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From the chairs

Rural
Gerard Smith FRICS

Concerns of strategic importance were raised at the recent meeting of the Land and Resources global group. One such was water, so the RICS Water Conference in November, chaired by Gerard Smith (see left), proved highly popular. With growing interest in seas and oceans, the way we contribute to their sustainability and health while also responding to pressures from the built environment must be a key part of our plans.

RICS Geomatics is hosting an offshore and hydrographic focus meeting with the UK’s Geospatial Commission on 27 February to ensure the voices of marine and offshore data professionals are heard, and will attend the World Ocean Summit in March to build relationships with the other groups working in this area.

As data analytics and spatial intelligence in particular becomes more strategic, geomatics is also increasing in visibility and, potentially, relevance. Land and oceans are more and more frequently being monitored by remote and robotic sensing and observation techniques, but expertise is still required to check their quality and ensure their fitness for purpose.

Geomatics
Gordon Johnston FRICS

Environment & resources
Stephen McKenna MRICS

Planning & development
Paul Collins MRICS

As I write this the new year has just begun, and much will have changed nationally and internationally by the time this is published. At this same time, the RICS community is exploring how surveyors’ roles will change in the future (RICS.org/futureprofession).

Planning and development will be at the forefront of a changed and changing world, and RICS professionals involved in this sector should play a key role. Nevertheless, the big question is will they do so with their current knowledge and skills, or will they need a fresh approach? Core knowledge and skills in development appraisal will arguably remain a constant, but what else will or should be expected of future planning and development surveyors?

That’s where you, the planning and development members, can give us a steer in keeping us professionally relevant. What new knowledge, skills and attributes do we need to identify, embrace and invest in, to help lead best practice in the planning and development of the built and natural environment? Email me, paul.collins@ntu.ac.uk, or Tony Mulhall, tmulhall@rics.org, with your ideas.
Briefing

Natural capital in focus

Welcome to this special edition of the Land Journal, which is themed to natural capital to reflect the importance of this subject.

The features in this issue take the themes of RICS’ 2017 insight paper Value of natural capital – the need for chartered surveyors a step further to showcase some of the challenges and opportunities for chartered surveyors, as well as the need for innovative and collaborative thinking. We hope you find them interesting and informative.

New criteria for PII run-off cover

Changes to RICS requirements for professional indemnity insurance (PII) run-off cover come into force on 1 April and apply to all registered firms. Amendments have been made to allow annual premium payments to remain possible for commercial work and to guarantee that firms have access to run-off for consumer-facing work. There will also be a run-off pool that will expand availability as well as helping to eliminate risks of gaps in PII cover.

Key appointments made to Geospatial Commission

Sir Andrew Dilnot has been appointed chair of the government’s Geospatial Commission and Nigel Clifford deputy chair. Both have taken up the roles for three years.

Finnish pilot develops sustainable forestry app

A Finnish consortium has developed a global mobile app that uses big data more efficiently in the bioeconomy. The aim is to help landowners and forestry operators produce food, energy and biomaterials more responsibly and sustainably by collecting their forests’ data using a smartphone, which they can upload to the Finnish Forest Centre’s forest resource database.

The app makes it easier to collect information and keep forest inventories up to date. It also makes the payment of sustainable forestry subsidies smoother, and can be used to monitor the impacts of storms, snow, pests and diseases.

The project, which is due to end this year, is co-financed by the EU’s Horizon 2020 programme.

databio.eu/en

Events

RICS Environment and Resources Conference
3 April, Bristol
rics.org/envandresources

RICS Rural Conference
June, Cirencester
Register your interest now; dates will be confirmed in due course.
rics.org/ruralconference

Land & resources global board

Barney Pilgrim
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RICS is looking forward to bringing this edition, with its natural capital and ecosystems theme, to the 2019 World Bank Land and Poverty conference (bit.ly/WBLPC2019). This is the first significant event in the global land professional calendar, at which more than 1,000 expert land professionals gather. RICS has a lot planned for conference week, 25–29 March, and this edition will be distributed to delegates where it has particular relevance.

The World Bank has also recently released its third volume on wealth accounting, which embraces the concept of natural capital. The Changing Wealth of Nations 2018 covers a set of assets that constitute the wealth of countries beyond the traditional metrics of GDP (bit.ly/WBCWoN18).

It’s worth also noting that a dependence on natural capital is woven through many of the Sustainable Development Goals (SDGs).

We are looking forward, too, to the launch of the final International Land Measurement Standard reporting framework at the conference, and the FIG meeting in Hanoi. RICS should be proud of its role in such an important initiative.

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rics.org/pii

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bit.ly/Geospchairs

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Natural capital has become prominent both globally and nationally in recent years. It has been defined by the Natural Capital Protocol (bit.ly/natcapprot) as the ‘world’s stocks of natural assets[,] which include geology, soil, air, water and all living things’, and from these derive a wide range of ecosystem services that make human life possible. Ecosystem services have been defined as ‘the benefits people obtain from ecosystems’, and are classified under four headings, as detailed in the box opposite.

Much of the recent focus on natural capital has related to the identification, recognition and valuing of the supporting, regulating and cultural services, given that better recognised services, such as food and fuel, fall under provisioning.

Natural capital has been the focus of the Economics of Ecosystems and Biodiversity, a global initiative whose principal objective is to bring the values of biodiversity and ecosystem services into decision-making at all levels across all sectors (teebweb.org). But there have been a plethora of other global initiatives concerned with natural capital.

In the UK, the most significant work is the UK National Ecosystem Assessment (NEA; see uknea.unep-wcmc.org), which published its first report in 2011. This was the first analysis of the country’s natural environment in terms of benefits to society and continuing economic prosperity. The assessment contained six key messages, detailed in the box overleaf.

**UK policy**

The NEA’s stark messages on our natural capital and ecosystem services spurred respective UK governments into action with the evolution of policies to ensure a natural capital approach is embedded in the land sector, especially given our imminent withdrawal from the EU and Common Agricultural Policy at the time of writing. While some policy developments for England are outlined in some detail, similar policy developments are taking place throughout the UK.

The UK NEA also prompted the formation of the Natural Capital Committee in 2012, an independent body that advises government on the sustainable use of England’s natural capital. Environment secretary Michael Gove asked the committee to advise on the government’s 25-year plan (bit.ly/UK25yrenvplan). Published in January 2018, this sets out the government’s goals for improving the environment in England over the next generation, and how the government will work with communities and businesses to achieve this.

The plan was followed by a consultation that started to outline government’s thinking on the future of agricultural...
subsidies and land management support (bit.ly/greenBrexit). The key theme of this document was the proposed move to a system of public money for public goods.

September 2018 saw government publish the Agriculture Bill, which enshrined the policy objectives of this consultation. The bill details plans to phase out direct payments under the Common Agricultural Policy and move towards a framework that will see farmers and land managers being paid to provide public goods. The aim is to ensure they are empowered to maintain their role as custodians of the countryside, while also producing the highest-quality food, timber and biodiversity.

The bill also allows ministers to make payments during the transition period, up to 2020, to improve farming productivity. ‘This could include supporting investment in technologies and methods that can help farmers reduce the use of inputs such as fertilisers and pesticides, while maintaining or increasing production,’ it says. Such support could be in the form of grants, loans, loan guarantees or capital allowances.

Natural capital has been the guiding principle throughout the drafting of the bill. Having a sound understanding of this principle will be essential if farmers and land managers are to generate and maintain future income streams. Collaboration will also be key; stakeholders will need to work together and, in many instances, new partnerships need to be forged.

The government is proposing that future funding will be directed through an environmental land management scheme (ELMS) with the expectation that the greatest payments will be directed towards those providing the most environmental benefits. One pilot by the Department for Environment, Food & Rural Affairs is currently running in Wensleydale, North Yorkshire, and is rewarding farmers according to measurable environmental outcomes. Initial reports indicate that those in the scheme are enthusiastic about the payment by results approach because they can use their skill and judgement to achieve the desired outcomes.

For instance, senior farm conservation officer at the Yorkshire Dales National Park Authority Helen Keep says: ‘One of the most surprising and pleasing aspects of the pilot is that it has helped to engender a healthy competitiveness among the farmers to do more for the environment.’

Key stakeholders in the land sector have also focused on harnessing natural capital opportunities. In September 2016, think tank Green Alliance and the National Trust issued a proposal for a natural infrastructure scheme to show how new markets could help support farming methods that reduce flooding, provide clean water and restore wildlife, to the benefit of all.

The National Trust highlights that flooding and water pollution are estimated to cost at least £2.4bn a year to businesses, infrastructure operators and government agencies in England, and believes diverting even a small proportion of this towards land management changes on farmland that reduce flood risk and pollution would represent a significant addition to funding for environmental restoration.

The trust also foresees that new natural capital delivery companies could see groups of farmers working together with businesses to ensure flood protection and clean water. The Country Land and Business Association (CLA) has also developed and continues to promote a form of land management contract through which farmers and landowners would be paid to provide ecosystem services with defined measures and outcomes based on scientific evidence and societal needs.

Mindful of the developments in natural capital and ecosystem services, and seeing the need for the profession to engage, RICS commissioned the first of two papers on the subject from Charles Cowap, Challenges for international professional practice: From market value to natural value, published in 2012 (available from Fiona Mannix; see also the following article in this issue).

This highlighted how new approaches to the valuation, appraisal and management of natural capital and ecosystem services promised to transform the way land is managed, development is carried out, assets are appraised and valued, and goods and services once taken for granted are paid for.

The paper predicted that developments in the ecosystem services arena would have far-reaching implications for the work of chartered surveyors in valuation, estate and property management, construction, property development and environmental services. These predictions are coming true.

Value of natural capital: The need for chartered surveyors, the second paper, developed RICS’ thinking on ecosystem services (rics.org/valuenaturalcapital). This reviewed the broad topic of environmental valuation from the perspective of a practising valuer, land manager or estate manager, and approached the field of economic valuation of the environment from a professional valuation perspective.

It presents the language and approaches of environmental valuation in such a way as to enable parallels to be drawn with the technical procedures familiar to professional valuers when dealing with the conventional property assets in established market contexts. Care is of course required to ensure that clients fully understand the nature of the advice being provided, and that there may — and usually will — be wide

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**Classifying ecosystem services**

- **Supporting services**: the services necessary for all others, including soil, photosynthesis, biomass, nutrients and water.
- **Provisioning services**: the products obtained from ecosystems, including food, fibre, fuel, genetic resources, power and fresh water.
- **Regulating services**: the benefits from regulation of processes including regulation of air quality, climate, water, erosion, poaching and natural hazards.
- **Cultural services**: the non-material benefits people obtain from ecosystems through spiritual enrichment, recreation and aesthetic experiences, taking account of landscape values, use and non-use benefits to buyers and users.
While the paper outlined examples of grasslands and woodlands, the approaches involved can be applied to a range of natural assets. However, it’s important to note the distinction between the value of an asset as it stands for sale or notional sale, and the evaluation of the deemed or perceived benefits or disadvantages associated with an asset’s existence, enjoyment, environmental or aesthetic contribution for strategic decision-making purposes. Although it may be possible to translate the benefits of some assets into part of a sale or notional sale, it will not with others.

**Actions for professionals**

In the first instance, chartered surveyors and land managers need to support landowners to identify, map and document natural capital assets. Consideration is then needed to assess and appraise these assets and the products and services they provide so professionals work with both private and public partners and develop market opportunities based on such benefits as: woodlands actively sequestering carbon; grasslands and wetlands reducing flood risk and improving water quality; access to the natural environment enhancing our health and well-being; and our urban trees improving air quality and providing essential shade and shelter. In 2018, the Office of National Statistics estimated the value of the UK’s natural capital at some £761bn, based on capitalised annual flows of these services (bit.ly/ONSNCmeth). Forest Enterprise’s natural capital account also suggests a natural capital asset value of £22.99bn for England’s public forest estate (bit.ly/UKFCNCA).

There will be key roles for chartered surveyors in advising land managers to identify opportunities, instigate collaboration, bring key parties together, develop markets and put a range of new agreements in place to help realise some of the natural capital values and ensure that land continues to provide vital services across all three pillars of sustainability; that is, economic, social and environmental.

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**Related competencies include:**
Agriculture, Land use and diversification, Management of the natural environment and landscape

**Further information:** For copies of the RICS papers cited, email Fiona Mannix.

**UK NEA: key findings**

1. The natural world, its biodiversity and its constituent ecosystems are critically important to our well-being and economic prosperity, but are consistently undervalued in conventional economic analyses and decision-making.
2. Ecosystems and ecosystem services, and the ways people benefit from them, have altered markedly in the past 60 years as a result of changes in society.
3. The UK’s ecosystem services currently provide some services effectively, but others are in long-term decline. Out of a total range of services, around 30 per cent are declining.
4. The UK population will continue to grow and its demands and expectations will continue to evolve. This is likely to increase pressure on ecosystem services in the future, and climate change will have an exponential impact.
5. Actions and decisions taken now will have consequences far into the future. It is important that these are understood so we can make the best possible choices, not just for society now but also for future generations.
6. A move to sustainable development will require a mixture of regulations, technology, financial investment and education, as well as changes in individual and societal behaviour and adoption of a more integrated, rather than conventionally sectoral, approach to ecosystem management.
Clause one of the Agriculture Bill currently before Parliament sets out how the government will fund environmental work in the countryside in future. Financial assistance will be available for:

- managing land and water to protect or improve the environment
- supporting public access to the countryside
- managing land and water for improved cultural or natural heritage
- climate change adaptation and mitigation
- mitigation of environmental hazards
- activities for the health and welfare of livestock
- plant protection.

What might such measures look like? The box overleaf shows one example of how this may work, although published details are still sketchy.

But why rely on government funding when there are private commercial arrangements to be sought? Deals that, given the caprice of government funding, could be more sure-footed, secure and sustainable, as well as more private and confidential? What might these look like?

Utility companies might for instance pay for natural asset management to protect or enhance their operational assets. The most obvious examples of this would be water companies paying to secure decent supplies of good-quality water, by funding changes to farming practices or peatland restoration for instance. Stretches of railway line could also be made less vulnerable to weather and flooding by having developers contract with Network Rail to provide natural flood management and sustainable drainage.
Proposals such as these will need careful appraisal, and will draw on all the traditional skills and knowledge that land agents and valuers have.

**Appraisal and agreement**

Financial appraisal will draw together the important elements. However, the final decision will depend on the answers to the following questions.

- What new revenue will be generated, over what period, and according to what cash flow pattern? How secure is this revenue?
- How will revenues be updated or reviewed?
- What extra costs will be incurred, both capital and operational? Again, how will these fluctuate in future?
- What existing revenue, if any, might be compromised or forgone?
- What existing costs, if any, might be saved?

If the total extra revenue plus costs saved exceeds extra costs plus revenue forgone, the deal might be worthwhile, but some more questions must be answered first.

- What will be the tax consequences be?
- What will be the impact of the change on capital value?
- What other knock-on effects might arise in terms of future use and management, whether positive or negative?
- What happens if or when the agreement is terminated, and at what cost?

The exact form of legal agreement will then need to be settled. At one extreme this may be a lease or licence to enter or occupy land and carry out activities there, and in this case, the terms will have to be considered against the appropriate statutory background. Is this an agricultural lease for example, taking effect as a farm business tenancy? Or is it a commercial letting, falling under the scope of the Landlord and Tenant Act 1954? The answer will be crucial in determining many of the terms of the agreement – for example, contracting out under the 1954 Act.

In many other cases, however, the contract will cover the provision of a service by the farmer or landowner and payment for this service by the beneficiary. The agreement may need to provide for the beneficiary to come on to the land to carry out certain works. Payment may need to be conditional on such works being carried out or outcomes achieved.

Questions will therefore arise over the duration of the agreement and the terms under which it can be reviewed or terminated. In the longer term, what will happen if the landowner dies or wishes to sell? Will the agreement be intended to bind future owners, and how will this be effected?

The inclusion of covenants to this effect may be another important consideration in negotiations. The government has accepted the Law Commission's proposals for conservation covenants, but other parliamentary business has so far scuppered legislative progress on this. This legislation will allow for positive covenants for conservation purposes to be binding on future title-holders, and there will of course be subsequent registration requirements. Meanwhile, some purchasers may consider the use of estate contracts to protect their longer-term interests.

**Existing land use**

Some natural capital contracts may have few if any implications for the existing use and management of land. Others, however, could be significant. Stocking densities for example may need to be reduced, and machinery movement may become more difficult over ground that becomes waterlogged for longer periods. Other uses such as sporting activities may also need to be considered. The financial effects of these requirements will need to be reflected in the financial appraisal, but it will be equally important to look at the physical working implications.

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**An environmental land management system**

Hangery Farm covers 200ha crossed by two footpaths and a bridleway. The farm is predominantly arable, with some beef rearing and finishing to make use of the less-accessible areas. There is a 10ha block of woodland, two public footpaths and one public bridleway. One of the footpaths skirts the farmyard.

Under the new vision for the countryside in the government’s 25-year environment plan, the Department for Environment, Food & Rural Affairs’ command paper *Health and Harmony* and the Agriculture Bill’s new funding, we can expect rigorous but effective and efficient enforcement of minimum standards for public access; in other words, the footpaths and bridleway must be compliant with minimum legal requirements in all respects at all times. We can also anticipate funding to support access to the countryside, which will seek to add to the minimum amenities of the fully compliant access network. It will entail, for example:

- better surfacing standards
- improved accessibility
- other facilities including rest areas, observation points, interpretation material, parking areas, emergency contact information and medical assistance such as a defibrillator
- added benefits including an environmental plan for the woodland, the treatment of watercourses and flows, and field boundaries
- wider compliance issues, such as the management of farm waste and the attainment of minimum soil management standards
- payment based on simple formulae or menus for work that gives benefit over and above the attainment of minimum standards, for which the polluter – who in this case would be the farmer – pays.
This should also be broadened to consider the knock-on effects where the land is part of a larger working farm or estate. Some upland farmers in the North of England and Wales have for example reported problems with livestock arising from a greater prevalence of bog asphodel \((Narthecium ossifragum)\). Veterinary research has suggested that an interaction between the plant and other microbes in the soil has, in some circumstances, led to the production of toxins that can be fatal to cattle and sheep, although the effect is by no means certain, universal or predictable.

Other interests in the same land will need to be identified and considered as well. Examples could include existing tenancies, joint owners, holders of sporting or mineral rights, beneficiaries of easements and restrictive covenants, mortgagees and other security-holders, and, where trust ownership is involved, the interests of beneficiaries. There may also be statutory agencies that have an interest; for example, where land is designated a Site of Special Scientific Interest, the appropriate authorities will need to be involved.

Risk assessments may need to be reviewed regarding new activities and the relationship with existing activities. Questions of occupier liability should also be considered, concerning both invited visitors under the Occupiers’ Liability Act 1957 \((\text{bit.ly/OccuLiab57})\) and others under the Occupiers Liability Act 1984 \((\text{bit.ly/OccuLiab84})\). Insurers should also be consulted to ensure that public liability and other cover is not compromised.

At the very least, most farmland is likely to be registered on the Rural Land Register and receiving funding under the Basic Payment Scheme. The same land may also be signed up to stewardship or other agreements. The rules will need to be reviewed to ensure continuing compliance, or reflect the cost of disengagement in the financial appraisal.

Many providers of the environmental services envisioned here will be farmers for tax purposes. Will their trading status be affected by the new arrangement? How will they stand for aspects of capital gains tax such as entrepreneurs; holdover and rollover reliefs? Crucially, will the land continue to qualify as agricultural and business property for inheritance tax reliefs?

Compromise of these reliefs may be a reason not to proceed, but this question needs to be looked at fully in the round. For example, the loss of agricultural property relief may be less of an issue if business property relief takes its place; equally, the loss of both reliefs may be acceptable if expected revenue can more than make up the difference. Again, this will call for careful financial appraisal. A contractual arrangement that offers more than enough compensation for the loss of key reliefs may even be preferable to a reliance on the continuing availability of these reliefs.

**The future**

The interests and commitment of future generations will be an important issue for some. Contrast the farming family where at least one child is keen to carry on in agriculture with the situation where all the youngsters see their primary employment away from the farm. Might a scaling back of farming activities open other business opportunities, servicing the new contract itself or in other areas altogether? Might the release of capital from one part of the business – by selling surplus stock for example – allow for investment in other, potentially more profitable areas?

Finally, what impact will the new venture have on capital values? What are the key financial and other risks associated with the project? Careful evaluation of these will be crucial to determining the long-term security of the project. Potential changes in capital value may also be modelled through the financial appraisal, particularly where there is no certainty as to what these changes might be in future. In this situation the financial appraisal can be used to model different degrees of impact; in other words, how much change in value can be absorbed before the project falls over in financial terms?

There is plenty of work, then, that is an excellent fit with the traditional knowledge and skill set of land agents and valuers, especially those who can identify and develop new initiatives in this area: the land agent can become an eco-entrepreneur.

**Related competencies include:** Agriculture, Landlord and tenant, Land use and diversification, Management of the natural environment and landscape

**Further information:** charlescowap.wordpress.com

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Water on the line: stretches of the railway network could be made less vulnerable to weather and flooding by using private commercial arrangements, such as developers contracting with Network Rail to provide natural flood management and sustainable drainage
The restoration economy

When it comes to biodiversity, the UK is one of the most impoverished places on Earth. To restore it, we need new financial models for the countryside.

David Hill

By land area, agriculture has caused the greatest losses to biodiversity in the UK – 97 per cent of meadows have been destroyed since the Second World War, while, since the early 1970s corn buntings have declined by 87 per cent, skylarks by more than 75 per cent, linnets by 76 per cent and turtle doves by 95 per cent.

Built development has also permanently removed wildlife habitat through direct loss or fragmentation into smaller parts. Little regard has been paid to compensating effectively for those losses in the planning system. As a result, most of the remaining biodiversity in England is now confined to the 30 per cent or so of the land area that is not dominated by arable farming, improved grassland or built development. Many lowland areas of the UK have effectively become green concrete as far as biodiversity is concerned.

At the same time, plenty of us are enthusiastic about wildlife conservation. Membership of voluntary conservation bodies is significant; the top 17 have a combined income of £980m and spend about £370m on conservation. Added to this, the government pays about £400m in agri-environment grants to farmers to protect the natural environment in certain areas. But to date, our love of wildlife has not averted massive rural biodiversity loss.

Nature and natural capital is now being recognised as critical to our health, prosperity and economy. To capture this value we need greater investment in it, across a range of initiatives. Nature is an essential not a luxury, and the services and resources it provides us contribute at least 40 per cent to global GDP. Yet for too long we have valued natural capital and biodiversity at zero, and, as a result, the bank of nature is nearly empty.

We need a substantial savings plan to restore balance. We should start by creating a restoration economy — a term coined by biodiversity compensation broker Environment Bank to demonstrate how making nature economically visible would generate new skilled labour in the rural environment where job prospects are currently challenging.

There are three broad areas of funding that collectively would enable the creation of the restoration economy.

Land management contracts
While the UK is still a member of the EU, farmers receive about £3.2bn annually to subsidise their industry and about £400m in payments to mitigate the damaging impacts of farming and food production. This will not continue.

After Brexit, this money will be paid out to farmers through contracts under a new environmental land management scheme for providing environmental goods and services, for example, by creating and managing long-term wildlife habitat at scale. Statistics from the Department for Environment, Food & Rural Affairs show that, on average, farm businesses are only viable because of subsidy, in the form of the Basic Payment Scheme. Many farm businesses are therefore likely to fail unless there is a system of payment of public money for public goods.

I propose that the payment mechanism should be secured through locally relevant, 25-year contracts with farmers and land managers in accordance with a management plan for their farm. Payments would be results-based, unlike the current subsidy and agri-environment payments regime; subsidies are paid irrespective of environmental performance and the agri-environment payments on the basis of complex outputs that do not make as significant a contribution to environmental gain as they should.
Criteria for results-based payments would be set within effective long-term contracts, commercially priced to offer incentives to the land manager with simple administration, straightforward regulatory compliance, and flexibility. There needs to be a formal contracting environment where farmers are identified and directly contracted to meet specific targets, or where specifications for wildlife habitat creation, for example, are put out to tender, perhaps by reverse auction, identifying exactly what the money is buying.

The independently established contractual model, I believe, offers the best opportunities for improving the environmental performance of farming. Farmers would bid to secure contracts either singly or, at catchment scale, by collaborating with each other. Where farmers work together to provide conservation on a greater scale, the areas of land over which biodiversity could be restored would be substantial. Restoration over large tracts of land in this way also ensures greater biodiversity than working with small fragments of land, so farmers should be encouraged to collaborate to secure funding and, in so doing, build resilience into their business models.

Habitat offsetting and habitat banking

Having introduced the idea of biodiversity offsetting into the UK nearly ten years ago, the government is now requiring new developments to ensure a net gain for biodiversity in both the 25-year environment plan (bit.ly/UK25yrenvplan) and the National Planning Policy Framework (bit.ly/UKNPPF2018).

There is general acceptance across government, conservation NGOs, the Chartered Institute of Ecology and Environmental Management, Chartered Institution of Water and Environmental Management and academia that development should provide a net gain in biodiversity. It is no longer appropriate for development’s impacts to continue without meaningful compensation.

For too long, planning authorities have failed to make biodiversity a material consideration in planning. Ecological consultants have designed and promoted on-site mitigation that rarely does anything of value for biodiversity. You may be startled to realise that the costs the developer has sunk into a mitigation scheme within the red-line boundary of the project site not only provide little benefit in terms of biodiversity conservation, but they have also consumed developable land. These sums would have been better invested in large-scale schemes off site where the habitat is protected for the long-term. Some appropriate mitigation within the development boundary is important though biodiversity net gain and the restoration of the UK’s biodiversity will not be delivered by landscaping and prettification of the development site.

At the Environment Bank, currently the only brokers in habitat offsetting, we measure the impacts from a development in biodiversity units and convert this into a conservation credit requirement. Developers purchase these credits from the bank and this funding is invested in new areas of wildlife habitat by working with farmers, landowners and conservation bodies. The new wildlife habitat is created and then managed for 25 or more years according to a detailed, outcome-focused plan, with the bank paying the land managers of the new habitat.

We create bespoke offset sites or large-scale habitat banks across the country. Site selection is spatially literate — that is, it ensures that projects are located where they will provide the most benefit to ecology and biodiversity — and often connected to existing
habits. The developer is issued with a conservation offset purchase agreement and a conservation credit certificate. These are then presented to the planning authority by the developer as evidence that they have discharged their liabilities for ensuring a net gain in biodiversity.

Habitat banking brings together the objectives of the 25-year environment plan to:
- ensure net gains from development
- create a nature recovery network.

Net-gain funding of habitat banks through conservation credits removes two barriers nature conservation has suffered since the late 1800s, specifically lack of access to both land and finance. Land can be found through contracts with farmers, landowners and conservation bodies in the right place and at the right scale to make a major difference to biodiversity conservation, and these providers gain a revenue stream for restoring biodiversity.

Proposals to make net biodiversity gain a mandatory consideration for all planning authorities are currently out for consultation. This will provide a level playing field for developers, give them greater clarity and certainty, and send the right pricing signals to potential investors for a market in habitat offsetting and banking to enable significant investment in the natural environment, which – according to the government’s Ecosystem Markets Task Force – could be in the order of £1.2bn per year.

Corporate natural capital accounting

The National Audit Office (NAO) and Office for National Statistics (ONS) have been working up metric-based assessments that corporate organisations can deploy to quantify, and hence understand, their businesses’ reliance on the assets that nature provides. They are beginning to understand the risk to their operations of treating natural capital, including biodiversity, as a commodity with zero value, and also starting to realise that effective reporting on the role of ecosystems and biodiversity gives them market advantage.

It is likely that investor interest in a company’s position and its mitigation of impacts on ecosystems and biodiversity will scale up substantially in the next decade. Consequently, where impacts are identified, corporates may look to offset these by investing in projects that rebuild and restore natural capital assets by buying environmental credits. Third-party investors and landowners are therefore likely to bring forward ecosystem projects that can secure such corporate investment.

What is needed is for government to signal the economic importance of natural capital to the corporate world. Formal, comprehensive roll-out of the metric-based assessment methodology and the encouragement of its adoption by corporates would provide a consistent basis against which to measure a company’s exposure to the risk associated with natural capital loss. Through HMRC, the government could also require corporates to advise of their impacts on biodiversity and natural capital through financial reporting regulations. Just as there is carbon disclosure by leading corporates, there could also be a natural capital or biodiversity disclosure initiative.

The government needs to signal the importance of natural capital to the corporate world

Corporates could buy environmental credits to invest in the natural environment. This investment could be used, for example, to create and protect large areas of new wildlife habitat; implement catchment-based flood alleviation wetlands; block up moorland drains to keep water on the hill and reduce peat discolouration in our water supply; plant and manage large tracts of broadleaved woodland to help alleviate the impacts of climate change and create wildlife habitat; and invest in managed rewilded landscapes that offer a range of ecosystem service benefits. The NAO and ONS could set standards and provide accreditation to establish a market and enable a system of tradable environmental credits. This trade could generate £3bn per year of investment for the natural environment, and third-party investment could also be attracted for land management interventions that support biodiversity and other natural capital assets.

Impact investment schemes — where investments are made in companies, organisations and funds with the aim of generating social and environmental impact alongside a financial return — were valued at $114bn in 2017, so the market is significant. Projects that build the restoration economy in the UK could attract investment that addresses the deterioration of biodiversity and natural capital due to intensive farming. The investments could be made into projects that enhance and restore biodiversity as well as sparing land thanks to technological advances in agriculture or sharing land through sustainable interventions in farming. Green or environmental bonds could also be initiated by government to leverage further funding: the global green bond market has grown from less than $1bn in 2007 to $200bn in 2017, with an estimated $443bn worth of outstanding green bonds in 2018 and a current growth rate of more than $100bn per year.

Given these three funding initiatives and the potential for restoring biodiversity through habitat banks, we calculate that a 500,000ha nature recovery network could be created in three to six years and managed for 25 years, subject to the dynamics of scale-up. That would certainly transform the practice of biodiversity conservation in the UK.

Prof. David Hill, CBE, is chair of the Environment Bank Ltd dhill@environmentbank.com environmentbank.com

Related competencies include: Management of the natural environment and landscape, Planning and development management
Talking land’s language

Ben Goldsmith was appointed a non-executive director of DEFRA’s board in March 2018. *Land Journal* spoke to him about the department, natural capital and all things environmental

Rob Yorke, FRICS
Q: What is your role in the Department for Environment, Food & Rural Affairs (DEFRA)?
BG: As an informal adviser to the secretary of state, I have been particularly keen to make sure that voices not often heard in DEFRA have a say; for example, during the preparation of the Agriculture Bill.

Q: Part of RICS’ role is about valuation. Based on the maxim ‘If you can’t measure it, you can’t manage it,’ are we getting overly bogged down in valuing natural capital?
BG: In a way I sympathise with the view that there is an intrinsic value to nature, which you can’t put a price on, and doing so somehow corrupts our relationship with it. Having said that, the country is moving towards environmental land management schemes (ELMS) in respect of rural payments, under which we will be paying land managers to provide services to the public according to the way they manage their land, so we will have to put an economic value on those services.

Q: Do you think the jargon – biodiversity offsetting, payment for ecosystems services, natural capital itself – stops us from, in the words of ecologist Sir John Lawton, ‘just getting on with it’?
BG: Yes, there is a place for that language, but perhaps not when you are promoting these ideas to the public. I would rather we talk about the beauty of nature and wildlife in words the public understands when we are trying to get ideas across. Some of the jargon, such as the word ‘sustainability’, has been overused, and the word ‘rewilding’ has some controversial connotations. But those working on the creation of new market mechanisms to enable nature recovery do need to use certain technical terms.

Q: At a recent natural capital investment event, environmentalist Tony Juniper said: ‘It is no longer about halting decline, it is about restoring nature.’ How do you think chartered surveyors can do that?
BG: The way the Agriculture Bill seeks to transform how taxpayers’ money is spent in the countryside will I think be the biggest win for nature that we have ever seen in this country. Instead of being handed over to farmers or land managers on a per hectare basis, millions of pounds will be paid directly in exchange for nature recovery. There is going to be a huge role for advisers of all kinds, including chartered surveyors, in helping land managers, individually and collectively, figure out how this is going to work and maximise their income under new schemes.

Q: Suppose landowners need to manage them?
BG: You generally won’t find a beaver more than ten metres from water. In lots of countries you are not allowed to farm right up to the water’s edge because we know that it causes soil erosion, run-off of nitrates and other chemicals. So frankly I am a believer in backing off from the water a little bit; in which case, beavers are much less of a problem. But of course, there are places where beavers will be an issue and we need to give landowners the right to manage them.

Q: Talking of water, does the return of beavers suggest there may be more in common between environmentalists and land managers over conservation?
BG: I am delighted that beavers are slowly returning to our landscape after an absence of centuries. I do think that we have a duty to put back the pieces of the jigsaw that we have removed.

Q: Perhaps in a less antagonistic way, given the tension caused by illegal releases of beavers and other species?
BG: When the government seems not to move, some conservationists inevitably decide to take matters into their own hands. However eager the public seems to be, it is important that efforts to restore missing species have the buy-in of local communities. That is critical to the success of any project. I don’t know the circumstances around how beavers made it into the River Otter or the River Tay, but I am delighted that it happened.

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holding and beavers interfere with your drainage system, then you have to be able to move them or even to kill them. That stands to reason. In the same way, while the wild boar re-establishes itself in our woodlands, we have got to make sure we hunt it enough. It’s just a simple part of playing our role in the environment and being sensitive to the needs of landowners who have a genuine problem.

But there is a tendency among the British landowning class to reject outright the notion that they should share the landscape with other species. I think there is a word for this: co-existence. We surely must be able to co-exist with wildlife in a way that other countries do.

Q: Are we in danger of doom fatigue over biodiversity losses? Is there more room for optimism to reframe the narrative?
BG: I think there are two potential sources of good news. The first is modern technology enabling us to farm more productively, with lower inputs to grow food that has less impact on the environment. I am a big believer that the government should be spending more on research and development to help advance the technology, and there is also more we can learn from organic practices. I think there is a huge opportunity for the productive parts of our farming sector to improve in terms of productivity, responsibility and impact.

The other source of optimism is in respect of the great blank canvases that our less-productive agricultural land represent – the great marshes of the East of England and Dartmoor, those places where genuinely productive and profitable farming is just not possible.

I think farmers in those places can fare much better by diversifying, with the aim first and foremost of helping nature recover, and food production in those places being a by-product of that work. Active management, including grazing animals, is key to this, with farmers being rewarded by the taxpayer under ELMS.

Q: In my opinion, environment secretary Michael Gove has been a bit weak on forestry. Where is the leadership in forestry on some of the more marginal pieces of land?
BG: I hold with the theories of Professor Frans Vera, who challenges the notion that Europe and Great Britain were once a closed-canopy forest.

He says grazing animals had a much greater impact than we have assumed previously, and that wood pasture would have been the norm before agriculture. Human beings like glades, and the wildlife capturing our imagination today such as songbirds and butterflies exists at the woodland edge. An upland landscape of wooded pasture appeals to me.

Of course, we must have a commercial timber industry, but I would like it to be continuous-cover forestry with native species, and the commercial sector should be rewarded for the environmental benefits and landscape beauty that it provides. At the same time, let’s not renature the uplands with forests planted just for commercial production of wood.

Q: Is there conflict between the various 2020 objectives for biodiversity and renewable energy, say in conserving upland bird populations in areas earmarked for wind farms?
BG: Yes, such policies do sometimes conflict. For instance, elsewhere in the world, the use of oils produced in agriculture – including palm oil, or rapeseed oil as fuel for cars – is profoundly immoral because you are stripping the land of natural habitat or food for people. Smaller-scale biomass makes more sense: projects fed by local woodchip as a by-product from mills are great.

I would rather see solar panels on the roofs of warehouses – there are several thousand hectares of flat roofs in the South East of England alone that could be used for this – and solar photovoltaic cells in our roads as well, which is an interesting idea I have seen pioneered in France. I also think there is a role for offshore wind.
Use of oils produced in agriculture is profoundly immoral because you are stripping the land of natural habitat or food

Ben Goldsmith

Q: Has onshore wind more or less run its course?
BG: Potentially, the best sites have been used up and political winds change; but it is about the availability of quality sites.

Q: Do ecologists get in the way of good hydro schemes?
BG: With hydro, the basic rule is about size. Small hydro has lower impact, whereas large-scale hydro dams can have a terribly negative impact by flooding communities, and are difficult to fix once they have silted up – though given the dire threats that we face from climate change, I would rather have large-scale hydro than coal.

Q: How do you keep legislation at the gate, to enable innovation to flourish but trusting people not to overexploit? Might an environment watchdog’s teeth be too sharp?
BG: The watchdog envisaged in the current Environment Bill would have the remit of holding government to account rather than individual farmers and businesspeople, and I do think, historically, the implementation of regulation in the countryside has perhaps been somewhat bureaucratic. There is scope for simplifying life for rural businesses — it doesn’t necessarily mean regulations should be weakened, but I do think the implementation of that regulation can perhaps be done in a more streamlined and simple way.

Q: Thinking of the Oxford Farming and Oxford Real Farming Conferences, is there more room for the cross-fertilisation of ideas, including better-quality arguments?
BG: I totally agree — there is so much to be learnt from each other. Those farmers farming profitably with lower inputs in the organic movement have knowledge that could help reduce inputs in conventional farming and vice versa. I believe in dialogue and sharing knowledge and information in moving to new ways of farming.

Q: Do we require rural psychologists to help land managers and farmers make some tough transitions in remote areas of the UK?
BG: The average income for small sheep farmers in the uplands is not fair, and the market is not working for them. I think we should assist them to diversify, and pay them for the environmental goods that many of them are already providing. I think they should be paid for the drystone walling, the hedges, pastures full of wildflowers and lots of things they love doing but are not being rewarded for, and encouraged to profit from the enormous number of visitors to those landscapes.

Q: Should UK national parks become more like Yellowstone Park and charge?
BG: No, because Yellowstone doesn’t have people living there. But maybe our parks could become more like Asturias in northern Spain, where thriving rural communities are being paid for the physical environment created by extensively grazed livestock and environmental services, such as guiding tourists. Every single farming family in one village I visited were doing B&B, supported by a special scheme providing tax breaks for their businesses. The landscape is slowly becoming more interesting, more colourful, more alive and it is working economically, socially and environmentally. Why not aspire to these examples in Europe that have more people, not fewer, than we have in our uplands?

Q: If you were a large landowner, say a Dyson or a Buccleuch, what would your remit for your property adviser be?
BG: It would be entirely different for each of them. As a lowland Dyson, I would push for innovation in my farming to increase productivity, becoming more responsible in having less impact on the environment. I would identify those places on my land where farming is not worth doing, and I would seek environmental services from the land by allowing nature to restore itself. There is space on every farm for a pond or a hedgerow or two and an uncut patch.

If I were a landowner in windswept Scotland, I would move away from a monoculture of red deer for stalking, seeking to make my landscape a more interesting model for visitors. It would still include hunting, fishing, shooting but it would also include birdwatching and hiking, cycling, kayaking and glamping. I would also be looking to be rewarded for reducing flooding and income from local authorities for public access. There is a whole bunch of different things we could look at to diversify into in a brave new world.

Rob Yorke FRICS is a rural chartered surveyor and independent commentator robyorke.co.uk @blackgull

Use of oils produced in agriculture is profoundly immoral because you are stripping the land of natural habitat or food

Ben Goldsmith
Coral reefs are arguably one of the most valuable forms of natural capital, certainly in terms of habitat. One estimate puts their value at $1tr a year, generating annual benefits of around $350,000/ha. This value derives largely from fisheries, tourism and coastal protection, which in turn support considerable real-estate value. Corals also support around 1bn people’s livelihoods.

Despite this, over the past 30 years humans have caused the destruction of 50 per cent of the world’s coral reefs through overfishing, destructive fishing practices, tourism, pollution and sediment run-off. Together with climate change impacts, losses are predicted to reach up to 90 per cent by 2050. The most recent report from the Intergovernmental Panel on Climate Change, Global Warming of 1.5°C (ipcc.ch/sr15), estimates that, with such an increase in temperature, there will be a loss of around 70–90 per cent of corals, with more than 99 per cent loss if warming reaches 2°C. These climate-related impacts will be a result of warmer water increasing coral bleaching and lowering oxygen levels, as well as increased storm damage and acidification. It makes depressing reading.

These losses will not only threaten the livelihoods of many millions of people, but wipe billions of dollars of value from real estate and tourism activities around the world. Furthermore, their decline will deprive millions of people in future of marvelling at the spectacular underwater scenery and myriad colourful fish and organisms that live among the reefs.

Estimating the monetary worth of benefits that coral reefs provide is at the heart of a natural capital approach. However, such a monetary valuation is far from new, and sadly, seems to have been limited in its effectiveness. Back in 1992, I published a paper on the economic value of coral reefs in the Marine Pollution Bulletin, highlighting the many and varied benefits of corals and the techniques available to calculate their environmental value (bit.ly/Spurgeon92).

Since then, numerous coral valuation studies have been carried out around the world, some of which I have been involved in. This includes establishing for example the value of corals for the islands of American Samoa — one of the first studies to use geographical information systems to map out the different values, highlighting the locations of greatest coral reef value. A series of focus groups and questionnaires was also carried out with locals and visitors to establish the nature and extent of different values. Typically, such studies help inform enhanced protection of reefs and sustainable financing for this, through additional government funding or the introduction of fees for diving or marine park entrance, for instance.

The value of our vanishing reefs
Coral reefs are among Earth’s most valuable habitats, but their future appears bleak. Could a natural capital approach save them?

James Spurgeon
We continue to see relentless destruction of coral reefs as a result of a multitude of activities

Over the past few decades, many coral reef damage assessments and associated offsetting studies have also been carried out for ship groundings and a variety of coastal developments. The latter have included power and desalination plants, ports, ferry terminals and cable laying in the Middle East, Florida and beyond. They often involve environmental valuation techniques to determine how much compensation should be paid, and to establish how far coral restoration should be implemented.

Some have been part of project finance studies for financial institutions signed up to the Equator Principles (bit.ly/EquPrincs), following International Finance Corporation performance standard 6. This standard sets out requirements for ecosystem services assessments and biodiversity offsets.

The mitigation hierarchy is always followed where practicable, which begins with avoiding damage, then minimising it, then restoration, and finally, if needed, some form of offset, compensation or both. It is not unusual for millions of US dollars to change hands, usually with a view to restoring the damaged corals or investing in some form of related beneficial activity such as management of nearby protected areas or reef monitoring.

Valuations and assessments tend to be based on values calculated for other sites – that is, using value transfers – and determining how much additional area should be restored based on habitat equivalency analysis and restoration costs.

These applications have been designed to minimise coral losses at particular sites or compensate for damage to specific corals; the aim for each has been to result in no net loss of corals, although this may not always have been the outcome. Nevertheless, we are continuing to see the relentless destruction of coral reefs throughout the world as a result of a multitude of activities, and compounded by unchecked climate change. What is needed is for governments, businesses and the financial sector to adopt a comprehensive natural capital approach, that recognises values, dependencies and systems thinking, and integrates this into decision-making and policy-making.

This is where the Natural Capital Protocol, launched in 2016, can significantly help. In a national application of this, as part of the International Finance Corporation’s Natural Capital Program, the protocol was used to evaluate three alternative management scenarios for Bacuit Bay in Palawan, the Philippines. The study was carried out by Indufor, with technical support from Sustain Value, on behalf of an island resort company, boat tour operators, dive boat operators and the Palawan Council for Sustainable Development. All these tourism-related companies depend on the health and quality of coral reefs, water and fish in the bay.

The natural capital assessment revealed that, by jointly managing these shared natural assets in an interconnected land- and seascape, the island resorts, boat and diving operators, local fishermen and local and national governments could all be significantly better off financially in the medium and long term. The financial rewards for all stakeholder groups clearly justified further collaboration and developing a public–private partnership that goes beyond the existing planned management proposed.

Another recent study, funded by the Prince of Wales’ International Sustainability Unit, the UN Environment Programme and the International Coral Reef Initiative, also demonstrates how a natural capital approach can provide a compelling financial case for enhanced investment in coral reef management. The Coral Reef Economy report (bit.ly/Correefeco), reveals the estimated financial value accruing to tourism, coastal developments and commercial fisheries from coral reef dependencies in the Coral Triangle in South East Asia and the Mesoamerican Reef in the Caribbean. It highlights that reversing the continuing decline of coral reefs and ensuring a healthy state could unlock tens of billions of dollars in additional value.

The report findings showed that this can be largely achieved through strategic interventions, such as no-take marine protected areas, afforestation, construction of wetland wastewater treatment and improved soil management in farming. Not only do these directly benefit nearby corals by reducing fishing pressure, pollution and sedimentation, they help sequester carbon, thereby reducing climate change impacts.

While the prognosis for coral reefs looks bleak, a natural capital approach can play a critical role in demonstrating business and government dependencies on corals, and hence justify the significant actions needed to reverse their decline. Natural capital approaches can and must play a pivotal role in tackling climate change. The concept can shine a light on considerable opportunities for natural capital-based climate mitigation that also generate other valuable benefits such as coral reef protection.

James Spurgeon operates Sustain Value, a network-based natural and social capital consultancy that supports businesses to value, manage and report on related sustainability issues. He was a lead author of the Natural Capital Protocol and has carried out coral offset and valuation studies throughout the world. He was involved in all the specific coral studies mentioned above, and was a technical reviewer of The Coral Reef Economy report james.spurgeon@sustainvalue.co.uk

Related competencies include:
Management of the natural environment and landscape. Use of the marine environment, Valuation
An impact investment approach

Everyone is talking about natural capital – but how can you viably put a price on nature?

James Cairns

The basis of the natural capital thesis is sound: by putting a price on nature, you can use this to attract the investment and regulatory protection that other forms of capital are able to attract. But the reality is that you can only price natural assets if there is a market willing to pay to protect or use them.

At Mopane Capital, it is our view that a realistic and credible way to value nature is to securitise the asset so it can be represented on the balance sheet and traded. That means valuing natural capital in a tangible way connected to the underlying asset – land.

The key questions, then, are as follows.
1. Who is the market?
2. How can this work?
3. Does this still account for the intrinsic essence of natural capital?

Impact investment

Impact investment is a growing asset class that seeks to finance projects blending environmental impact, social impact or both with a subsidised financial return. Market evidence suggests that investors are willing to pay a premium or accept a lower risk-adjusted return for the natural capital features that land assets and ecosystem services provide. Such blended finance transactions currently focus on projects in developing countries, largely in the tropics, that make a social or environmental difference, or both, at scale.

The impact market is growing at an estimated 18 per cent a year according to the Global Impact Investor Network’s Annual Impact Investor Survey 2017 (bit.ly/GIINsurv17), and JP Morgan, with the Rockefeller Foundation, estimates that impact investments could reach $1tr in assets under management by 2020. Market participants include development finance institutions, high-net-worth individuals, family offices, and, increasingly, the leading investment banks, which want to be seen as part of the solution, not the problem.

The market is fundamentally driven by the need to fill a significant gap in funding for the protection and conservation of at-risk wilderness, species and ecosystems. Credit Suisse and McKinsey’s Conservation Finance. From Niche to Mainstream: The Building of an Institutional Asset Class (bit.ly/Consfin14) estimates that environmental conservation projects need $300–400bn each year to preserve and restore ecosystems, but receive just $52bn, which has historically come from public and philanthropic sources. This is compounded by the fact that governments in these regions cannot continue to fund these public goods, while donations are also falling because of poor performance and accountability. Sustainable finance of natural capital is the only viable way to prevent and reverse the loss of protected area land and unique ecosystems.

In addition to yield and impact, tax offsetting, portfolio hedging and long-term capital growth expectation are subliminal drivers of this market, as are intangible elements such as reputation, legacy and the intrinsic satisfaction that comes with preserving and restoring iconic landscapes.

Karingani Game Reserve, Mozambique

Assets and ecosystem rights include the following:
• 150,000ha of pristine bush in a single aggregation
• land secured in 50-year + 50-year DUAT title, a state-granted land right
• water rights, development rights and a tourism licence with control of the ecosystem.

Conservation and ecosystem features include:
• integration with Kruger National Park and Great Limpopo Transfrontier Conservation Area
• strong habitat integrity, biodiversity and a frontline role in protecting at-risk rhino
• baseline habitat, social and game survey completed to form key performance indicator (KPI) targets.

The ecosystem business plan is based on:
• high-value, low-density eco-tourism development plan
• investment return of up to five per cent over a 15-year term
• strong capital growth prospect and tax-efficient structures.

This valuation underpinned the price and supported sale of a 20 per cent equity interest to an investor.
and species. The market is therefore complex, as well as immature, and as such transnational activity is constrained by a lack of advisers equipped with a standardised and practical valuation model that can represent the specialised factors influencing value, risk and return for a natural capital asset in this market.

**Market model**

To bridge this gap, Mopane Capital has developed and pioneered a valuation model that appraises natural capital assets from an impact investor’s position. The model is dubbed the Natural Capital Asset Model and takes a twist for natural capital. In simple terms the approach can price a premium for the natural capital element in a land asset as an addition to, or a discount against, market value or risk.

The ultimate output is a value that underpins real-estate-based equity, debt and risk pricing and can sit fairly on the balance sheet to support transactions, decision-making and asset management. Financial accountability and established methodology underpin the viability of application, but it is the innovative methodology underpin the viability of application, but it is the innovative classification of the relevant special value features that enables valuers to quantify a natural capital premium robustly.

The first step in the valuation process is to understand and review the fundamental criteria that must be met to securitise and raise capital. These are based on impact investor criteria and can be defined as:

1. land tenure and control of ecosystem rights to provide security
2. ability to monetise the asset or ecosystem services for a risk yield
3. upside from tax offsetting, portfolio or capital growth strategy
4. measurable and positive environmental and/or social impact
5. good corporate governance, management and compliance
6. landscape-scale approach with integrated ecosystem and social inclusion.

If an asset meets these triage criteria then investors can engage and the model can work. The downside to this approach is some private and public goods will be missed; however, what can be valued will be robust and has a good chance of achieving sustainable economic success. The inconvenient truth is we cannot save the whole planet — but where these criteria are met, we can make a difference.

The next step is to quantify the special natural capital attributes. It is essential to inform these adjustments using as much quantitative data as possible to minimise subjectivity and provide a rigorous rationale. This needs to be done at the level of the individual asset and then benchmarked against the relevant market and property indices that are available. However, data is still limited, and an element of valuer skill, judgement and experience is needed.

The final process is to fold the natural capital analysis into the valuation approaches to reach a robust weighted value reflecting the natural capital premium in the final asset value. The mechanics behind this are currently based on Mopane Capital’s proprietary model and market experience.

This model is not suitable for all natural capital situations; however, in our view, where criteria are met, it does offer a rationale for the sustainable financing of natural capital assets. The bottom line is that natural capital value is ultimately what the market is willing to pay to save it. Impact investors have paid a premium or accepted a risk-adjusted return to protect and restore natural capital-based land projects. That is powerful, but the market is still immature and it is our opinion that, we, as a profession, could adopt this as a standard model to drive market activity and enable investors, stakeholders and governments to unlock finance for protecting these special assets.

*James Cairns is founder and CEO of Mopane Capital*  
jc@mopanecapital.com

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**Table 1. Basis for Mopane Capital’s approach**

<table>
<thead>
<tr>
<th>Value/risk adjustment</th>
<th>Rationale</th>
<th>Data source</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scarcity</strong></td>
<td>At-risk wilderness; endangered species; scale; population pressures etc.</td>
<td>Red List of Threatened Species; LoW map; population maps; likelihood risk</td>
<td>+/- ARY +/- Comps +/- PV</td>
</tr>
<tr>
<td><strong>Marriage value</strong></td>
<td>Aggregation; ecosystem integration; landscapes; economies of scale</td>
<td>Property assessment; trans-frontier parks; sustainable plans</td>
<td>+/- ARY +/- Comps +/- PV</td>
</tr>
<tr>
<td><strong>Hope value</strong></td>
<td>Supply and demand – diminishing market; market growth/maturity</td>
<td>Morgan Stanley Capital International (MSCI) Index, Green Bond Index, Global Impact Investing Network Index; GDP growth rates etc.</td>
<td>+/- ARY +/- Comps +/- PV</td>
</tr>
<tr>
<td><strong>Ecosystem risk beta</strong></td>
<td>If higher beta it is higher risk for monetising services, but it offers higher level of protection for ecosystem</td>
<td>Property baseline study v sample benchmark over time</td>
<td>Beta (X) ARY + Comps</td>
</tr>
<tr>
<td><strong>Sustainability alpha</strong></td>
<td>Measure property KPIs against UN Sustainable Development Goals (SDGs). If KPI beats benchmark index, then alpha is created, meaning positive</td>
<td>One Planet Index; MSCI Carbon Index; World Bank Human Capital Index (all of these are property SDG KPIs)</td>
<td>Alpha (X) ARY + Comps</td>
</tr>
</tbody>
</table>

**Note:** alpha and beta returns are adjustments relative to index  
**Key:** ARY = all-risk yield; Comps = comparables; LoW = Temporally inter-comparable maps of terrestrial wilderness and the Last of the Wild ([bit.ly/Allanetal2017](bit.ly/Allanetal2017)); PV = present value
Remote sensing satellites offer an effective way to monitor and defend mangroves – vital natural capital that can provide wildlife habitats and protect us from rising sea levels.

Richard Flemmings
Mangroves are small shrubs or trees that typically grow at the boundary between land and water in coastal areas of the tropics, favouring saline and brackish waters. They survive under a range of water oxygen concentrations, temperatures and salinity levels in swampy and muddy environments.

They also offer many natural capital benefits: the trees often grow densely together and have incredibly strong root systems, forming protective barriers against storms that may otherwise destroy the shorelines, intertidal zones or marshes where they grow. Below the waterline, these interwoven roots also serve as safe havens for many species, especially crabs and oysters. Perhaps most importantly, the trees are a critical means of carbon sequestration.

Despite their resilience, however, mangrove forests are like many ecosystems under attack on multiple fronts. Rising sea levels pose serious risks, as do water and air pollution in coastal zones, where the overall environment is put under stress by human development. Even worse, mangroves are being clear-cut in some parts of the world to make way for new ports, energy facilities and beach communities. This unchecked destruction of mangrove habitat threatens many interrelated ecosystems and may diminish natural capital across a broader geographic area, both on- and offshore.

However, remote sensing satellites 650km above the Earth can help deal with this critical problem by accurately and efficiently assessing the condition of mangroves and other vital vegetation.

**Earth-observing satellites**

NASA launched Landsat, the first non-military remote sensing satellite, in 1972, which was able to resolve objects as small as 30m wide. In the decades since then, several commercial companies have put Earth observation satellites into orbit with ever-increasing spatial resolution and more frequent overpasses of the globe; the WorldView satellites operated by US firm DigitalGlobe, for instance, collect imagery with 30cm resolution.

Spatial resolution is important for identifying features on the ground by their physical appearance, size or shape — roads, buildings and cars are good examples.

But the digital sensors aboard today’s sophisticated imaging satellites record far more than the naked eye can see. Most of these devices are multispectral sensors, meaning that they measure reflected energy across the electromagnetic spectrum. The intensity of these returns gives tremendous insight into the ground surfaces and objects from which the energy has been reflected.

Algorithms have been developed to process such multispectral data and classify land use and cover on the Earth’s surface. In other words, the digital data can be used to identify and differentiate a cement car park from a bare field or grass from snow. These algorithms can even tell the difference between the spectral signatures of corn, soy beans, mangroves, evergreens and nearly every other species of tree and vegetation.

Species identification is just the first step: the algorithms are now so powerful that trees and other types of vegetation can also be differentiated by condition or health. Plant stress can often be revealed in satellite imagery long before it becomes visible on the ground. Combine this spectral information with 30cm spatial detail and it’s possible to assess the health of individual trees and small clusters of crops.

**Protecting natural capital**

A recently completed large-scale mangrove mapping project for Environment Agency – Abu Dhabi identified mangrove forests and assessed stands, or individual trees where possible, by condition. The project offered a clear understanding of mangroves throughout the emirate that were healthy, compared to those that were under stress.

GIS-based map reports showed precisely where the stressed mangroves were. This allowed teams of scientists on the ground to visit areas of concern, determine the cause of stress and devise a conservation management plan. Where mitigation was not possible, the scientists knew precisely how many hectares were affected so an equal area of new mangroves might be planted elsewhere to offset the loss.

Monitoring change over time is another key benefit of the technology. New imagery of a site in Abu Dhabi was for instance compared with archived multispectral data of the same area to determine the speed at which mangrove health is changing. This gave scientists an idea of how much time they had left to save the stressed trees and prevent healthy ones from a similar fate.

From a natural capital standpoint, satellite imagery gives many stakeholders a way to calculate the value of trees, vegetation and other resources based on precise and unbiased measurements of geographic area and condition. Data derived from satellites can enable a deep understanding of environmental assets, and to some extent their economic value.

In the case of mangroves, this could include the value of fish stocks in the protected intertidal ecosystem, or the value of coastal assets that are protected in storm surges. TCarta has applied this technology successfully around the world for similar mapping and monitoring projects involving numerous species of vegetation on land and in shallow-water coastal environments.

The bottom line is that satellite imagery offers a fast, efficient and cost-effective method for understanding natural capital.

Richard Flemmings is operations director at TCarta. rfi@tcarta.com

**Related competencies include:**

Management of the natural environment and landscape.
Our aim at Forest Enterprise England (FE) is to encourage as many people as possible to enjoy visiting our public forest estate, while also ensuring we manage it to the highest environmental standards and harvest timber for the UK processing industry.

There’s no doubt that FE provides a valuable service, but, like much of the public sector, this is an intangible benefit with a tangible cost. Reassuringly, this is a modest 45p per adult per annum because FE covers most of its costs through selling timber and income from recreational services, with an annual turnover of £90m.

However, FE still needs to justify the small amount of public funding it gets, and even more importantly, has to ensure that its custodianship leaves the public forests in a better shape than when it inherited them. This is quite tricky – how can you compare the value of a red squirrel reserve with the health and well-being benefits of a mountain biking trail? Natural capital accounting (NCA) can help us do so.

**What is NCA?**

NCA is about reaching a total valuation of all the benefits society gets from our land, such as visits from the public, the amount of biodiversity protected, carbon absorbed by our trees, flood water stored and slowly released, air quality improvements and many more. NCA suggests that we can add all these values up and more easily compare how we’re doing over time – both in total and in each of the different areas where we provide benefits.

The difference between NCA and previous ecosystem service approaches to valuation is that the former identifies an asset value; that is, it looks at the benefits generated, subtracts the costs of generating those and then totals that value in perpetuity to create a net asset value.

Essentially this keeps you honest: you can’t steal our children’s natural capital to benefit today’s generation, because if you do the net natural capital asset value will fall to reflect the future reduction in ecosystem benefits. If the total natural capital asset value changes then we can use that to ask ourselves questions about our land management and how that is affecting the figure, and then make better decisions.

In 2015/16, FE decided that there is value in producing a natural capital account for the whole organisation, and has done so every year since: the most recent of these accounts, for 2017/18, is available online ([bit.ly/FEENCA1718](bit.ly/FEENCA1718)).
What we have learned

As an organisation that is concerned with public benefit, FE feels positive about having a total natural capital asset value to compare with the total asset value produced by financial accounting. Yes, we knew it was bound to be a bigger figure, but just how much bigger was a surprise: our natural capital asset value in 2017/18 is £23bn, compared to a £2bn financial accounting asset value. This is staggering, particularly given that the account is as yet incomplete.

We have also learned about the value of repetition. It’s complicated doing an NCA, because both the concept and the way you get to the data need fearsome levels of thought and interrogation. We might not repeat the process every year, but in the first few we’ve made incremental improvements and embedded the data collection as routine for teams. Every year so far we’ve picked up several procedures or technical issues that need updating or amending; we are sure this will continue.

Public access to the estate has proved to be a highly significant part of the total asset value: at the moment this is calculated at £14bn. Valuing recreational visits in this way puts into context the cost—benefit ratio of providing access to public woodland adjacent to population centres. It boosts the evidence base available for continuing or expanding such provision, despite the comparatively high cost in terms of both capital value and management burden.

There is great value in the detail as well. The basis of the NCA is a register of natural capital assets, and while most of this doesn’t feed into the net sterling natural capital asset value, it lists data such as the number of hectares of different types of designated land we manage. We’ve always had some of this information tucked away in our databases, but it’s the first time it has been gathered and published annually in an easily comparable way.

Importantly, we’ve added a traffic light rating and arrows to the asset register to make it easier to identify areas that need more management attention. This also shows the impact of our policies; the increase in open-space habitats to encourage biodiversity, for example. And, as trends emerge, the detail in this asset register will enable good questions to be asked of the FE leadership team — not least whether there are other data sets, such as indicator species audits, that we should be measuring and listing to understand our natural capital impact.

Starting work on the NCA has highlighted the importance to some of our other evidence-gathering. For example, assessing the number of visitors and how many visits they make to our woods has always been a thorny question; we’d already begun a new, consistent way of surveying it but not everyone was convinced it was worthwhile. Needing this data for the NCA gave it additional impetus internally, and reinforced the need to agree a methodology for our published visitor numbers.

Creating the account has identified the gaps in our understanding of how much benefit we provide. This is helping FE encourage and support those researching the areas where we are enthusiastic about adding new types of value. For example, we hope that in the next year we may be able to add more values for flood mitigation, water quality and air quality.

NCA is an ideal tool for an environmental organisation wanting to assess whether it’s doing a good job across a wide range of outcomes. Like all tools it needs careful handling and the right inputs, but NCA allows FE to generate an overall value of the outcomes the public forest estate provides, for the first time. And that, like the natural environment we care for, is priceless.

Miranda Winram is FE’s head of strategy and insight miranda.winram@forestry.gsi.gov.uk

Related competencies include: Forestry and woodland management, Management of the natural environment and landscape

Further information: Contact Jacob Waller for more on FE’s work jacob.waller@forestry.gsi.gov.uk

Forest Enterprise England

Forest Enterprise England manages the country’s public forest estate – that’s about 252,000ha of publicly accessible woodland, 160m trees, 782 scheduled ancient monuments, 110 listed buildings and 30 registered parks or gardens.
Managing interconnected and vital systems of water, land, people and infrastructure without degrading the natural environment is a complex task. Yorkshire Water knows that land is precious and is striving to find ways to unlock its value for society — all this in the face of the increasing challenges presented by climate change, a growing population and the imperative to keep bills affordable.

Financial accounting is an essential function for every organisation, ensuring that it has the necessary resources to continue operating. But as every landowner or manager knows, financial assets are not the only thing on which an organisation depends. Physical resources, such as clean water, raw materials and a skilled workforce, and non-physical resources such as brand reputation, customer satisfaction and people’s knowledge, are equally vital to its sustained existence. In recognition of these vital yet often undocumented resources, a new branch of accounting has emerged: sustainability accounting. Yorkshire Water is now working to embed such practices throughout the business, living up to its vision of ‘taking responsibility for the water environment for good.’ At the heart of this process is the six capitals framework.

The six capitals
The term financial capital is used to describe the financial assets such as cash, shares and bonds held by an organisation or individual. In sustainability accounting, other forms of capital are recognised, however. The term can be used to refer to a stock of any physical or non-physical resource that yields flows of benefits for an individual, an organisation or society at large — including those often-forgotten, intangible yet vital natural resources. As economist Dieter Helm put it in the Guardian: ‘Natural capital is everything
nature provides us for free. It is what our economy is built on. We add [artificial] capital in the shape of houses, factories, offices and physical infrastructure, and human capital with our skills, ideas and science (bit.ly/Helmnatcap).

To account for its operations sustainably, Yorkshire Water has adopted the International Integrated Reporting Council’s framework of six capitals:

1. **financial capital**: the firm’s financial health and efficiency
2. **manufactured capital**: pipes, treatment works, offices and IT
3. **natural capital**: the materials and services from the environment on which we as a firm rely, especially water
4. **human capital**: the capabilities and well-being of our workforce
5. **intellectual capital**: our knowledge and processes
6. **social capital**: our relationships and customers’ trust in us.

**Bold and ambitious strategies**

Natural capital is often envisaged as the base on which the others are built, or as a system that encompasses them. This illustrates an important truth: directly or indirectly, we rely on the living world in everything we do. In developing sustainability accounting methods to inform our land strategy, we have therefore focused on natural capital accounting, often using it as the basis for assessments of the other types of capital. Our vision is to be more bold and ambitious in what we do with our land, thinking differently to find innovative ways to recognise and enhance its true value.

In 2016 Yorkshire Water piloted the then draft Natural Capital Protocol (NCP; bit.ly/natcapprot), working with AECOM and using the protocol to evaluate capacity building options at Rivelin water treatment works (bit.ly/NCPstudyYW). This ex-post valuation confirmed that our chosen approach – a plant using traditional clarifiers, partially covered by a green roof – resulted in greater net benefits to nature and society than the default option of a dissolved air flotation and magnetic ion exchange plant.

Collecting the internal and external data required to value stocks and flows of natural capital was challenging, but in the end we were left with valuation evidence and methods on which we were able to draw for subsequent projects, and had a better understanding of how the NCP can guide natural capital assessments.

The next step was to apply the NCP to an ex-ante assessment of a land management opportunity, working with Arup to quantify the environmental and social costs and benefits of different development options for a sludge landfill site at Burnby Lane. This presented a new set of challenges and opportunities, including using natural capital assessment to evaluate a less constrained set of options and considering how to set spatial boundaries without disregarding geographical context.

Following the success of these two studies, we turned our attention to non-operational sites, investigating how the capitals approach could help us formulate a recreation strategy for the Little Don area in the Peak District, which includes the Langsett, Midhope and Underbank reservoirs and is a popular site for both local visitors and tourists. Yorkshire Water’s Little Don Recreation Plan aims to promote health, fitness and well-being by creating opportunities for outdoor recreation that is open to all. We worked with AECOM to create a model comparing options for the area.

The model values impacts on people’s health and well-being, job creation, the local economy and the natural environment, using a range of internal and external data sets such as the UK National...
Ecosystem Assessment ([bit.ly/UKNatEcoAss](bit.ly/UKNatEcoAss)) and our own visitor surveys. With the focus on making outdoor recreation accessible to all, we used Natural England’s Monitor of Engagement with the Natural Environment ([bit.ly/MonEngNatEnv](bit.ly/MonEngNatEnv)) to calculate the benefits of increasing time spent in nature, including detailed breakdowns by demographics to demonstrate the additional benefits of increasing the diversity of our visitors as well as overall numbers. The results are shown in Figure 1.

In this context, the scenarios can be summarised as follows:

- **inclusive environment**: encouraging all groups to interact with the environment
- **active recreation**: planting trees and encouraging sports such as mountain biking
- **active biodiversity**: protecting and restoring nature, with limited visitor access
- **sustainable farming**: working with farmers to better balance the needs of the environment
- **sustainable forestry**: planting the majority of the site with broadleaved woodland and hedgerows.

### Embedding into strategy

Having created this capitals valuation model for Little Don, we are now working to embed it into decision-making processes for our land strategy. As part of our Beyond Nature programme, which aims to transform the way farms connect with the land, water and wildlife around them, we are carrying out a baseline natural capital assessment at Humberstone Bank farm in North Yorkshire.

This study presents an opportunity to develop the valuation model, building a spatial element into the process by integrating it with geographic information systems and refining how we quantify the impact of strategies that work with nature on service measures, such as raw water quality and flooding. This exercise will help us define our approach to valuing land, to monitor the impact of our plans to implement integrated catchment management during the regulatory asset management period 2020–25, and to fulfil our pledge to plant 1m trees in Yorkshire in the next ten years.

We’ve also embedded the six capitals framework into our capital investment planning. Our decision-making framework, which we use to develop our five- and 25-year business plans, contains a so-called capitals engine that optimises asset maintenance and development and other works in our budgets for environmental, human and social benefits. Currently in use for our five-yearly water industry price review submission to Ofwat, the framework will also become part of our business as usual, helping us to make decisions for society and create the best value for our customers.

In October, Yorkshire Water won the Embedding an Integrated Approach category of the Finance for the Future Awards; the Little Don model was also shortlisted in the Innovative Project category.

### Measuring true value

The process of valuing natural, social and human capital flows in monetary terms can be resource-intensive and challenging, but it brings environment and society to the fore in decision-making, illuminating the scale of costs and benefits and revealing the nature and significance of trade-offs in a universally understood language. Yorkshire Water is not the only company to benefit from this approach: we were inspired by many others, including the International Integrated Reporting Council’s six capitals, the Crown Estate’s work on total impact, and the UK government’s 25-year environment plan, which puts natural capital front and centre and promises ‘gold standards in protecting and growing natural capital’.

The concept of putting a value on land and nature can seem counterintuitive: why try to impose a pound sign on values that run deeper than profit? However, as WWF’s executive director of advocacy and campaigns Tony Juniper puts it, ‘excluding nature from the mainstream economic discourse … perpetuates the battle that we have been losing for decades’. By giving nature its rightful place in decision-making, we’re expanding our definition of value to encompass what really matters.

**Hannah James is lead sustainability adviser, Yorkshire Water**

hannah.james@yorkshirewater.co.uk

**Related competencies include:** Management of the natural environment and landscape, Valuation

**Further information:** yorkshirewater.com/capitals

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**Scale of supply**

Yorkshire Water supplies 5m domestic customers and 140,000 businesses daily with 1.3bn litres of clean water, and collects about 1bn litres of waste water. It manages 671 treatment works and 83,000km of pipework 24 hours a day.

The utility owns 28,000ha, 11,000ha of which are Sites of Special Scientific Interest. It has 250 agricultural tenancy agreements, while a large proportion of its land is open to the public: it welcomes more than 7,000 pupils each year to its education centres, and around 1m visitors for recreation.

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**Figure 1. Net present values relative to baseline**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Value (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusive environment</td>
<td>£11.5m</td>
</tr>
<tr>
<td>Active recreation</td>
<td>£21.3m</td>
</tr>
<tr>
<td>Active biodiversity</td>
<td>£7.1m</td>
</tr>
<tr>
<td>Sustainable farming</td>
<td>£6.2m</td>
</tr>
<tr>
<td>Sustainable forestry</td>
<td>£2.6m</td>
</tr>
</tbody>
</table>

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**Related competencies include:** Management of the natural environment and landscape, Valuation

**Further information:** yorkshirewater.com/capitals
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