

The environmentality of 'Earth Incorporated': on contemporary primitive accumulation and the financialisation of environmental conservation

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In the latest James Bond film, *Quantum of Solace*, the villainous business tycoon Domenic Greene, makes a moving (and familiar) speech to potential company sponsors at a spectacularly glamorous, environmental fund-raising gala in Bolivia. He states:

We are in a spiral of environmental decline. Since 1945 17% of the planet's vegetated surface has been irreversibly degraded. The Tierra Project is just one small part of a global network of Eco-Parks that Greene Planet has created to rejuvenate the world on the brink of collapse. I hope that tonight you make a decision to be part of that.¹



Meanwhile, Greene is creating immense environmental and social upheaval: investing in oil pipelines and profits in various localities globally; creating a scarce resource of Bolivian water by diverting it into huge hidden dams,

thereby increasing dependence on private provision which he of course owns; and managing a tight cabal of self-serving global élites intent on resource capture on a massive scale.

The parallels with contemporary scenarios are uncomfortable. As Mac Chapin in *A Challenge to Conservationists*, Christine Macdonald in *Green Incorporated* and Dan Brockington in *Celebrity and the Environment* have detailed recently,² the world's major environmental organisations are collaborating systematically with corporations known more for their socially and environmentally polluting effects, competitive exploitation of highly valued natural 'resources', and élite profit structures. Donations from the corporate world have led to staggering increases in such funding for the 'not-for-profit' mega-environmental NGOs (ENGOS) of Conservation International (CI), The Nature Conservancy (TNC), the World

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Wide Fund for Nature (WWF), the Wildlife Conservation Society (WCS) and the African Wildlife Foundation (AWF);³ leading to harsh accusations that these organisations are 'polluter-funded leeches sucking on the flesh of environmentalism, leaving it weaker and depleted'.⁴ The corporate world in turn is rewarded by these mega-ENGOS with 'green awards' for apparent demonstrations of environmental stewardship, distributed at glamorous environmental fund-raisers not dissimilar to that conveyed for Domenic Greene's 'Eco-Parks Foundation' in the *Quantum of Solace*.⁵ Corporate 'green' reputations are thereby ensured, contributing to accusations of 'greenwash' from some quarters.⁶

But the benefits to business do not stop there. Environmental mega-NGOs increasingly are working with the corporate, business and financial worlds to reformulate and repackage environmental conservation and 'sustainability', such that this is centralised as part of profit-making portfolios. This includes: endorsement of so-called 'green' products; assistance with finding 'offset' solutions, such that environmentally damaging extractive development in one location can be 'offset' against investment in environmental health in a different location; work to mobilise additional financial values in land now owned by corporations based on measures of environmental health, such that these can be traded in new environmental offsetting markets and additional profits can ensue;⁷ and lobbying international environmental policy forums for subnational rather than national targets, the former being easier to manage for revenue generation through emerging global markets in new environmental commodities.⁸

There are several interrelated strands to the justifying, and neoliberal,⁹ logic guiding these alliances and practices. First, that it is a capitalist market economy based on the profitable trade of commodities, including commoditised environmental damage, that will solve environmental crisis. Second, that it is only the correct pricing and 'capitalization' of nature, framed as the attribution of 'value', that stands between degradation and health of the non-human world.¹⁰ Third, that with the assistance of appropriate technical, scientific, economics, financial and legislative expertise, this pricing will additionally boost and sustain the global economic growth required to sustain capitalism,¹¹ thus producing 'green growth'.¹² And fourth, that business and corporations are *the* key to the development and instituting of social and environmental 'sustainability'. Stuart Hart, writing in the *Harvard Business Review* epitomises this view in the statement that 'corporations are the only organizations with the resources, the technology, the global reach, and, ultimately, the motivation to achieve sustainability'.¹³ In this logic, it clearly makes sense for those with apparent expertise in nature management to join forces with those with expertise in business and finance.

Since a key motivation in the corporate, business and finance worlds is the expansionary production of surplus to sustain the acquisition and growth of capital,¹⁴ what is required for these sectors to be brought onto the environmental board in a structural way is that environmental concerns are reconfigured as 'a major source of revenue growth'.¹⁵ 'Sustainable development', as the catch-term that brings the notion of environmental sustainability into the arena of economic development, increasingly is presented as 'one of the biggest opportunities in the history of commerce', with companies 'selling solutions to the world's environmental

problems'.¹⁶ This is a discourse that has intensified in the wake of recent financial crisis.¹⁷

These developments constitute an important shift. Under neoliberalism, business frequently has been protected from the costs of environmental governance through 'free trade' agreements that identify environmental regulation as a barrier to trade, and that may require additional legal mechanisms to protect the right to profit of investors.¹⁸ Today, the current combination of environmental and financial meltdowns instead are being constructed explicitly as creating investment *opportunities* in 'sustainability'. The homepage of the new investment fund 'Inflection Point Capital Management', for

example, states that it is 'the world's first multi-strategy asset management boutique offering exclusively sustainability-enhanced investment products across a broad range of asset classes';¹⁹ and elsewhere on the website includes the statement that the company sees 'recent market meltdown as a multi-



Welcome to Inflection Point Capital Management: the world's first multi-strategy asset management boutique offering exclusively sustainability-enhanced investment products across a broad range of asset classes.

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trillion dollar "advertorial" for sustainability-enhanced approaches'.²⁰ This fund is headed by Matthew Kiernan, acclaimed author of *Investing in a Sustainable World*, former President of the World Business Council of Sustainable Development (WBCSD), and regular speaker at the annual Davos World Economic Forum. Kiernan suggests that we are entering a 'Sustainable Investment Revolution', poised to re-engineer 'the very "DNA" of the capital

markets'.²¹ The cover of Kiernan's book features an image of a blue-green earth, half of which is subsumed by gleaming American quarter-dollar coins (1.). This is an optimistic 'earth-as-money' trope repeated in the logo of the United Nation's Environment Programme's (UNEP) New Green Deal initiative, which depicts a delicate young green plant, shooting up from a pile of Euro coins (2.);²² and

Current 'earth-as-money' trope



echoes an earlier UNEP and IUCN (International Union for the Conservation of Nature) document on payments for ecosystem services (PES) that includes an image of verdant green

foliage amongst which various currency notes appear as 'leaves' (3).²³

This apparent 'financialisation' of environmental crisis and protection extends a key feature of capitalism in its current guise as neoliberalism. As Moore notes, this is 'the penetration of finance into everyday life, and above all into the reproduction of extra-human nature'.²⁴ In this paper I am concerned with the specific ways in which this financialisation is occurring in the arena of environmental governance for environmental conservation, as a constitutive part of 'world-ecology' – of both 'the accumulation of capital and the production of nature'²⁵ – under neoliberal capitalism. I am interested in environmental crisis as not only signalling a developmental crisis of capitalism – *aka* James O'Connor's 'second contradiction of capitalism', whereby capitalism undermines its own possibilities for accumulation by depleting its required material base.²⁶ Instead, I wish to draw attention to the ways in which environmental crisis and conservation become accumulation opportunities for capitalism, particularly through relationships with finance and investment.²⁷ I thus depart from Brockington and Duffy, who state that '[c]onservation has hardly been involved in the production of value through financialisation',²⁸ in focusing on some ways in which environmental governance for conservation, justified by environmental crisis, currently is being financialised.

For capitalism to make an accumulation opportunity of environmental crisis it needs to create new products, new commodities, that can be invested in, traded and speculated on. Nature needs to be 'capitalised' and 'capital ecologized' in new ways.²⁹ Or, to paraphrase Morgan Robertson,³⁰ capital needs to create new natures that it can see: requiring that the earth-in-crisis is rethought and reworded such that it is brought further into alignment, conceptually, semiotically, and materially, with capital.

With regard to the scale of planetary ecosystem management, three statements by significant 'players' in the world of global environmental governance are indicative of the magnitude and currency of this ideational shift. The first is by the Deputy Head of the Species Programme of the IUCN who, in a 2009 document on the IUCN websites states that '[i]t's time to recognize that nature is the largest company on Earth working for the benefit of 100 percent of humankind – and it's doing it for free.'³¹ The second is by Maurice Strong, Secretary General at the 1972 UN Conference on the Human Environment in Stockholm and the 1992 Earth Summit in Rio, and first Executive Director of the UNEP. In a 1996 lecture to the Korea Institute for International Economic Policy, Seoul, he states 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.'³² Recently, this second statement has appeared in full on the website of a new investment fund called EKO Asset Management Partners, whose website homepage states that they are '... a specialized investment firm focused on discovering and monetizing unrealized or unrecognized environmental assets... in short, a "merchant bank" for the world of environmental markets.'³³ EKO's investors hail from the world of *haute finance* and include James Wolfensohn, 9th president of the World Bank Group, as well as Lord Jacob Rothschild

and Alexander and Ben Goldsmith of the Rothschild and Goldsmiths banking dynasties.

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Capital for Environmental Markets

EKO is a specialized investment firm focused on discovering and monetizing unrealized or unrecognized environmental assets. We do this by matching smart capital with people, projects, and companies that are poised to profit from new and emerging environmental markets (markets for carbon, water, and biodiversity). In doing so, EKO hopes not only to harness the power of capital markets and help allocate resources to their "highest and best" ecological use, but also to help preserve ecosystems for future generations. EKO is, in short, a "merchant bank" for the world of environmental markets.

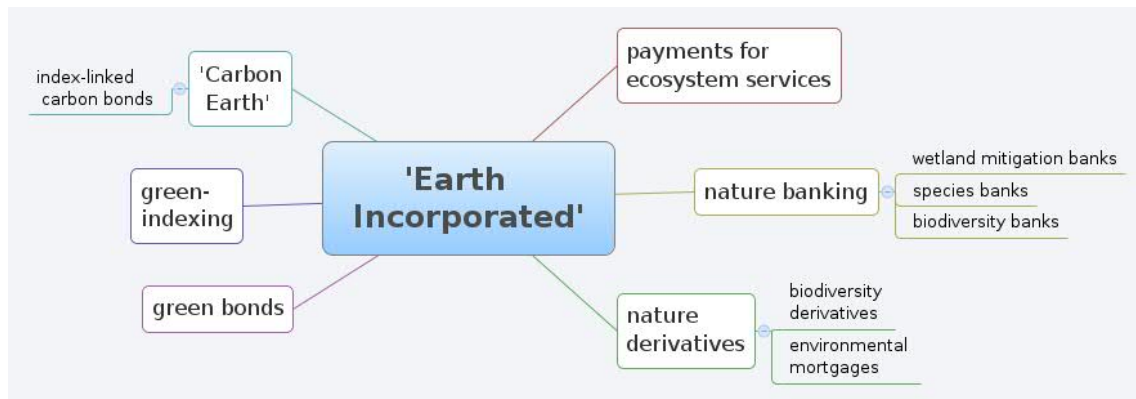
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There are two key aspects of these statements that I wish to emphasise. First is the conceptualisation of nature *as a company* that needs to be acknowledged for the *work* that it does. Of course, any ensuing payments do not actually go to nature, but to the people who are able to capture them. So what becomes significant is the question of who, via enforceable property rights signalling ownership, becomes able to capture the revenue arising from such exchanges. The second is the construction of nature as akin to a bank account: as a store of capital, requiring and justifying 'its' expert management by '*nature bankers*'. These conceptualisations are making possible the rapid creation and proliferation of an arguably unintuitive, even *weird* to use Polanyi's term,³⁴ 'environmental infrastructure'³⁵ of new markets in novel environmental commodities seen as representative of environment health and damage. In combination, these innovations are posited as a solution to environmental crisis that not only sustains a capitalist political economy but actually enhances it to produce 'green growth' (see below). This environmental infrastructure is populated by a new and frequently opaque ecology of intersecting terms and concepts: *offsetting*, *payments for ecosystem services*, *natural capital*, *green-indexing*, *biodiversity derivatives*, *green bonds*, *environmental mortgages*, to name a few.

In what follows I highlight a few aspects of these new concepts and products that I think are indicative in terms of the earth they are bringing forth, and in which particular social relationships, as well as relationships between human and non-human worlds, are implicit and imbricated. I will conclude with some gestures towards how I am currently theorising the implications of these phenomena.

Introducing the new financial services offered by Earth Incorporated



1. Carbon markets: mitigation and offsetting

Although the strange possibility of trading in carbon has only appeared in the last few years, it has rapidly become entrenched and familiar. Climate stock exchanges, now are established in London (www.ecx.eu) and Chicago (www.chicagoclimatex.com), and emerging in Montreal (www.mcx.ca), China (www.chinatcx.com.cn), and Australia (www.envex.com.au), and carbon rapidly is being reformatted into a range of tradable derivative options and futures products based on company carbon emission allowances. The organisation that runs these exchanges, Climate Exchange Plc (www.climateexchangeplc.com), is itself a company whose shares are listed and traded on the London Stock Exchange.

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TICKER DATA (TEN MINUTE DELAY)

ICE ECX EUA Daily FUTURES	BID	ASK	FIRST	LAST
Daily	16.10	16.15	16.07	16.10

ICE ECX CER Daily FUTURES	BID	ASK	FIRST	LAST
Daily	14.40	14.52	0.00	0.00

ICE ECX CER FUTURES	BID	ASK	FIRST	LAST
Dec10	14.26	14.35	14.52	14.25

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ECX PRICES Market Snapshot
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ICE ECX EUA DAILY FUTURES CONTRACTS	Settlement Price	Total Volume
Spot	16.37	50

ICE ECX CER DAILY FUTURES CONTRACTS	Settlement Price	Total Volume
Dec10	16.52	5949
Dec11	16.92	405
Dec12	17.68	597
Dec13	19.02	115
Dec14	19.92	0
		7066

ICE ECX CER DAILY FUTURES CONTRACTS

ICE ECX CER DAILY FUTURES CONTRACTS	Settlement Price	Total Volume
Spot	14.60	0

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The mitigating trade in carbon holds a key to understanding what might be qualitatively new in 'capital's new natures', and how these are manifesting as 'Earth Incorporated'. First, they are already, and are proclaimed to become, extremely lucrative. The environmental consultancy firm Advanced Conservation Strategies for example, states on its website that '[b]y 2030, Carbon will be the largest commodity market in the world: \$1.6-2.4 trillion, about the same as the current oil market'.³⁶ This market trade manifests in various ways, two significant ones being: 1. trade in the 'free gift'³⁷ to industrial emitters of government allocated emissions quotas (i.e. 'carbon credits') (e.g. under the European Union Emissions Trading Scheme (UE ETS)); and 2. the purchase of standing biomass (normally in the global south), which under expansionary carbon accounting practices increasingly is becoming conceived as carbon 'sinks' for the 'offsetting', or dumping, of emitted carbon produced elsewhere. A recent paper in *Conservation & Policy* thus states that 'the acquisition of carbon offsets will be the biggest financial investment in the environmental sector to date';³⁸ and current heat over the programme for Reducing Emissions from Degradation and Deforestation (REDD+) administered by the UNEP, is indicative of policy and business excitement over the potentially lucrative linkage of carbon offsets with the carbon stored in standing biodiversity.³⁹ As noted above, an accompanying array of derivative products also increases the possibilities for greater financial returns on this trade, extending its reach into the complex and intractable realm of 'mad money' associated with derivatives trading, hedge funds, and futures markets.⁴⁰

Second, and importantly, carbon markets naturalise a key idea, which is of the *equivalence* and *substitutability* of very different 'things' and 'environments', via essentialising everything in terms of the element of carbon. This creating of 'Carbon Earth' entails the bringing forth of earth as a carbon matrix in which all production and activity is reduced to the concentration and exchange of the element of carbon.⁴¹ This innovation permits unintuitive confluences. It conceptually enables carbon production as one thing (e.g. industrial emissions) in one location, to be 'offset' against its storage in another qualitatively different thing (e.g. tropical forests) in another location. There are perverse predictabilities to this essentialising logic, some of which indeed are manifesting. One is the proposal by the organisation 'Optimum Population Trust (Opt)' that carbon emissions by consumers in the industrialised world might be 'offset' by their paying for reduced fertility (via funded contraception) in the developing world.⁴² Through 'PopOffsets' (www.popoffsets.com), then, the life of an 'unwanted' African baby, becomes 'valued' according to its equivalence to the reductions in estimated carbon emissions represented by its prevented birth, and its ensuing absent-presence as a carbon 'non-person'.



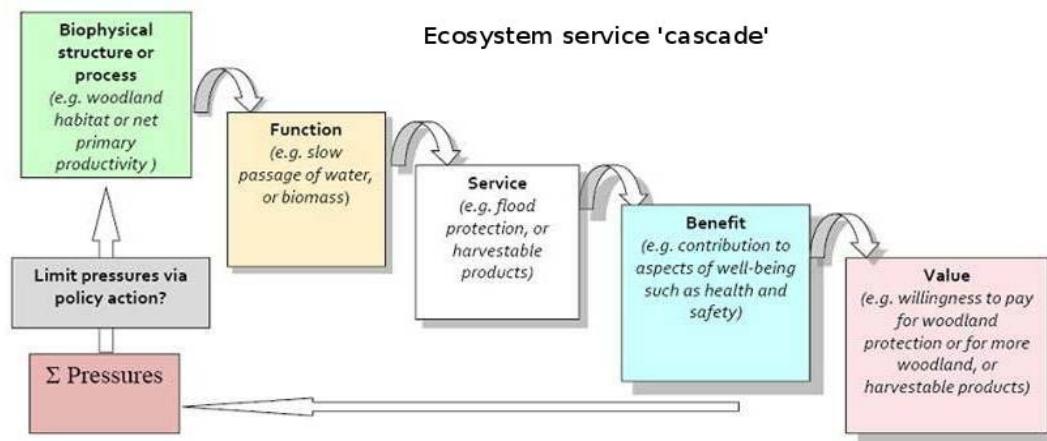
Carbon offset trading as a model for mitigating the production of environmental damage is being pursued in collaborations between corporations and major environmental organisations, to facilitate the emergence of an array of new voluntary environmental offset commodities

and exchanges. This was highlighted by Caroline Seagle yesterday in her paper for this conference which described how Rio Tinto is working with ENGOs in Madagascar to create biodiversity offset schemes whereby the impacts of mining in one location will be 'paid for' by investing in biodiversity conservation in a different location.⁴³ As such, biodiversity offsets bring what has been termed 'the ultimate anti-commodity', i.e. biodiversity, into the mitigation banking market,⁴⁴ such that 'clearing of native vegetation may be allowed if offsets are established elsewhere in the landscape'.⁴⁵ These conceptions bring forth proliferating layers of additional finance accumulation through the bundling together of different environmental products that, as they are distinguished and capitalised, can begin to be offset and traded in combination with each other. Bekessy and Wintle make plain this opportunity in suggesting that carbon offsetters might also accrue biodiversity credits 'when the biodiversity benefits of a carbon-sequestration project can be demonstrated', such that this will 'encourage carbon investors to [also] favor biodiversity-friendly carbon-offset schemes'.⁴⁶

An interesting new development in relation to this construction and financialisation of 'Carbon Earth', relates to proposals for the creation of *index-linked carbon bonds* to be issued by governments.⁴⁷ According to the London Accord business and investment network, '[a]n index-linked carbon bond is a government issued bond where... interest payments [from government to investors] are linked to the actual greenhouse gas emissions of the issuing country against published targets', such that '[a]n investor in this bond receives an excess return if the issuing country's emissions are above the government's published target'.⁴⁸ The rationale, then, is that the issuing government has an additional *incentive* to make sure national emissions targets are met, because then they will have to pay lower interest rates to bonds that they issue to investors, such that investors then provide governments with cheaper debt *as long as* governments meet their emissions targets. The implication and intention that I wish to stress here is that this implies that private sector 'green investors' will be *governing*, or at least *disciplining*, governments on their carbon/climate policies, via the incentives built into the bond structure, thus structurally shifting the locus of responsibility for global environmental outcomes into the incentivising domain of investment finance. At the same time, however, with profit as the intrinsic logic underscoring investment, questions must surely remain over the possibility that additional forces might conspire such that country emissions levels are kept high, thus perversely ensuring high flows of capital from governments to green investors in the form of interest payments.

2. *Payments for Ecosystem Services*

The next and related layer that I want to touch on in this financialisation of environmental governance is that of the growing discourse on Payments for Ecosystem Services (PES). The idea here is that those wanting and/or requiring the 'service' of environmental health should pay those dwelling in the landscapes in which these 'services' are located. These flows and 'cascades'⁴⁹ of services and payments can be seen most clearly in the case of downstream water users paying upstream users to maintain water flow and/or quality.⁵⁰



Given both the location of valued ecosystems in the 'global south', accompanied by the need for their services in the industrialised 'global north', payments from north to south for service maintenance by the south for the north increasingly are being posited as a means of producing win-win sustainability (i.e. conservation and development) scenarios.⁵¹ I have reviewed elsewhere the emergence of PES schemes, reflecting on some of the implications of monetising ecosystem health and degradation, as well as on the onto-epistemological⁵² significance of constructing nature as 'service-provider' and the displacement of other(ed) nature knowledges and values that this entails.⁵³ As Diana Pound has argued recently, the Millennium Ecosystem Assessment's (MEA)⁵⁴ emphasis on identifying and valuing the 'goods and services' that ecosystems provide for human well-being, seems to be justifying an overly econometric approach to ecosystem appreciation and measurement that can overshadow both the emphasis on the integrated Ecosystem Approach supported by the UN Convention on Biological Diversity (CBD), and the diverse ways that people and cultures are intrinsically part of ecosystems.⁵⁵ What I want to draw attention to here is the way in which current excitement over PES is justifying the urgent need to measure, assess, standardise and disaggregate nature into new 'goods and service categories', combined with measures of their health and/or degradation and the assigning of 'value' to these measures.⁵⁶

This is being done via rapid ecological assessment and economic valuation techniques. The latter rely heavily on contingent valuation or estimates of 'willingness to pay', the validity of which has received intense criticism within economics.⁵⁷ Ecosystem service valuation 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 sites, also is often arrived at via the practice of 'benefit transfer'.⁵⁸ This parallels the conceptual convenience, as noted above, of the substitutability or *correspondence* between different locations, by permitting the transfer of 'economic value estimates from one location to a similar site in another location', an assumption and practice that again can produce a number of transfer errors.⁵⁹ Frequently the appropriateness of the service values derived from 'benefit transfer' from specific sites,

would require infrastructural and other developments of the corresponding site so that they may, theoretically at least, attain the equivalent values (e.g. where recreation service values are enhanced by tourism developments that also transform local sites, or where high wetland values actually derive from the regulating services they perform by treating waste-water from neighbouring manufacturing facilities; all of which also are time specific and may vary substantially depending on additional factors).⁶⁰ Nevertheless, through investment combined with regulatory and legislative support, these valuation techniques are permitting the creation of an array of new markets in the environmental products represented by the measurements they produce. They are ushering in an enormous systematic and competitive effort to measure, catalogue, *dissect* and 'value', i.e. monetise, nature's 'goods and services', via an emerging 'ecoinformatics' that entrains mapping, measuring and monetisation techniques to produce combined ecosystems services catalogues, applicable from local to global scales.

The Nature Conservancy and the World Wide Fund for Nature, with Stanford University, for example, are collaborating on a ten-year 'Natural Capital Project', to develop tools for the modelling and mapping of the economic value of ecosystem services and to construct a global 'natural capital database'.⁶¹

Similarly, in 2009 CI and partners launched its project 'ARIES', or 'Artificial Intelligence for Ecosystem Services', 'a web-based technology... offered to users worldwide to assist rapid ecosystem service assessment and valuation at multiple scales, from regional to global'.⁶² This is described as 'poised to revolutionize the way governments, businesses and communities think about and manage their local



environments'.⁶³ The output of 'an ARIES user session' is 'an *environmental asset portfolio* that describes in depth the spatial distribution of ecosystems and ecosystem services in the area, their potential and realized economic values'.⁶⁴ I have commented elsewhere⁶⁵ on how the ARIES logo, as it appears on the ARIES Facebook site, embodies this sense of transcendent, remote ecosystem management and control. The Aries constellation signifying the ARIES project and web application, hovers in dark space over the surface of a distant earth: surveying landscapes and capturing environmental information - the choice and form of which is structured in highly contingent ways - so as to empower decision-making processes based on digital maps and models of monetised landscapes. In the UK, a new tranche of £40.5 million funding is being allocated by the Department for International Development (DfID), the Economic and Social Research Council (ESRC) and the Natural Environment Research Council (NERC), for interdisciplinary research on delivering *Ecosystems Services for Poverty Alleviation* (ESPA).



As the call for applications states, 'ESPA seeks to generate the evidence on ecosystem

services, their full value and links to sustainable poverty reduction, so as to equip end users and decision makers with the knowledge on how to manage ecosystems better'.⁶⁶ The normative framework and justification is the intent to facilitate and foster sustainable economic growth as 'green growth'.⁶⁷ The European Investment Bank is working with the University of Stirling's Management School to 'design markets for ecosystem service delivery' (or 'eco-delivery' as they call it).⁶⁸ And the massive UNEP research programme on The Economics of Ecosystems and Biodiversity (TEEB), identifies '[t]he lack of market prices for ecosystem services and biodiversity' as the key driver for both biodiversity loss and negative impacts on human well-being, the corresponding implication being that the assigning of new market prices to nature will enhance both ecological and social health.⁶⁹

All this effort constitutes a systematic ushering in of a new large-scale economic-environmental science so as to bring into focus a world of measured and 'valued' ecosystem services. The collaborative (and competitive) investment in complex 'ecoinformatics' approaches is connecting and entraining ecological and economics data so as to create 'value' at various ecosystems scales, and to produce what Jim Igoe is terming 'eco-[i.e. ecologically and economically] functional nature'.⁷⁰ It parallels capital investment in bioinformatics at the scale of molecular biology, as detailed by Scott Prudham at this conference.⁷¹ In combination it works to permit consolidation of private claims to domains (and inventions) of life, and as such to 'expand the scale and scope of capital accumulation via so-called "extra-economic" means'.⁷² I will return to discuss the significant implications of this process below.

3. Nature Banking and New Nature Markets

By creating the nature that capital can see, and in tandem with property rights based on enclosure (i.e. on land as property), landowners can become nature entrepreneurs, thereby capitalising on the new nature prices accruing to defined land areas. Forms of 'nature banking' now are prominent in the US and Australia, and this approach is rapidly gaining traction elsewhere. The UK, for example, has just announced its first conservation credit scheme to be facilitated by The Environment Bank Ltd.,⁷³ within a conservative policy discourse that considers a future biobanking *industry* to be worth billions.⁷⁴ The nature banking and offset market approach has been advocated particularly strongly by the Katoomba Group, 'an international network of individuals working to promote, and improve capacity related to, markets and payments for ecosystem services (PES)',⁷⁵ and whose online 'Ecosystem Marketplace' provides market information to facilitate transactions.⁷⁶

As noted for carbon markets above, nature banks are being embraced in part due to a rapidly extending discourse of the high financial values being projected onto conserved non-human natures. Extrapolating from one highly valued wetland in the US to the country's 51.4 million acres of freshwater forested wetlands, for example, produces a mouth-watering figure of \$1.7 trillion.⁷⁷ An array of wetland mitigation banks in the US now exist, enabling wetland landowners to realise 'value' embodied through maintaining wetland ecosystems by entering into financial exchanges with developers intending to degrade wetlands elsewhere, and accompanied by an array of permitting and regulating legislation.⁷⁸ Species banking has

proliferated in recent years, particularly in the US,⁷⁹ and biodiversity banking (or biobanking) now is advocated such that '[a]ccrued investment [by landowners in biodiversity] could be sold to a party wishing to liquidate an equivalent amount and quality of vegetation elsewhere in the landscape'.⁸⁰

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Top 7 Most Banked Species

Vernal Pool Fairy Shrimp	28
California Tiger Salamander	25
Vernal Pool Tadpole Shrimp	24
Coastal California Gnatcatcher	17
Swainson's Hawk	16
San Joaquin Kit Fox	14

Species Credits Per State

Map showing species credits per state: CA (74), HI (1), AK (1), VT (1), NH (1), ME (1), NY (2), PA (1), OH (1), WV (1), VA (1), NC (1), SC (1), GA (1), FL (3), TX (5), OK (1), KS (1), MN (1), IA (1), MO (1), WI (1), IL (1), IN (1), MI (1), OH (1), PA (1), NY (1), VT (1), NH (1), ME (1).

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Wildlands, Inc.

Private investment is promoted as the source of funds to facilitate the creation and structuring of such banks and markets. The Ecosystem Marketplace's former Director and co-founder in fact is now a partner and co-founder of EKO Asset Management Partners, the merchant bank mentioned above established precisely to invest in – i.e. to capitalise – these new markets in new environmental products.⁸¹ The consequent attaching of prices to nature's 'services' permits the accessing of these new nature values by those who own land and whose ownership is protected by property law. The mission of the US Office of Ecosystem Services and Markets thus is to 'focus on scientifically rigorous and economically sound methods for quantifying carbon, air and water quality, wetlands, and endangered species benefits in an effort to facilitate the participation of farmers, ranchers, and forest landowners in emerging ecosystem markets'.⁸² In combination, the process serves to add more monetary value to that which is already able to enter a market exchange; i.e. to that which already is formally owned. As such, this latest wave of ideational and semiotic transformations in the realm of conceptualising the material of nature, accompanied by investment in these 'new natures' and the property relationships guiding their enclosures, further reconstitutes and reconfigures nature and nature protection for gain by capital. The income accruing from exchange goes to landowners or those able to enter into formal agreements regarding any additional value gained from investing in initiatives that add environmental 'value' to land. In industrialised economies, land is already so concentrated in the hands of large landowners that further inequalities in landholdings may not ensue, but further accumulations of wealth amongst propertied 'nature entrepreneurs' are of course what is being promoted (the conservation argument being that this will prevent the conversion of these lands into uses that might be environmentally degrading). In market conservation terms such initiatives are logical because they putatively increase the possibility of benign relationships with the nature on private land, but only to the extent that markets in new environmental products on this land remain buoyant. Such initiatives do not

engage seriously with any of the equity or environmental justice issues arising from the unequal distribution in land and wealth that such proposals build on.

In so-called emerging or survival economies,⁸³ significant displacement effects can arise from such environmental 'value-adding' initiatives.⁸⁴ In these situations, people often find it hard to demonstrate formal tenure over land, even if they have lived there for many years; and given the private property fetish of capitalist market relations, it remains difficult, even impossible, for the distributive and other complexities of communitarian relationships based on sharing and on diverse nature-knowledges to enter into the market environmentalism discourse. In such circumstances accumulation by capital often involves the contemporary breaking and dismantling of peoples' land-entwined socio-economic worlds and practices through eviction and displacement, accompanied by privatizations of land tenure,⁸⁵ a process that tends to concentrate land and resources in the hands of élites.⁸⁶

4. Proliferating environmental-financial products: or 'nature derivatives'

The final nexus of new 'nature products' that complete this brief survey of the financialisation of environmental governance for conservation, consists of current proposals for the creation of derived environmental-financial products, or 'nature derivatives'. I want to touch on a couple here.

First is the suggestion, by Mandel, Donlan and Armstrong in a recent paper in *Frontiers in Ecology and the Environment*, for the creation of 'biodiversity derivatives'.⁸⁷ Bear in mind that 'a derivative is a bet as to whether the value of the underlying security, which might be a stock, bond, or financial index, will increase or decrease by a specified date'.⁸⁸ Mandel *et al* suggest that the market should be used to reduce the costs of conservation, by applying derivatives, i.e. 'financial instruments designed to allow the commoditization and sale of risk',⁸⁹ to the risk of species extinction. The proposal is that 'governments issue modified derivatives contracts to sell species' extinction risk to market investors and stakeholders',⁹⁰ as a means of providing *incentive structures* that take 'full advantage of the market to reduce costs in conservation',⁹¹ through *aligning* the interests of conservationists, government and landowners, by making species presence more financially valuable to landowners than modifying habitat through development. These would be akin to insurance derivatives (*aka* weather derivatives and hedging against risk), 'issued with modifications to allow responsible action to decrease the likelihood of the insured event' so as to encourage 'social change that is incentivized through market forces'.⁹² I find it hard to grasp the logic of this. I can see that futures exchanges might help stabilise commodity prices, as Harriet Friedman highlighted in her talk at this conference.⁹³ But species occurring *in situ* are not intrinsically manufactured for sale (although clearly they become commodities through the attribution of prices, and complexities also are added due to the increasing manipulation, manufacture and even creation of genotypes through biotechnology).⁹⁴ Again, it seems perverse to transform the value of species survival into prices whose rise or fall is entangled with bets on the likelihood of their extinction, underscored by a situation whereby species value rises with rarity, i.e. with the risk of loss or extinction. Be that as it may, Mandel *et al* argue that through issuing a

derivative whose value is based on *species decline*,⁹⁵ and '[i]f the trading of species derivatives were responsibly permitted', then 'those who do not currently incorporate a conservation ethic into their economic decisions would stand to profit from a change in behaviour towards environmental stewardship'.⁹⁶ This, of course, is a classic neoliberal suggestion to design, invest in, and legislate for market-based incentives to manipulate behaviours through appealing to the financial self-interest of those with protected access to land under private property tenure arrangements.

The second area of derived nature finance-products that I want to note is that of 'environmental mortgages', proposed as a means of producing conservation and development win-win scenarios in circumstances characterised by both high global environmental values and high local economic poverty. The suggestion is that communities in low income nations finance poverty alleviation and economic development through offering newly monetised 'environmental assets' as collateral for 'environmental mortgages'. These would be loans linked to independent measures of the state of an environmental asset and offered by international environmental investors.⁹⁷ They would contribute 'debt-based investment', i.e. that 'capitalizes environmental assets locally and makes that capital available to local communities through collateralized lending, microfinance approaches, and access to affordable financial services', thereby 'providing access to affordable financial services in exchange for environmental stewardship'.⁹⁸ In these proposals, then, ecosystem services as newly priced nature values are to be used as collateral for loans so that people (of the 'south') – or the 'fortune at the bottom of the pyramid' as the business community likes to frame them⁹⁹ – can be brought further into the global monetary system. The question arises of who then owns or has governing powers over the collateral? - which in this case is constituted by the new nature *prices* attributed to nature, through the application of a globalising hegemonic value system that is homogenising (and hoovering up), all possible nature values.

The nature of the beast?

What the above have in common is that they constitute a new wave of semiotic¹⁰⁰ and material enclosure of 'the global environment' into a range of derived tradable commodity forms, to produce an increasingly 'derivative nature'¹⁰¹ of complex, virtual nature products. These are made possible by empowered innovations in conceptualisations of the non-human world, which in turn have powerful material effects on human nature, on non-human nature and on human:nature relationships. They constitute 'capital's new natures': a radical contemporary conceptual transformation of the non-human world that releases new nature 'value' for accumulation by capital, in part by extending the breaking of human land-entwined 'immanent ecologies'¹⁰² globally.

Clearly a lot can be said regarding these innovations and their structuring implications. Currently I am viewing these phenomena through two key theoretical lenses: Marxian primitive accumulation, and Foucaultian bio-political governmentality in the realm of socio-

environment relations. I want to close this paper by touching on what for me these offer by way of both explanation and prediction.

Primitive accumulation is the drive of capital and of its protagonists to both *create* and capture the forms of capitalist value that underscore all subsequent relations of production and exchange. For Marx, the two critical enclosures are of land as property, and human activity as labour, the creation of which required the historical separation of each from the other, or the *disembedding* of people from land-entwined social relations, as Polanyi puts it.¹⁰³ Other scholars have highlighted additional historical primitive accumulations as integral to capitalist strategy. Silvia Federici, in her *tour de force Caliban and the Witch*,¹⁰⁴ for example, delineates two further key enclosures in the service of capitalist primitive accumulation: that of women's wombs and reproductive labour, accumulated as a free service through the systematic destruction of women's productive autonomy (associated with the terrorising 'witch-hunts' of Europe in the 16th and 17th centuries in particular, in which some two hundred thousand women were slaughtered); and that of the self-disciplining of the body's urges in its creation as 'body-machine', to fit with the homogenised and increasingly automated organisation of capitalist industrial production. Michael Perelman additionally frames the eradication of scores of annual religious 'holy-days' throughout the Middle Ages as primitive accumulation. This worked to further release an increasingly individualised and disciplined labour force for capital, both by increasing annual numbers of work days and by eroding the collective celebrations and associations that could happen on Saints' Days.¹⁰⁵

These accumulations of productive forces that are not *a priori* manufactured for sale, all require, and are mirrored by, significant and frequently radical, i.e. onto-epistemologically unintuitive, *a priori* ideational transformations. New commodity fictions need to be imagined for them to manifest; and the commodity fantasies that become discursively and materially empowered are those privileged through the exigencies and structures of imperial and patriarchal history and political economy. Marx states additionally that '[a]s soon as capitalist production is on its own legs, it not only maintains this separation [of labour from the means of capitalist production], but reproduces it on a continually extending scale'.¹⁰⁶ Massimo de Angelis refers to this as the *ontological*, as opposed to historical, condition of capitalist production, to describe the continuous creation and capture of new commodities that permit capital's recursive accumulation.¹⁰⁷ Many other authors have stressed this *continuous* nature of so-called 'primitive accumulation', from Rosa Luxemburg writing in 1913,¹⁰⁸ to David Harvey writing in 2010.¹⁰⁹ Recent analyses of primitive accumulation that see its historical shape as present in contemporary circumstances globally, thus frame the process as 'continuous',¹¹⁰ 'permanent',¹¹¹ and contemporary.¹¹² As Silvia Federici, maintains, 'primitive accumulation has been a universal process in every phase of capitalist development', re-launching 'similar strategies in the face of every major capitalist crisis'.¹¹³

My suggestion here is that the current and proliferating creation of new nature values and tradable commodities, i.e. that both structure nature into the reified commodity form in previously unthought ways, and create additional ways of bringing diverse peoples into the

global market in service to these new commodity forms, can be understood and analysed as a new and significant wave of primitive accumulation (of nature and of peoples' productive activities by capital). In other words, the current new environmental infrastructure that is being designed by *haute finance*, corporations, mega-ENGOS and university research teams in this sense is simply a process of contemporary primitive accumulation that facilitates the reinvention and expansion of capital(ism). If this is the case, it should be characterised by three things: 1. the continuing dismantling of human land-entwined livelihoods and lifeworlds to release both new nature values and labour for global markets; 2. the encouragement and instituting of new dependencies on the global market economy; and 3. the increasing concentration of capital in the hands of fewer individuals, organisations and élite networks. I think that this is exactly what is happening, under the slippery neoliberal and modernising mask of 'sustainable development' and the instituting of 'sustainability'.

My second theoretical frame affirms 'Earth Incorporated' as arguably the dominant 'environmentality' shaping environmental governance today, and draws on Michel Foucault's work in various ways. Foucault has emphasised the ways in which new regimes of governance are structured and bolstered by new social sciences, which iteratively also enable new techniques of management and administration. At the time of the rise of the bourgeois class and the Age of Reason in Europe, for example, he makes much of the accompanying rise of a new bourgeois spirit that partitions, makes distinctions, classifies, codifies and calculates.¹¹⁴ He is talking here about the body, and about the new social sciences that helped to construct, subject, manage and *accumulate* the body as a utility-maximising 'body-machine'. It seems to me that in the arena of global environmental governance *aka* primitive accumulation, we are currently seeing the emergence of something similar: of a socio-environmental science of 'ecosystems services' and service-maintainers, that is making nature, as 'the world's body',¹¹⁵ 'operations intelligible and controllable', and, importantly, 'void of any intrinsic teleology'¹¹⁶ or agency.¹¹⁷ In transforming and accumulating the body's and 'Nature's' exceeding immanence into 'work powers', the animated, embodied and sentient world experienced by non-capitalist rationalities is of necessity erased. The body 'as a receptacle of magical powers', together with an 'animistic conception of nature that did not admit to any separation between matter and spirit', are both broken up to be cultivated, captured and conserved.¹¹⁸

Through ecosystem service science, nature's life, like that of the body, is being made conceptually docile, through becoming 'caught in a [new] system of subjection', whereby its behaviour is 'calculated, organized, technically thought' and 'invested with power relations'.¹¹⁹ As with the new sciences of demography, nutrition etc. that make possible the administrations of the modern era and which involved the *application of accounting to social relations*, currently we are witnessing the similar *application of accounting to socio-environmental relations*, through the seemingly neutral and thoroughly depoliticised new sciences of carbon accounting and ecosystem services. Like the human body, and the body-politic of populations, nature as service-provider is 'entering a machinery of power that explores it, breaks it down and rearranges it', thus bending its immanent forces towards economic utility.¹²⁰ The 'micro-

physics of power' operating in the multiplicitous moments and institutional apparatuses of ecosystem service science is strategically *training* socio-environment relations into those of Earth Incorporated.¹²¹ The utility of nature's forces in service to neoliberal capitalism is enhanced by further creating nature as both usefully productive and subjected.¹²²

Following Prudham's analysis of the invention and sanction of commodities in the molecular realm, this is the 'discursive and institutional work necessary to render the messy materiality of life legible as discrete entities, individuated and abstracted from complex social and ecological integuments'.¹²³ It creates, or more accurately sanctions, the 'theft' of new (private) properties from the work of 'complex social and biophysical contributions'.¹²⁴ As Prudham notes further, in the ensuing discursive and institutional production of new nature 'things', these are severed 'from contending use rights' (local food production for example), so that they are able to circulate as exchange values from which additional market 'value', not least in the proliferation of new and increasingly derived exchangeable nature products, can accrue.¹²⁵ The process in its entirety – the creation and production of capital's new nature *fictions*, is supported by capital's accomplices: universities, ENGOs and other civil society organisations, the legal system and property rights supporting and enforcing enclosure.¹²⁶ The discourse of nature as service-provider is what is making this possible,¹²⁷ accompanied by the naturalisation of capitalist 'free markets' rationalised by a Coasean institutional economics that assumes the emergence of social and environmental optima through the incentivised bargaining of those with private property allocations.¹²⁸

Foucault's more recently published work, particularly his lectures of 1978-79 on biopolitics, published in English in 2008, is critically illuminating in this respect.¹²⁹ Prescient as ever, he draws to the fore the socio-political fact of the 'truth regime' of the market under liberalism; and the corresponding necessity of working to create the governing incentivising and regulatory structures that allow for the 'free market's need for 'frugal government'. As Martin O'Connor has also noted, '[t]he logic of the marketplace states plainly that all capitals will realize their "full value" only by insertion within the sphere of exchange value. Under the doctrine of utility maximisation, their best use will be signaled by price: they should always go to the highest bidder'.¹³⁰ These market workings require the so-called 'rolling back of the state', combined with the bolstering of the private sector's capture of public resources (including 'nature'), both of which are hallmarks of neoliberal capitalism. In combination these constitute a 'governmentality' that ironically requires intense government and public engagement to facilitate the construction and regulation of the incentive structures that discipline individual and corporate behaviour, such that this conforms with the logic of the 'free market'. This, as Noel Castree notes, is 'the paradoxical need for "free" markets to be managed'.¹³¹ Robert Fletcher, in a soon to be published article in *Conservation and Society*,¹³² extends this notion of governmentality to highlight the governing incentive structures associated with *environmental* governance for environmental conservation under neoliberal logics, as well as the different *environmentalities* associated with other governing logics. Through continuous processes of primitive accumulation to ensure the release of new capitals to service the drive for production of surplus capital (profit), and under the governing value-

frame of environmentality, i.e. which necessitates the participating of all environmental concerns in the logic of the market, all environmental phenomena become framed, treated and *banked* as capital. Given the truth regime of the market, the art of government in relation to 'environmental conservation' of necessity, then, will be the environmentality of 'Earth Incorporated'.

I have noted elsewhere that there is an intrinsic fallacy at the heart of these proposals and policies to incentivise environmentally ethical behaviour via market design.¹³³ This is that 'the market' does not in and of itself embody or produce virtuous behaviour. The market does not care, and it seems to be problematic to think that it is only the correct design of markets, e.g. through pricing mechanisms, that will prevent the manifestation of nature losses. Given a political economic system based on the desirability of the accumulation of money's signs, what is being promoted under these proposals is a valuing of nature *as money*, not of nature's immanence or sentience, or as a community of which we as humans are one of many companions. And since the 'free-market' is an emergent property of the dance of multiple commodity prices, exchanges and other influencing factors, there is nothing intrinsic to this system to uphold the prices of environmental health relative to the unpredictably shifting prices of other commodities.

I want to close with one final thought. When the image of earth from space became mass circulated and 'spectacularised', it was viewed positively from an environmentalist perspective in making clear that we all share a single interconnected and limited planet from which, currently at least, there is nowhere to run. But in claiming this consciousness of so-called 'spaceship earth' something rather perverse has also happened. This is the tendency to try and approach environmental issues from larger and larger scales, such that place-based and immanent ecological knowledges are continually displaced and devalued. Félix Guattari, in his essay *The Three Ecologies* considers that the earth increasingly is being managed as if by remote control.¹³⁴ This too is an integral element of the environmentality of Earth Incorporated, indicated by the accelerating tendencies towards converting ecological phenomena into digital information for mapping purposes, the trade of derived environmental commodities via digitised stock markets, and an emphasis on 'scaling up' in the conservation endeavours of large ENGOs and donors. This becomes a strangely ungrounded and dematerialised response to collective concerns regarding social and environmental health, at the same time as facilitating private capture of reconfigured values, rather than any radical expansion of 'common[wealth] and its powers'.¹³⁵ Perhaps, then, an onto-epistemological challenge for creating dynamically equitable and healthy ecologies is to find our way back down to earth: to both think and embody socio-environmental realities that re-embed, rather than dis-embed, human and non-human natures, without knee-jerk reliance on the mediating and structuring sign of money.

- ¹ EON Productions (2008) *Quantum of Solace*, directed by Marc Forster
- ² Chapin M (2004) A challenge to conservationists. *World Watch Magazine*, November/December: 16-31; MacDonald C (2008) *Green Incorporated: an environmental insider reveals how a good cause has gone bad*. Guilford: The Lyons Press; Brockington D (2009) *Celebrity and the Environment: Fame, Wealth and Power in Conservation*. London: Zed Books
- ³ Sachedina H, Igoe J and Brockington D (2010) The spectacular growth of the African Wildlife Foundation and the paradoxes of neoliberal conservation, *Current Conservation* 3(3):24-27; MacDonald KI (2010) The devil is in the (bio)diversity: private sector 'engagement' and the restructuring of biodiversity conservation. *Antipode* 42(3):513-550
- ⁴ Hari J (2010) The wrong kind of green. *The Nation* 22 March, <http://www.thenation.com/doc/20100322/hari/print> Accessed 9 March 2010, p.9
- ⁵ Benjaminsen TA, Kepe T and Bråthen S (2005) *Between Global Interests and Local Needs: Conservation and Land Reform in Namaqualand, South Africa*. unpublished manuscript; Brockington op. cit.
- ⁶ Rowell A (1996) *Green Backlash: Global Subversion of the Environmental Movement*. London: Routledge; MacDonald C op. cit.
- ⁷ The mining conglomerate Rio Tinto, together with the IUCN, thus are exploring 'opportunities to generate marketable ecosystems services on land owned or managed by the company', see Bishop J (2008) Building biodiversity business: notes from the cutting edge. *Sustain* 30:10-11, p. 10.
- ⁸ For descriptions and critique see: MacDonald C op. cit.; Brockington op. cit.; Sullivan S (2009) Green capitalism and the cultural poverty of constructing nature as service-provider. *Radical Anthropology* 3:18-27; Sullivan S in press 'Ecosystem service commodities' – a new imperial ecology? Implications for animist immanent ecologies, with Deleuze and Guattari. *New Formations* 69, special issue on 'Imperial Ecologies'; Hari op. cit.
- ⁹ By 'neoliberal' (and 'neoliberalism') I refer in particular to the coalescence of globalising political and economic policies that flow from the Washington Consensus drawn up in 1989 by economic advisers to the major international financial institutions (primarily the World Bank and the International Monetary Fund). This global(ising) economic framework is complex in structure and effects but includes: deregulation of international finance flows; protection of business interests in part via the establishment of so-called 'free trade' regions; and structural adjustment programmes which 'developing' countries are expected to agree and adhere to in order that they may access donor funds for development purposes. These introduce a range of conditionalities, frequently oriented towards the opening up of 'southern' markets and utilities to international business, and the 'rolling back of the state' to permit further trade, private investment and donor permeability in such contexts. Major International Non-Government Organisations (INGOs) and Environmental Non-Governmental Organisations (ENGOs) have mushroomed in this context to fill the facilitating and implementation vacuum left in circumstances of weakened states and public sectors. The varied ways in which the combination of such structuring processes have vested sovereignty, i.e. decision-making powers, in locations beyond the nation state has famously become termed *Empire* by Michael Hardt and Antonio Negri (2000 *Empire*. Cambridge, Massachusetts: Harvard University Press). For more detail on the neoliberalisation of nature and of environmental protection see McCarthy J and Prudham S (2004) Neoliberal nature and the nature of neoliberalism. *Geoforum* 35:275-283; Sullivan S (2006) The elephant in the room? Problematizing 'new' (neoliberal) biodiversity conservation. *Forum for Development Studies* 33(1):105-135; Igoe J and Brockington D (2007) Neoliberal conservation. A brief introduction. *Conservation and Society* 5(4):432-449; Castree N (2008a) Neoliberalising nature: the logics of deregulation and reregulation. *Environment and Planning A* 40:131-152; Castree N (2008b) Neoliberalising nature: processes, effects, and evaluations. *Environment and Planning A* 40:153-173; Büscher B (2010) Anti-politics as political strategy: neoliberalism and transfrontier conservation in southern Africa. *Development and Change* 41(1):29-51. Nb. James Ferguson comments recently, that 'uses of neoliberalism' in so-called 'progressive scholarship' to critique the consolidated inequities produced by capitalism, can produce something of a knee-jerk reaction against any initiative that contains neoliberal elements, even while that initiative might manifest progressive outcomes in some terms and at some scales (in Ferguson J (in press 2010) The uses of neoliberalism. *Antipode*. The situation is complex, and the structuring implications of neoliberal political economic policies clearly are both varied and significant.
- ¹⁰ As championed in the 1990s by environmental economist David Pearce, e.g. Pearce DW (1998) *Economics and the Environment*. Cheltenham: Edward Elgar; Pearce DW, Markandya A and Barbier E (1989) *Blueprint for a Green Economy*. London: Earthscan; Pearce DW and Turner RK (1990) *Economics of Natural Resources and the Environment*. Hemel Hempstead: Harvester; Pearce DW and Warford J (1993) *World Without*

End: Economics, Environment and Sustainable Development. Oxford: Oxford University Press. As Turner (2001) reviews, David Pearce's work was 'underpinned by a strong affinity with individualism and as he saw it with the protection of individual freedoms and democratic processes. He was therefore naturally drawn to neo-classical insights for policy and management agendas, that coalesced around the creation of property rights and markets in environmental assets, the use of economic incentive policy instruments and the removal of perverse subsidies', in Turner K (2001) The 'Blueprint' legacy: a review of Professor David Pearce's contribution to environmental economics and policy, *CSERGE Working Paper PA 05-01*, http://www.uea.ac.uk/env/cserge/pub/wp/pa/pa_2005_01.pdf Accessed 11 June 2010, p. 1

¹¹ In the business literature, a related environmental justification for enhancing economic growth is the argument that, despite the acknowledged positive relationship between income and consumption levels, further increases in global affluence will be required to reduce the environmentally damaging effects of the growing human populations of the world's so-called 'survival economies', in acknowledgement that human fertility seems to fall with monetary income (e.g. Hart SL (1997) Beyond greening: strategies for a sustainable world, *Harvard Business Review* January-February:66-76, .p. 70)

¹² A concept critically discussed in Martin A, Blowers A and Boersema J (2009) Do we want green growth or a green recession? *J. of Integrative Environmental Science* 6(1):1-6

¹³ Hart op. cit. p. 67; also see Hawken P (1993) *The Ecology of Commerce: A Declaration of Sustainability*. New York: Collins Business, p. xiii; Hawken P, Lovins A and Lovins L Hunter (2008) *Natural Capitalism: Creating the Next Industrial Revolution*. New York, Back Bay Books; Kiernan MJ (2009) *Investing in a Sustainable World: Why Green is the New Color of Money on Wall Street*. New York: Amacom, p. xii

¹⁴ Altwater E (1989) Ecological and economic modalities of time and space. *Capitalism, Nature, Socialism* 3:59-71, in O'Connor M (1994) On the misadventures of capitalist nature. In M. O'Connor (ed) *Is Capitalism Sustainable? Political Economy and the Politics of Ecology* (pp 125-151). London: the Guilford Press

¹⁵ Hart op. cit. p. 68

¹⁶ Hart *ibid.*, p. 68, 71

¹⁷ Sullivan (2009) op. cit.

¹⁸ As documented for the North American Free Trade Agreement in McCarthy J (2004) Privatizing conditions of production: trade agreements as neoliberal environmental governance. *Geoforum* 35:327-41

¹⁹ Inflection Point Capital (2010a) Homepage. <http://www.inflectionpointcm.com/> Accessed 26 April 2010

²⁰ Inflection Point Capital (2010b) Timing. <http://www.inflectionpointcm.com/timing.html> Accessed 17 March 2010

²¹ Kiernan op. cit. pp. xvii, xiv

²² UNEP New Green Deal, <http://www.unep.org/greeneconomy/> Accessed 23 April 2010. Thank you to Bram Büscher for bringing this to my attention.

²³ UNEP/IUCN (2007) Developing international payments for ecosystem services: towards a greener world economy. http://www.unep.ch/etb/areas/pdf/IPES_IUCNbrochure.pdf Accessed 23 September 2008, p2

²⁴ Moore J (2010) The end of the road? Agricultural revolutions in the capitalist world-ecology, 1450-2010. *J. Agrarian Change* 10(3):389-413, p. 390

²⁵ *Ibid.* p. 389

²⁶ O'Connor J (1988) Capitalism, nature, socialism: a theoretical introduction. *Capitalism, Nature, Socialism* 1:11-38

²⁷ Also see Sullivan (2009) op. cit.; Brockington D and Duffy R 2010 Capitalism and conservation: the production and reproduction of biodiversity conservation. *Antipode* 42(3):469-484 (and the papers in the volume which this introduces); Büscher B, Neves-Graça K, Sullivan S, Brockington D and Igoe J (forthcoming) Towards a consolidated critique of neoliberal conservation

²⁸ Brockington and Duffy op. cit. p. 480

²⁹ O'Connor M op. cit., pp. 126, 133

³⁰ Robertson MM (2006) The nature that capital can see: science, state, and market in the commodification of ecosystem services. *Environment and Planning D: Society and Space* 24: 367-87, p368

³¹ Jean-Christophe Vié, in IUCN (2009) *Wildlife Crisis Worse Than Economic Crisis*.

<http://www.iucn.org/about/work/programmes/species/?3460/Wildlife-crisis-worse-than-economic-crisis—IUCN> Accessed 10 August 2009

³² Strong M 1996 A new 'rich-poor' war, Lecture to the Korea Institute for International Economic Policy, Seoul, Korea, 22 October 1996. <http://www.mauricestrong.net/2009032079/speeches2/speeches2/korea-economic-policy.html> Accessed 30 November 2009

- ³³ EKO Asset Management Partners <http://ekoamp.com/who/> Accessed 23 April 2010
- ³⁴ Polanyi K (2001 (1944)) *The Great Transformation: the Political and Economic Origins of Our Time*. Boston: Beacon Press, p. 187. Polanyi writes that '[w]hat we call land is an element of nature inextricably interwoven with man's [*sic*] institutions. To isolate it and form a market for it was perhaps the weirdest of all the undertakings of our ancestors'.
- ³⁵ Kiernan, M. (2010) *Après Copenhagen — le déluge??*, <http://www.inflectionpointcm.com/thought2.html> Accessed 17 March 2010
- ³⁶ Advanced Conservation Strategies, Environmental markets, http://www.advancedconservation.org/blog/?page_id=58 Accessed 7 December 2009
- ³⁷ O'Connor op. cit. p140
- ³⁸ Bekessy SA and Wintle BA (2008) Using carbon investment to grow the biodiversity bank. *Conservation and Policy* 22(3):510-513, 510
- ³⁹ I describe and discuss this further in Sullivan (in press) op. cit.. For more information see: www.unredd.org; Peskett P, Huberman D, Bowen-Jones E, Edwards G and Brown J (2008) *Making REDD Work for the Poor*. London: Poverty Environment Partnership. For detailed analyses of the carbon offset trade, including REDD, see: Böhm S and Dabhi S (2009) *Upsetting the Offset: The Political Economy of Carbon Markets*. London: Mayfly Books, online <http://mayflybooks.org/wp-content/uploads/2009/12/9781906948078UpsettingtheOffset.pdf>; Gilbertson T and Reyes O (2009) *Carbon Trading: How it Works and Why it Fails*. Critical Currents 7, Uppsala: Dag Hammarskjöld Foundation; Phelps J, Webb EL and Agrawal A. (2010) Does REDD+ threaten to recentralize forest governance? *Science* 328:312-13; Corbera E and Brown K (in press 2010) Offsetting benefits? Analyzing access to forest carbon. *Environment and Planning A*.
- ⁴⁰ Strange S 1998 What theory? The theory in *Mad Money*. *CSGR Working Paper* 18/98, <http://www2.warwick.ac.uk/fac/soc/csgr/research/workingpapers/1998/wp1898.pdf> Accessed 23 August 2009
- ⁴¹ Sullivan (in press) op. cit.
- ⁴² Optimum Population Trust (2009) Ground-breaking carbon offset project will put population on the Copenhagen agenda. <http://www.optimumpopulation.org/releases/opt.release3dec09.html> Accessed 3 December 2009
- ⁴³ Seagle C (2010) Offsetting the 'global body': mining-conservation partnerships as legitimization and governance in Madagascar, paper presented at the conference *An Environmental History of Lund University*, Lund University, 6-8 May 2010.
- ⁴⁴ Ten Kate K and Maguire P (2008) Voluntary biodiversity offsets. *Payments for Ecosystem Services: Market Profiles* (pp. 21-22). Forest Trends and the Ecosystem Marketplace, http://ecosystemmarketplace.com/documents/acrobat/PES_Matrix_Profiles_PROFOR.pdf Accessed June 23 2008, p. 21; also Bayon R 2008 Banking on biodiversity. *Innovations for a Sustainable Economy* (pp. 123-239). Washington: Worldwatch Institute, State of the World Report.
- ⁴⁵ Bekessy and Wintle op. cit.. p. 511.
- ⁴⁶ Bekessy and Wintle *ibid.* p. 510.
- ⁴⁷ I am grateful here to my colleague Martin Frost for talking me through the history and workings of government issued bonds.
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