the management of unimaginably large virtual funds of money through betting on ultimately unpredictable market probabilities (see, for example, descriptions in Ferguson, 2009; McNally 2011; Graeber 2011; G Sullivan 2011). These are greatly problematic models for conceptualising and managing the fleshly, relational and unpredictably varying entities, populations and phenomena that constitute 'real nature' as opposed to 'natural capital'. The discursive transformation and actual materialisation of nature as natural capital, and the promotion of this for addressing both ecological and economic crisis, thus invite a closer look.

5. Leveraging natural capital

The application of the economic and financial category of 'capital' to the immanent domains of other-than-human-natures and of life itself is an interesting mirror of what Weston (2013: 525) describes as an ascendant 'application of biological metaphors to economics'. At the same time, denoting 'the irreducible *materialities of natures*' (Castree, 2003: 275, emphasis in original; also Bennett, 2010; Coole and Frost, 2010) as 'natural capital', through applying economic metaphors to biological and ecological realms, also is doing rather different work in the world. This is because 'external natures' increasingly are being literally conceived and put to work as money capital. As such, accounting for nature in terms of money is creating innovative and unintuitive possibilities for materialising and leveraging non-manufactured nature as 'natural capital'.

This is the other edge of the sword. By this I mean that it is unclear how exactly the increasing leverage-ability of 'nature' as 'natural capital' in financial products and flows will constitute benefits for a broad spectrum of people, or for the natures leveraged in these terms. At the same time, increasing the possibilities for leveraging nature in these terms perhaps provides an indication of why accounting for nature as 'natural capital' is becoming so popular in the sectors of society that have tended to treat nature health and harm as externalities that have little to do with profits or pay-outs. Below I discuss two new layers of this new 'leverage-abilty': 1. the creation of bonds linked with monetised measures of other-than-human-natures, and frequently of forested nature, as natural capital; and 2. proposals for the monetisation of 'environmental risk' posed to investors by environmental decline.

'You know what I mean by a bond? Something that binds?'[xxxi]

In the environmental policy arena, the Climate Bonds Initiative states that '[t]he bond market is the great innovation that distinguishes western capitalism from previous economic systems'.[xxxii] A bond is a promise by its issuer to repay its holder the agreed amount at a fixed future time (the maturity date), and with an agreed rate of interest. From the letters of credit issued in Europe by the Knights Templar in the 12th century, a bond denotes a loan of funds whose repayment is secured by its attachment to something held by the debtor (the *issuer*), and valued by the holder of the bond (the *investor*). In Shakespeare's *Merchant of Venice*, Shylock secures his bond on a pound of Antonio's flesh. More usually, bonds are attached to something that is more easily legible in monetary terms. So, a mortgage is secured by a property, a banknote is secured by the currency reserve held by the Central Bank, and a government or sovereign bond is secured by the sovereign national reserve at a government's disposal. For the bond holder, and although based on someone else's indebtedness, bonds can also become assets which can themselves serve as collateral to be borrowed against.[xxxiii]

Bonds secured on monetised signifiers of environmental health now are flourishing. Climate Bonds and Green Bonds thus 'frontload' future funds by encouraging government borrowing from investors with the debt secured on the future economic and environmental (especially climate) benefits predicted to flow from these investments (Climate Bonds Initiative, 2009: 2, 4; Kerste et al., 2010). The World Bank Treasury currently issues a variety of bonds secured on climate-related goals, including 'Cool Bonds'[xxxiv], 'Eco Bonds'[xxxv] and 'Green Bonds'[xxxvi]. In the UK 'environmental bonds' – 'including green investment bank bonds, green infrastructure bonds, and woodland creation bonds', issued by either the government or the private sector – are being encouraged as a means of linking investment to pledges of environmental improvement by issuers (Ecosystemmarkets Task Force, 2013). These bonds target an emerging class of investors in sustainability, interested in investing in companies whose 'sustainability performance' may be linked to financial ratings indices that include environmental proxies.[xxxvii] They permit investor finance and venture capital to be connected now with infrastructural developments considered to enhance future environmental sustainability, or at least which will be built with a less environmentally harmful effect than is 'normal' for the sector, and to generate financial returns from this.

A recent report on *Opportunities for UK Business that Value and/or Protect Nature's Services* also promotes environmental bonds as 'vehicles for [direct] investments in nature' for '[c]orporate industries wishing to purchase bonds as a means of offsetting their residual environmental impacts through the supply chain' (Duke et al., 2012: 32). The report states that '[a] number of asset classes such as biodiversity, water, carbon, which are co-located on the same area of land, could be "stacked" and an environmental bond created, providing a stable investment return [although it is not clear exactly what will generate this rate of return]', and that '[f]inancing by government could leverage scaled-up investment which would help fund green growth and jobs' (Duke et al., 2012: viii, also 57-58). These 'asset classes' of 'nature' are understood here 'as components of ecosystem markets' that 'provide the natural capital on which society depends' (Duke et al., 2012: 32). In this context, then, 'conservation bonds' (as termed in the report) would be underpinned by government, such as through the UK's Green Investment Bank[xxxviii] established to accelerate 'transition to a green economy', in part through capitalising natural capital in terms of 'green asset classes' that can generate rates of return on investments (Duke et al., 2012: 22).

This innovation of western capitalism is also being brought to bear so as to leverage landscapes of conserved and/or restored nature in the global south as the underlying collateral for capital-releasing loans. This would be through bonding these loans with the calculated monetary value and projected income-generating capacity of the 'natural capital' supported by these landscapes. A 'high-level workshop' thus was held in 2011 to consider the development of 'Forest Bonds' to finance 'ecological infrastructure such as tropical forests', hosted by WWF,[xxxix] the Global Canopy Programme[xl] and the Climate Bonds Initiative. Their financial partners were global investment banking and securities firm Goldman Sachs[xli] and the Swiss private bankers Lombard Odier[xlii]. The workshop report proposes that public-sector funds and incentives such as tax breaks be used 'to support private-sector investment in forests' in return for government issued bonds based in part on the monetary value adhering in the 'natural capital' of tropical forests (Cranford et al., 2011: 5; also see Cranford, Parker and Trivedi, 2011; Duke et al., 2012: 56 on 'sub-national rainforest bonds'), and against state income from 'sustainable forest management' (as suggested by Forum for the Future and EnviroMarket Ltd, 2007: 4). It is advised that 'the investment proposition needs to be large and liquid to attract the largest investors', and that multilateral donors might 'play an additional catalytic role by issuing a forest bond themselves and helping to pump-prime the forest bond market' (Cranford et al., 2011: 5).

Through this 'EcoSecuritisation' (Forum for the Future and EnviroMarket Ltd, 2007), forests and other landscapes of valued 'natural capital' in effect would be 'materialised' as capital so as to leverage additional finance from global capital markets. This is intended to create an attractive new investment frontier that frontloads the funds needed for 'forest development'. The financial capital that would be realised from this 'natural capital' is projected to confer financial resources for a developing country's economic transition to forest-friendly eco-entrepreneurial activity, rather than destructive land uses such as oil palm, soya and cattle-ranching. Issuers of a 'forest bond' such as the governments of forest-rich countries of the global south would thereby raise 'large-scale finance now that will be repaid by existing and anticipated future income' from the forests thus invested.

But where exactly will the income come from for repaying the bond once it comes to maturity? It is suggested that it will derive from sources such as forest carbon revenue, ecosystem service markets, sustainable timber and agriculture and taxes (Cranford et al., 2011). Thus, 'EcoSecuritisation merges existing securitisation techniques with rapidly emerging environmental markets, in order to attract low cost, long term 'patient capital' to projects that have potential to generate significant Payments for Ecosystem Services (PES), such as tropical forestry' (Forum for the Future and EnviroMarket Ltd, 2007: 9; also Duke et al., 2012: 33). It is thus worth considering forest carbon revenue and PES as sources of debt repayment in a little more detail.

Forest carbon revenue is a reference to the 'future streams of payments for expected emissions reductions'[xliii] (World Bank Group, 2012b: 1) provided by the carbon contained in standing forests that are projected to be 'unlocked' under REDD+ (i.e., the UN programme for Reducing Emissions from Deforestation and Forest Degradation in Developing Countries[xliv]). The REDD+ programme encourages forests of the global south deemed to be under sustainable forest management and involving the conservation and enhancement of carbon stocks, to become tradable in global emissions offsets markets to the extent that their carbon can be calculated, accounted for and conserved, as well as monetised and monitored. It is based on a widely held assumption that '[t]here exists a fundamental gap between the value high-income nations place on pristine tracts of land in low-income nations, and the value that the owners of that land place on it, driven in part by the necessities of economic activity' (Advanced Conservation Strategies, 2011). As its name suggests, REDD+ is intended to reduce emissions of carbon to the atmosphere caused by reductions in forest cover. At the same time, concern regarding carbon loss from southern tropical forests occurs in a context of unequal distribution in industrial fossil fuel emissions. As such, REDD+ is akin to a giant global offsetting scheme whereby industrial emissions are maintained in part by ensuring enhancement of forests as stored carbon in the south.

Making southern forests ready for REDD+ involves significant monitoring and conservation work by local communities and the giving up of alternative production practices, not to mention the centralised administration and surveillance required to permit registration of the new carbon value of forests. Nonetheless, if all this 'value' can become legible as 'natural capital', as recommended by the World Bank Group, it might indeed then 'serve as collateral to loans to finance the upfront investments in [REDD+] programs', in effect creating 'REDD+ bonds' (World Bank Group, 2012b: 1-2; UNFCCC Ad Hoc Working Group on Long-term Cooperative Action, 2012). As such, investment in forest bonds might act to fund the creation of REDD+ programmes, such that the future carbon revenues from these programmes ultimately are directed to service the loans offered for their creation. The Althelia Climate Fund, an asset management platform run by Althelia Ecosphere, invested in by the European Investment Bank, and advised by Ecosphere Capital LLP and the environmental NGO Conservation International, has been established to do precisely this. With initial investments totalling US $80 million in June 2013, the fund comprises 'a diversified portfolio of investments in Africa, Latin America and Asia that take the form of real assets (certified commodities and agricultural produce) and environmental services (verified emissions

reductions and other ecosystem services [including carbon accounted for under REDD+])' that will deliver 'cash dividends to investors' (Althelia, 2013: 1). A recent press statement from the asset management company Althelia Ecosphere, whose website tagline is 'Aligning Economy With Ecology', thus describes '[e]cosystem goods and services from Natural Capital' as 'worth trillions of US dollars per year' (2013: 3). At the same time, it is hard not to see such initiatives as intensifying processes whereby standing 'natural capital' in southern countries becomes bound to outside investors in ways that influence sovereignty over those resources, as well as increasing the indebtedness of invested countries.

The reference to ecosystem service markets implies a similar mobilising of capital from other aspects of conserved nature in southern countries, through the receipt of payments for the maintenance of these increasingly valued and monetised 'services'. Thus, World Bank loan funding is being directed to support countries such as the Republic of Congo to become providers of monetised and marketable 'environmental services to the emerging global markets' (World Bank, 2011: 3). As well as through forest carbon credits under a REDD+ mechanism (as described above), this would include the monetised value of conservation products such as biodiversity offsets.[xlv] Demand for purchase of these conservation products comes in part from ecological pressure exerted by extractive industry and plantation forestry, which in the Congo case are also supported by the World Bank (World Bank, 2011: 13).[xlvi] Somewhat tautologically then, the logic of these funding models is to create new sources of repayments to investors through funding strategies that necessitate the creation of these very sources of repayments. This is in two ways: 1. by enhancing the scarcity of healthy ecosystems through funding development and extractive activity, in such a way as to stimulate a mirroring need for ecosystem service and offsetting markets (cf. Sullivan 2012: 24-25; 2013b); and 2. by funding the natural capital accounting frames and techniques creating the monetary values for new nature categories such as 'ecosystem services' and REDD+ credits that themselves might be mobilised as both the security and as sources of repayment for these loans.

World Bank economists have also considered the design of bond structures attractive to private investors in association with funding the conservation of specific charismatic species. 'Tiger Bonds' have been proposed, for example, to frontload future funds for subsequent repayment through the capitalisation of nature assets associated with tiger territories (Keiss, 2009).[xlvii] These assets might include future forest carbon revenues from the REDD+ mechanism as it plays out in such territories (as above), or created through '[e]stablishing biodiversity as collateral for lending' (Keiss, 2009: 24). In the private sector, the US consultancy firm Advanced Conservation Strategies proposes the creation of 'environmental performance bonds' as insurance-based contracts based on 'the health of an endangered species' relative to the activities of a company or economic sector.[xlviii] They suggest that such a contract would provide immediately available funds for 'endangered species mitigation' if a company 'does not perform environmentally'; that it would simplify environmental compliance by companies; and, through fixed payments to reward environmental performance, would provide financial incentives to companies for environmental stewardship. This proposal attempts to enhance corporate responsibility for negative environmental changes by transforming measures and indicators of these changes into numerical scores that can be incorporated into financial

performance models. It is an approach that seems to turn the risk of species loss and decline into insurable events that can be planned for, but that perhaps pays little heed to the embeddedness of organisms, populations and species within ecosystemic relationships, or to unpredictably dynamic contexts of environmental change.

These proposals for binding nature as natural capital with financial domains, constitute some new ways in which conserved nature is conversely becoming 'unbound' (Brockington et al., 2008) from localities and other(ed) culturenature value practices, through its calculation as natural capital and the ensuing possibilities for its release as leveraged and circulating financial assets. The associated mantra is that all 'stakeholders', including forest-dwelling peoples of the tropics, should benefit appropriately. At the same time, proposals for bonds based on 'natural capital' generate concerns regarding the possible transfer of monetised nature values to private investment capital portfolios. In particular, clarification is needed regarding what happens to the natural capital collateral in cases of default. Proposals such as forest and REDD+ bonds, for example, are based on an underlying assumption of a secure future income stream arising from payments for the carbon stored in forests of the global south. Nevertheless, a broader context of crisis in carbon markets such as the European Union's Emissions Trading Scheme (EU ETS) and the recent dramatic fall in the price of tradable carbon (see, for example, Carrington, 2013), suggest that this assumption may be untenable, generating questions regarding possible enclosure of leveraged 'natural capital' by lenders in such circumstances. It is not alarmist to suggest such possibilities. We have only to remember the way that the recent subprime mortgage crisis, wherein lenders fell over themselves to advance loans onto books without adequate assurance of repayment strategies, facilitated the massive foreclosure of the capital 'securing' such loans when repayments were not forthcoming. The documents cited here for Forest Bonds, for example, are opaque on this point, asserting, that '[i]f for any reason … earmarked cash flows did not arise, the issuer would draw on other [unspecified] financial resources to meet its obligations' (Cranford et al., 2011: 14). This invokes the possibility of a further transfer of government, i.e. public, resources to lenders. Indeed, given current tendencies for governments to subsidise a floor-price for carbon so as to maintain carbon markets (see, for example, HM Revenue and Customs, 2012), as well as to bail out lenders in instances of bad debt, such proposals might give rise in time to more ways in which public resources are directed to sustain private investment portfolios.

Materialising environmental risk

The above illustrates some possible ways in which accounted for 'nature' might be leveraged financially as 'natural capital'. An additional thread in current financial 'materialisation' of environmental factors is a growing concern with the ways in which environmental risk might pose danger and opportunity for financial investments, whilst at the same time emphasising ways in which 'such risks can be transformed into opportunities, and ideally, profit' (Dempsey, 2013: 41). The Biodiversity for Banks (B4B) programme initiated by the Equator Principles Association, WWF and BBOP, for example, assists financial institutions to overcome the challenges of incorporating risks associated with biodiversity and ecosystem services into their

lending decisions.[xlix] ESG (Environment, Social and Governance) performance of financial investments increasingly is materialised through scoring and indexing methodologies for ESG indicators, accompanied by a desire to reduce risk to investors caused by negative performance in ESG indicators for associated investment contexts. The Natural Capital Declaration Roadmap also emphasises the financial 'materiality' of 'emerging natural capital risks in bond and equity markets, as well as in insurance and lending' (Mulder et al., 2013: 5).

In connection with the natural capital accounting technologies and projects outlined above, an emergent nexus of devices designed to calculate environmental risk and opportunities for firms is also taking hold. Jessica Dempsey discusses and critiques two such devices – the Integrated Biodiversity Assessment Tool (IBAT) and the Corporate Ecosystem Service Review (CESR) (prelude to the Corporate Ecosystem Valuation methodology discussed above) – designed specifically to calculate biodiversity risk for firms, noting their significance in providing 'the finely tuned, individuated information that firms need to internalize the risks they face from biodiversity loss' (2013: 47). An additional example of how these linkages are being systematised for national and international environmental parameters has been published recently as *E-RISC: Environmental Risk Integration in Sovereign Credit Analysis*, by the UN Environment Programme's Finance Initiative (UNEP-FI), the Global Footprint Network and collaborating financial institutions (UNEP-FI and Global Footprint Network, 2012; also see UNEP-FI et al., 2011). This seeks to clarify the material risk of environmental parameters to current investment portfolios that incorporate government bonds, in a context in which outstanding sovereign debt in 2010 was in the order of US $ 41 trillion (UNEP-FI and Global Footprint Network, 2012: 3). Risk here is the danger to investment portfolios posed by commodity price volatility, climate change, and reductions in a country's natural resource productivity or 'biocapacity' due to environmental degradation. All of these may adversely affect a country's investibility by enhancing risk to investors.

While protecting the interests of financiers, however, this approach does little to recognise the ecological debt linked currently and historically to financial investment practices. These include: 1. speculative financial practices elsewhere in the financial system that are driving up commodity prices, encouraging land-grabs in the global south for the production of primary commodities, and thus enhancing both inequity and environmental transformation (cf. Berne Declaration, 2011); 2. investments in algorithmic and hardware technologies that permit ever-faster trading practices, thereby cranking up the energy within the financial system and increasing the likelihood of bubbles and crashes (cf. Mandelbrot and Hudson 2008); and 3. the historical infrastructure and large-scale investments that have created 'peripheral' economies as intrinsically more vulnerable to current price fluctuations and environmental change dynamics, and thus more risky in terms of sovereign bond investment (UNEP-FI and Global Footprint Network, 2012).[l] The accounting technology and institutional apparatus for materialising the environmental risk associated with investment in sovereign bonds, thus might be seen again as affording protection to financiers at the possible/probable expense of indebted countries. It is an assemblage of discourses, institutions and technologies that cushions financiers from both the negative ecological transformations associated with their own historical lending practices, as

well as from the possibility of declining sovereign credit ratings that may be associated with these same lending practices into the future.

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The above examples trace some ways in which conserved, restored and non-manufactured other-than-human-natures are being productively conceived, normalised and instrumentalised as 'natural capital'. From a more-or-less pertinent and useful metaphor (depending on perspectives) operating in the domain of the virtual and to which the 'real' of nature increasingly is made to conform (cf. Corson and Macdonald, 2012: 159), 'natural capital' seems to be becoming a fetishised factual category – or 'factish' as Bruno Latour (2010) might put it. As such, 'natural capital' is being constituted as having a perceived objective ontological status (cf. Corson et al., 2013): a 'solidity that seem[s] to make it independent of the accidents of belief and history' (Feyerabend, 1999: 67). It is becoming a naturalised yet constructed fact that is folding the behaviours and desires of diverse peoples around its sustenance and productivity. Although a metaphorical device, 'natural capital' thus is beginning to act in the world as what Actor Network Theorists term a 'black box': a 'naturalising' designation 'contain[ing] that which no longer needs to be reconsidered, those things whose contents have become a matter of indifference' (Callon and Latour, 1981: 285). Following philosopher Mary Midgley (2004), I suggest further that the fable of 'natural capital' is taking on myth-making characteristics. It is creating patterned orders of thought and truth in the world, the socially fabricated dimensions of which become occluded, and the sustenance of which elements of society increasingly bend their activities, intentions and desires towards.

The key world-making aspect of this myth is a systemic binding of nature with economic concepts and structures, in part through a conceptual unbinding of natures' constituents from ecological contexts and from different social-ecological relationships and conceptions of value. The process appears to be raising economic rents for land areas through the new prices that are attaching to the 'ecosystem services' provided by accounted for standing stocks of nature as 'natural capital'. Some commentators assert that this may enhance an impetus towards 'green grabbing' (cf. Fairhead et al., 2012), whereby new sources of conservation or 'green' value are appropriated, privatised, traded and speculated on so as to extend an historical trajectory whereby land, and today the newly 'valued' natural capital entities associated with land areas, becomes more valuable than the people on it (cf. Federici, 2004; Fairlie, 2009). Indeed, in many contexts where REDD+ and payments for ecosystem services are being stimulated, local people are working hard to both ensure that forest value remains embedded within communities, and to resist the cooptation of local nature values that outside investments can represent (Indigenous Environmental Network, 2013).[li] At the same time, the making and materialising of natural capital is working beyond the assigning of a commodity status to nature entities such that these can be traded (cf. Castree, 2003), so as to *financialise* other-than-human-natures through their discursive, technical, institutional and material inscription as money (cf. Sullivan 2012; 2013a). Whilst conjuring new silos of monetary value, current structuring of the global economy indicates that capture of new natural capital values may enhance existing inequities, with little assurance that financial rewards gained in this way generate behaviour that

is environmentally beneficial and are not redirected towards environmentally problematic investments elsewhere (cf. Munden 2011; Vitali et al., 2011).

To further interpret these overlapping shifts and their world-making characteristics and both power- and ethical-effects, I turn to selected works by philosophers Mary Midgley, Michel Foucault and Paul Feyerabend. In *The Myths We Live By*, Midgley highlights the mythical aspects of core 'truths' underpinning scientific and technical discourse and method, thereby illuminating the empowered patterning of thought associated with the truth-making qualities of such myths. In Foucault's *Abnormal* lecture series of 1974/75 the increasing entrainment of technical scientific discourses to guide legal pronouncements is shown to be underpinned by a radically simplifying series of terms and categories that nonetheless open the vast vista of human subjectivity to the empowered figure of the 'expert'. And in Feyerabend's *Conquest of Abundance* contemporary economistic positivism is analysed as the extension of an older tendency towards universalising abstractions that contain the diversities of the particular and the embodied. I mobilise these propositions to consider the consolidating metaphor of 'nature' as 'natural capital' as a potent new simplifying and universalising culturenature myth that is working to further open the multiplicitous diversity of emplaced and embodied socionatures as a vast vista for the universalising, abstracting and instrumentalising expertise of a powerful assemblage of specific actors and institutions. This is relevant because it remains rather unclear how the abstracting and calculative moves turning 'nature' into 'natural capital' will affect the sustenance of 'nature' and/or for whom.

6. Conclusion - accumulating, accommodating and resisting the natural capital myth?

To follow philosopher Mary Midgley (2004) in *The Myths We Live By*, and as illustrated in the examples worked through in this paper, the new economising 'myth' of nonhuman nature as 'natural capital' is rapidly becoming a hegemonic nexus of powerful symbols and signifiers for interpreting, knowing and directing the world in which we live. The metaphorical concept of natural capital is being discursively and technically constructed using the expert languages of economics and science in such a way that engenders authority and the appearance of universal truth, despite the basis of these assertions in particularity, conjecture, metaphor and fantasy. Exercising the language of natural capital in combination with the socionature structurings with which this is associated, appears to be engendering a self-sustaining and rule-bound influence in thinking the world (cf. Lévi-Strauss, 1962). Its particular effects include a conceptual amplification of nature's distance, docility and distinctiveness from humans who remain 'observers, set above the rest of the physical world in order [seemingly] to understand and control it' (Midgley, 2004: 175); whilst also acting to support the further incorporation of nonhuman nature within the mechanistic technologies of capital and offset accounting.

Through these effects, and following Foucault's description of the calculative disciplining of the social (cf. Sullivan, 2013a), the innate exuberances of other-than-human-natures are further 'calculated, organized, technically thought' and 'invested with power relations'; such that they

might more deeply enter 'a machinery of power that explores [them], breaks [them] down and rearranges [them]' to productively bend and release their immanent forces towards economic utility (Foucault, 1991[1975]: 24–26, 138, 170; also see Federici, 2004). Of particular importance is the precise division, placement and codification of nature aspects 'in a meticulous analytical space' that further creates 'nature' as 'an object of control, coercion, examination, judgment, and intervention' over which power may be easily transferred to the expert languages, practices and cartography of the formal economic and accountancy spheres (cf. Foucault, 2003[1974/75]: 272, 254, 227; also Murray Li, 2007a; 2007b). The creation of 'nature' as 'natural capital' is an essential means of priming nature for enrolment in these technical calculative spheres. As in Foucault's analysis of the productive disciplining and control of the body, sexuality and populations under emergent modern institutions, 'nature' thus is becoming further disclosed, arbitrated, corrected and improved via an externalising, partitioning and expert rationality.

At the same time, the proliferation of apparently authoritative propositions such as 'the annual value of "ecosystem services" globally is between $16-54 trillion' (Costanza et al., 1997: 253), or 'sustainability-related global business opportunities in natural resources may be in the order of US$2-6 trillion per annum by 2050' (WBCSD, 2011: 4), give apparent exactitude to a figure which is highly contingent on the method and associated assumptions of calculation. Whilst having 'the attraction of seeming to make life simpler because they are simple in themselves' (Midgley, 2004: viii), they act as examples of what Foucault (2003[1974/75]: 39, 41) describes as a regressive, adulterated expert language. They simplify the academic knowledges from which they derive, whilst acting to demean the 'richness of Being' of life's nature and to foreclose possibilities for the expression of culturenature values and evaluative practices. As such, they are perhaps dangerously reductive and speculative, even as they are animated by the powerful and authoritatively persuasive 'magic' of scientific language (cf. Midgley, 2004: xiv). Paul Feyerabend (1999) called this simplifying tendency towards abstraction 'the conquest of abundance'.[lii] Through this, the magnificent and emplaced abundance that surrounds and confuses us is reduced, creating a 'drab world… obedient only to scientific dicta and economic imperatives' (Borrini-Feyerabend, 1999: x).

Given a Newtonian and mechanistic tendency 'to use a single force to account for many different effects' (Midgley, 2004: xiv), however, universalising discursive strategies – such as the invoking of nature as natural capital – create the hermeneutic conditions within which institutional decisions and policies are made that further assert such 'myths' as self-evident. To follow Foucault, then, we can learn much of the likely 'power-effects' of 'the natural capital myth', by considering the ideology within which the discourse of natural capital is located, the institutional assemblage within which it is being promoted and operationalised, and the technologies of power that are putting the discourse to work (Foucault, 2003[1974/75]: 14). It is no coincidence, for example, that 'natural capital' is the dominant projection and construction of nonhuman nature at this combined apocalyptic moment of the Anthropocene and the hegemony of global neoliberal ideology. The natural capital myth is working to reconstitute the environmental transformations associated with the Anthropocene as a massive opportunity for the invigoration of capitalist economic relations. It is doing this precisely

through projecting a 'nature' that conforms with the globally dominant calculative rationality associated with the rise of capitalism (cf. Weber, 2010[1930]; Foucault, 1991[1975]), thus acting to deflect a questioning of the dominance of this political economic paradigm and its relationship to the systemic economic and ecological harms thereby caused.

Through the application of accounting technologies to socio-environmental relations, then, and as the examples discussed above indicate, nature is becoming more able than ever to be put to work for capitalism. But this is occurring through massive denial and concealment: of the exuberant and transgressive immanent tendencies and unpredictable dynamics of living entities and complexes; of other(ed) nature myths, knowledges and values (cf. Sullivan, 2013c); of the repetitive systemic destruction, violences and exclusions with which the privileged liquidity of capital is associated; and of the pathological inequities that at times it seems as though the entire *ecosocius* is constrained to serve (cf. Sassen, 2010; Transnational Institute, 2013). In particular, the coercive calculative synthesis of nature as 'natural capital' extends an expert approach to nature as 'the object of a technology and knowledge of rectification, reinsertion and correction' (Foucault, 2003[1974/75]: 21), as opposed to a community of vibrant subjectivities, desiring life too.

The 'natural capital myth' is colonising our imaginations, becoming part of 'the matrix of thought, the background that shapes our mental habitats' (Midgley, 2004: 5) so as to tell us who we are or might be as human beings in relationship with the other-than-human natures who also dwell on earth. It is offering a convergence between ecology and economy, but one that creates a docile 'eco-functional nature' (Igoe, 2010) that can be instrumentalised as a capital-bearing and fissionable asset within a dominant accounting and calculative praxis. It is encouraging and deepening a fetishising of economistic metrics, such that they have particular powers over the shaping of socionature futures, whilst simultaneously concealing and disavowing the relationships and drivers of problematic ecological change (cf. Büscher et al., 2012; Fletcher, in press; Latour, 2010). As such, the enhancing of 'measurementality' (Turnhout et al., 2013) and the management of measures (as repetitively encouraged by TEEB's director), are pulling us towards a scenario of socionature management delineated in the Millennium Ecosystem Assessment as the 'Technogarden' (see discussion in Daily et al., 2011: 10-11). Through this emphasis, transition towards 'sustainability' is to be achieved by investment in technically sophisticated innovation and market mechanisms, to produce an increasingly distant 'technonature' expertly administered by 'remote control' (Guattari, 2000[1989]). This, then, further entrenches the division between nonhuman nature calculated as 'pacified' and objectified goods to which property rights can attach, and humans as calculative agents effecting the disentangling standardisations producing this alienation (cf. Çalişkan and Callon, 2010: 5-8). As such, it is likely to intensify the disembedding emphasis (of 'society' from 'land' and 'nature') lying at the heart of capitalist enterprise (cf. Polanyi, 2001[1944], and also to be associated with a deepening of inequities, the displacement of different socionature knowledges and value practices, and disembodiment processes more broadly. This is why 'the natural capital myth' invites critically diagnostic attention, as well as juxtaposition with other world-making myths and associated practices.

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[i] http://dictionary.cambridge.org/search/british/?q=capital, accessed 14 June 2013.
[ii] http://dictionary.cambridge.org/dictionary/british/natural_1?q=natural, accessed 14 June 2013.
[iii] http://dictionary.cambridge.org/dictionary/british/nature_1?q=nature, accessed 14 June 2013.
[iv] Infographic from the website for the World Inaugural Forum on Natural Capital held in November 2013, http://www.naturalcapitalforum.com/blog/blog/200/Cant-see-the-TREES-for-the-WOOD, last accessed 14 February 2014.
[v] Thank you to Markus Milne, Professor of Accounting at University of Canterbury, Christchurch, New Zealand, and to Jody Boehnart of (www.eco-labs.org) for reminding me of this text. I have had this sitting on my shelf since undergraduate days, but had forgotten that Schumacher explicitly uses the term 'natural capital' in this.
[vi] http://www.naturalcapitalforum.com/
[vii] http://www.naturalcapitalforum.com/who-should-attend, accessed 10 November 2013.
[viii] http://www.naturalcapitalforum.com/ceosclub 10 November 2013.
[ix] See, for example, http://www.alliancetrustsavings.co.uk/investment-selector/mostpopularfunds/ and https://en.wikipedia.org/wiki/Alliance_Trust
[x] See http://www.wdm.org.uk/events/forum-natural-commons-counter-conference.
[xi] There are echoes here with Thomas Kuhn's (1970[1962]: ix, 1) well known historical analysis of the ways in which scientific knowledge building, through the striving of individual scientists, tends towards the production of relatively stable constellations of 'facts, theories, and methods' that become normative and paradigmatic, but which are susceptible to revolutionary 'shifts' towards a different constellation whenever there are sustained 'violations of expectation'. Kuhn's work demonstrates the constructed and contingent nature of scientific objects in the 'hardest' of sciences, as well as the simultaneously conservative nature of much scientific practice (i.e. in working to sustain accepted paradigms), and the tendency of scientific paradigms to experience crises that encourage 'paradigm shifts'. Whilst the present work takes the notion of interconnected 'shifts' as relevant for understanding the current predominance and productivity of 'natural capital thinking', my emphasis is slightly different. I am attempting to understand 'natural capital' as a normative paradigm for thinking about non-human nature that is being actively promoted, technically inscribed, instrumentalised, universalised less by the physical sciences than by the social science of economics and through the technical endeavour of accounting, and with the support of significant policy, business and financial actors seeking to uphold a particular economic system in which capital is primary.
[xii] http://www.cbd.int/
[xiii] http://www.teebweb.org/
[xiv] In 2012 the global economy allocated US $2.7 trillion to 200 people, while the poorest 3.5bn shared only US $2.2 trillion (Hickel, 2013; Miller and Newcomb 2012). In 2005 the US economy allocated 33% of 'net worth' to 1% of households (Kapur et al, 2005). The wealth of the richest 1% has grown by 60% in the last 20 years, a trend that has intensified since the financial crisis with greater growth concentrated in the hands of the 0.01% (Hickel 2013; Oxfam 2013). These figures are worrying not only because it is obscene for such poverty to exist as the reflection of such concentrated wealth, but because economic inequality, as measured by the Gini coefficient among countries and among US states, has been shown to be a robust predictor of biodiversity loss (Holland et al., 2009; Mikkelson et al., 2007).
[xv] As noted in Sullivan (2013a and c), I use the term 'other-than-human nature(s)', and occasionally 'nonhuman nature' and 'more-than-human nature' when referring to organisms, entities and contexts other than the modern common sense understanding of the biological species *Homo sapiens*. As highlighted in this paper, however, these terms are already culturally-embedded and constructed. For cultural contexts where the 'nonhuman' is 'personified' and there is a tendency towards the assumption of one humanity and many different embodied perspectives, these terms are problematic and even nonsensical. In the ontological domain of shamanic 'perspectivism', for example, there may be no 'nonhumans' (Viveiros de Castro 2004).
[xvi] http://www.unep.org/Documents.Multilingual/Default.asp?documentid=97&articleid=1503
[xvii] http://data.iucn.org/dbtw-wpd/edocs/WCS-004.pdf
[xviii] http://www.slideshare.net/Denette/denettes-international-alliance-presentation, slide 2
[xix] http://ekoamp.com/who/

[xx] http://www.defra.gov.uk/environment/natural/whitepaper/
[xxi] http://www.defra.gov.uk/news/2011/06/07/natural-environment/
[xxii] Green Indian States Trust gistadvisory.com/
[xxiii] http://pavansukhdev.com/
[xxiv] http://bankofnaturalcapital.com
[xxv] http://www.naturalcapitaldeclaration.org/
[xxvi] Peter Bakker speaking at the inaugural World Forum on Natural Capital, Edinburgh, 20-21 November 2013, personal notes.
[xxvii] http://www.defra.gov.uk/naturalcapitalcommittee/
[xxviii] A network of firms assisting with corporate value creation through assurance, tax and advisory services, http://www.pwc.com/gx/en/about-pwc/index.jhtml
[xxix] A US consultancy firm providing 'environmental, health, safety, risk, and social consulting services', http://www.erm.com/About-Us/
[xxx] See http://www.earthcp.com/ for more information.
[xxxi] From Pullman (1997: 187). Parts of this section derive from Sullivan (2012).
[xxxii] http://climatebonds.net/
[xxxiii] For an accessible introduction to the structure of financial products and financialisation mechanisms more broadly, see Corporate Watch (2012), www.corporatewatch.org.
[xxxiv] The first bond linked in part with future market prices in Certified Emissions Reductions (CERs) 'and the actual versus estimated delivery of CERs that will be generated by a hydropower plant located in the Guizhou Province in China'. See: http://treasury.worldbank.org/cmd/htm/CO2LBond.html.
[xxxv] Designed with Netherlands banking conglomerate ABN AMRO (http://www.abnamro.com), 'Eco Bonds' were issued in 2007 and are bond coupons 'linked to an equity index, the ABN AMRO Eco Price Return Index, comprised of companies that produce alternative forms of energy, engage in water and waste management, or are involved in the production of catalysts used to reduce pollution' (see: http://treasury.worldbank.org/cmd/htm/Eco3PlusNoteInaugural.html).
[xxxvi] Designed with Skandinaviska Enskilda Banken, 'the top bank for large corporate clients and financial institutions for the entire Nordic region' (http://sebgroup.com/pow/wcp/sebgroup.asp), Green Bonds have been issued by the World Bank Treasury since 2008 to encourage 'fixed income investors to support World Bank lending for eligible projects that seek to mitigate climate change [including through avoided deforestation, cf. REDD+] or help affected people adapt to it' (World Bank Treasury, 2012: 1; also see: http://treasury.worldbank.org/cmd/htm/WorldBankGreenBonds.html).
[xxxvii] As described by fund manager Matthew Kiernan, former Director of the WBCSD, in *Investing in a Sustainable World: Why Green Is the New Colour of Money on Wall Street* (2009, New York: Amacom). Kiernan is founder of Inflection Point Capital Management (IPCM), which compiles and manages a proprietorial database to provide information on companies' sustainability performance to investors (see http://www.inflectionpointcm.com) (discussed further in Sullivan, 2013a).
[xxxviii] http://www.greeninvestmentbank.com/
[xxxix] http://www.worldwildlife.org
[xl] http://www.globalcanopy.org
[xli] http://www.goldmansachs.com
[xlii] http://www.lombardodier.com/en/
[xliii] Although note that many analyses argue that it is unlikely that REDD+ will effect such emissions reductions, particularly because it permits (through 'offsetting') the sustenance of industrial CO_2 emissions elsewhere
[xliv] www.un-redd.org
[xlv] On which see the Business and Biodiversity Offsets Programme (http://bbop.forest-trends.org/), national biodiversity offsetting policies, such as those by DEFRA (http://www.defra.gov.uk/environment/natural/biodiversity/uk/offsetting/), as well as commentary and critique (e.g. Bull et al., 2013; Hannis and Sullivan 2012; Sullivan 2013b).
[xlvi] The World Wide Fund for Nature thus is researching opportunities for biodiversity offsets to offset mining investments and impacts within the Republic of Congo (see http://wwf.panda.org/what_we_do/where_we_work/congo_basin_forests/wwf_solutions/extractives/oil_and_mineral_extraction/).
[xlvii] Not to be confused with Treasury Investors Growth Receipts (TIGR), also known as 'Tiger Bonds', which are 'a type of zero-coupon bond originally issued by the US Treasury' and 'do not pay interest over time, but instead are sold at a severe discount and, once mature, pay out at the full market price they had when issued', see http://www.ehow.com/info_7793057_tiger-bonds.html
[xlviii] http://www.advancedconservation.org/environmental-performance-bond/
[xlix] See http://www.equator-principles.com/index.php/best-practice-resources/b4b
[l] To provide an indication of the extent of this vulnerability amongst 'less developed economies', Christian Aid suggested in that '182 million people in sub-Saharan Africa alone could die of disease directly attributable to climate change by the end of the [21st] century' (Christian Aid, 2008; also see Sharifa and Bond, 2012).
[li] For examples, see http://www.redd-monitor.org and http://globalforestcoalition.org/resources/climate-change.

[lii] I am grateful to Kathryn Papp for drawing my attention to this text.

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