

Why should we care about ecology?

Dr Mark Everard, Associate Professor of Ecosystem Services, University of the West of England (UWE), Coldharbour Lane, Frenchay Campus, Bristol BS16 1QY, UK (mark.everard@uwe.ac.uk, M: +44-(0)-7747-120019).

Introductory blurb



Dr Mark Everard is Associate Professor of Ecosystem Services at the University of the West of England (UWE Bristol), active since the 1980s in the development and application of ecosystem services internationally, and author of 22 books including the recent state-of-the-art text *Ecosystems Services: Key Issues* (Routledge, 2017).

Answers to this provocative title may be obvious to the readership of the *Bulletin of the British Ecological Society*. However, it is an important question to address if the values of nature are to be embedded into the diversity of world views and decisions of society as a whole, forming the basis for a sustainable future. What does ecology then mean and why should it matter in the context of a corporate boardroom, transport planning meeting or pretty much any other setting that ecologists rarely attend? Part of our mission is to make what we might accept as obvious equally so for those to whom it is currently not. And for that we need a language that is transferrable beyond our specific interests.

It is here that the paradigm and language of ecosystem services is so useful. In basic terms, ecosystem services are defined by the Millennium Ecosystem Assessment as “...*the benefits people obtain from ecosystems*”ⁱ. Various redefinitions and reclassifications have been advanced, along with periodic critique that ‘ecosystem services’ can mean different things to different people. However, this is as much a strength as a weakness, serving to engage formerly disconnected sectors of society in dialogue. As Bob Costanza summarises, the Millennium Ecosystem Assessment provides “...*an appropriately broad and an appropriately vague definition*” of ecosystem services spanning “...*both the benefits people perceive, and those they do not*”ⁱⁱ. Ecosystem services thereby expand awareness of the multiplicity of values conferred by nature, averting the narrow approach of conventional economics or perceptions that this is all ‘environmental stuff’ inconsequential to other walks of life.

Valuing the services of nature

Let us at this point head off three common misunderstandings about ecosystem services and their valuation.

Firstly, recognition and valuation of the services provided by ecosystems are not about 'putting a price on nature' for trading in the market. Ecosystem services do not value nature at all, but provide a means to recognise the generally underappreciated diversity of benefits that it provides for humanity.

Secondly, valuation means more than simple accountancy. The plurality of values provided by ecosystems differ qualitatively, and are often incommensurable with narrow monetary figures (even if normalisation in monetary terms may sometimes be useful for weighting in decision-making).

Thirdly, it is a fallacy that we do not already value ecosystems in decision making. We do so routinely, but generally with a default value of zero when their benefits are overlooked. Helping people understand that ecological systems confer real values upon them is central to embedding ecological understandings into decision-making processes, and vital for progress towards a sustainable pathway of development.

Natural, restored and emulated ecosystems

The diverse roles that ecosystems play in supporting human wellbeing are too frequently overlooked, often leading to their incremental degradation. Whether recognised or not, our natural or semi-natural landscapes work for us 24/7 through capture, storage and purification of water resources, buffering extremes of drought and flood, sequestering carbon, cycling nutrients, and providing aesthetic and recreational opportunities amongst a host of wider benefits. Assessment of the scope and indicative values that major habitat types confer upon humanity globally was a primary purpose of the Millennium Ecosystem Assessmentⁱⁱⁱ, and at national scale of the UK National Ecosystem Assessment^{iv}. Both studies were influential in raising awareness about the multiple values of ecosystems and the need to integrate them across policy areas.

Restoration of ecosystems and their functions underpin emerging strategies such as Natural Flood Management (NFM), founded on alteration, restoration or use of landscape features as a novel way to reduce flood risk^v. Coastal defence is also increasingly being addressed by a managed realignment approach that, rather than fighting ecosystem processes, entails controlled re-flooding of land formerly 'reclaimed' under former agricultural intensification policies (particularly following the Second World War) to allow the regeneration of former intertidal habitat that naturally disperses and dissipates energy from stormy, tidal waters. In contrast with engineered solutions geared to narrowly focused outcomes, commonly with multiple unintended negative impacts, restoration of ecological processes tends to generate a wealth of ecosystem service co-benefits such as habitat for wildlife including fishery recruitment, carbon sequestration and nutrient cycling, with substantially reduced maintenance costs.

We also routinely emulate nature in established management solutions. For example, we exploit ecological processes and services in secondary sewage treatment systems (principally trickling filters and activated sludge), sustainable drainage systems and other urban 'green infrastructure' such as street trees that are

not only aesthetically pleasing but also clean the air and slow run-off.

Reintegration with ecosystem processes

We are walking ecosystem processes, connecting constantly and indivisibly with supporting ecosystems as we breathe, drink, eat and excrete. But so too are our economic activities, be they founded on the productivity of fertile soils, exploiting flows of energy whether current or stored for millennia in fossil reserves, making use of water for cooling or as a vital ingredient, accessing mined, fished or felled raw materials, or emitting wastes for natural processes to dissipate or reintegrate. In all of these metabolic activities, the handshake with nature can be engineered synergistically with natural regenerative capacities. Alternatively, generally through oversight rather than intent, they may degrade the resources upon which future wellbeing depends. Our focus may be narrowly framed, or else may take account of the multiple ramifications of every decision and action for the integrated socio-ecological system of which we are part.

The mission of reframing all spheres of societal policies and practices around the finite carrying capacities of ecosystems, one of the central planks of sustainable development, is daunting and requires robust frameworks to articulate the multiple interdependencies between humanity and ecosystems. Ecosystem services achieve this by providing a dialogic framework framed in intuitive terms meaningful to those outside the community of ecosystems specialists: production of fibre, climate regulation, purification of water, nutrient cycling, soil formation, habitat for wildlife, erosion regulation, or harvesting of medicinal plants. This forms a basis for cross-sectoral debate, recognition of potential conflicts and innovation of win-win solutions.

Anchor services and systemic solutions

Virtually all decision-making is driven by an emerging need, be it a commercial aspiration, regulatory target or public policy. Historically, these needs have been treated as overriding drivers of resource use and management to achieve narrowly-framed outcomes, overlooking wider but inevitable ramifications across the inherently integrated socio-ecological system.

However, when the emerging need is instead viewed as an 'anchor service' around which consequences for other interlinked ecosystem services are assessed and where possible optimised, innovation to avert unintended conflicts and instead to contribute to ecosystem integrity and continued flows of multiple societal benefits are favoured. Innovative 'systemic solutions', generally working with natural processes to promote the driving need but explicitly aiming to optimise benefits across the full spectrum of ecosystem services and their beneficiaries, might result in rather different strategies than the generally narrowly framed solutions with which society has worked to date.

NFM, managed realignment and green infrastructure are pertinent examples, working with or emulating natural processes to promote 'anchor services' supporting

driving needs, whilst contributing to a spectrum of linked beneficial ecosystem service outcomes.

Much of my work is in water and other aspects of natural resource security in the developing world, where perhaps the linkage between ecological and human regeneration is clearest. However, the challenges are no less pertinent, if often less evident, across the developed world. As one example, I was part of a research team addressing persistent flooding of a railway cutting and downstream properties, related significantly to overspill from a small river carried in a narrow metal channel over the cutting. Our solution entailed working with upstream landowners to create detention basins calculated to detain floodwater during heavy rainfall and release it slowly to buffer river flows, reducing flood peaks for both the railway cutting and downstream properties. This systemic solution, based on restoring depleted natural processes, retained the grazing value of the land, coincidentally diversifying habitat for wildlife and local amenity. Regrettably, the rail operator instead took the 'safe' established option of installing a bigger pump to supplement the one already operating 24/7, entailing higher energy costs and still suffering rail flooding and accusations of contributing to flooding of downstream properties. However, the principle was demonstrated semi-quantitatively that the values of nature, with potential generation of a range of co-benefits, are germane to management solutions across all, often non-obvious, policy areas.

Who cares about ecology, or at least who should do for their own self-benefit as much as for tackling longer term sustainability aspirations? Well, ultimately all of us. Ecosystem services provide us with a tool to understand why, and to enter debate with others sharing common resources.

End of *Full Text* article

Legend to Figure below: *The role of ecological functioning and restoration in water, food and livelihood security and spiritual meaning is most obvious in arid, developing world settings where daily lives are closely connected with ecosystems.* (This is a low resolution version of the image [Impoundment in Alwar District, Rajasthan.jpg](#), a high resolution version of which will be emailed separately)



Legend to Figure below: *Ecosystem-based solutions can add value and produce diverse co-benefits in most policy settings, for example as a more sustainable option than this box channel carrying a river over a flood-prone railway cutting.* (This is a low resolution version of the image [River Frome, Chipping Sodbury cutting.jpg](#), a high resolution version of which will be emailed separately)



ⁱ Millennium Ecosystem Assessment. (2005). *Ecosystems & Human Well-being: Synthesis Report*. Island Press: Washington DC.

ⁱⁱ Costanza, R. (2016, p.17). Ecosystem Services in Theory and Practice. In: Potschin, M., Haines-Young, R., Fish, R. and Turner, R.K. (eds). *Routledge Handbook of Ecosystem Services*. Routledge: London. pp.15-24.

ⁱⁱⁱ *ibid*.

^{iv} UK NEA. (2011). *UK National Ecosystem Assessment: Synthesis of the key findings*. UNEP-WCMC, Cambridge.

^v Parliamentary Office of Science and Technology. (2011). *Ecosystem Service Valuation*. POSTnote 378, Parliamentary Office of Science and Technology, London.