



# Natural Capital Initiative Valuing our Life Support Systems 2019



## Summary report

The Natural Capital Initiative is a partnership of the Royal Society of Biology, British Ecological Society, Centre for Ecology & Hydrology and the James Hutton Institute.



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UK Research  
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## Valuing our Life Support Systems 2019

### Summary report

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## Introduction

The Natural Capital Initiative's 10<sup>th</sup> anniversary summit brought together over 180 delegates from across science, policy, NGOs, businesses and local communities to discuss innovative solutions that enhance the environment and strengthen society. It built on two influential summits in 2009 and 2014, which helped to shape natural capital thinking in the UK.

Valuing our Life Support Systems 2019 exceeded our expectations with the dynamic debates and open discussions between people from different organisations and disciplines. It offered an opportunity to meet new people from many diverse organisation as well as across generations of researchers and decision makers. Delegates valued particularly the opportunity to discuss new ideas from groups that are not always included in conversations about the environment.

During two days of talks, workshops and panel discussions, we tackled the most pressing issues in environmental governance, urban health and wellbeing, marine planning, and sustainable land and water management. We looked at innovative policy and management solutions that often cut across themes. For example, sustainable marine planning is all about good governance; and consideration of human health and wellbeing are essential for sustainable land and water management. New technologies can be incorporated into these solutions to accelerate change.

As with any new analytical approach, the use of natural capital spans a wide spectrum from conceptual frameworks to development of evidence and tools, creating good practice guidance, and mainstreaming the approach in decision making and management. A survey of delegates revealed that the natural capital community is making considerable progress towards improved evidence and tools (Table 1), but our next priority is to mainstream good practice for the benefit of people and nature.

In this report, we communicate the main messages from the keynote talks and panel discussions, as well as the sessions proposed and delivered by the natural capital community. We also share our key messages from the summit and propose a way forward.





## Natural capital progress and priorities for future work

In the feedback, we asked delegates to rate *progress* under different natural capital themes, from concept to mainstream adoption (Table 1).

Table 1. **Natural capital progress according to delegate feedback** (Red bars show “no progress”, amber “some progress” and green “good progress”).

Themes	Progress 				
	Conceptual framework in place	Practical implications understood	Evidence and tools available	Good examples of implementation available	Mainstream adoption of good practice
Definition of natural capital	2.53	2.19	2.21	2.12	1.38
Natural capital and government policy	2.03	1.77	1.56	1.67	1.18
Natural capital and business	2.00	1.59	1.89	1.69	1.30
Natural capital and planning	1.68	1.56	1.68	1.62	1.31
Natural capital and economics	2.41	1.95	2.25	1.95	1.44
Ethics of natural capital	1.67	1.32	1.32	1.26	1.12
Natural capital and urban environments	2.15	1.79	2.05	2.00	1.50
Natural capital and health	2.09	1.74	1.76	1.62	1.38
Natural capital, land and water management	2.54	2.20	2.07	2.13	1.60
Natural capital, biodiversity and nature conservation	2.14	1.93	1.96	1.88	1.50
Natural capital and cultural services	1.94	1.64	1.67	1.64	1.35
Natural capital and marine environments	2.00	1.74	1.62	1.37	1.22

The number in each box represents the average score for progress against the given Natural Capital Theme, where 1 = not/just started (red), 2 = some progress (amber), and 3 = good progress/complete (green).



We also asked what our future *priorities* should be (Table 2).

Table 2. **Priorities for future work according to the delegate feedback**

Themes	Conceptual framework	Practical implications understood	Evidence and tools	Good examples of implementation	Mainstream adoption of good practice
Definition of natural capital					★
Natural capital and government policy		★★	★★	★★	★★★★★
Natural capital and business	★	★		★★	★★★★★
Natural capital and planning					★★★
Natural capital and economics		★		★★	★★
Ethics of natural capital			★	★	★★★
Natural capital and urban environments				★	★
Natural capital and health	★		★	★	★
Natural capital, land and water management			★	★	★
Natural capital, biodiversity and nature conservation	★		★	★★	★★★★★
Natural capital and cultural services	★		★	★	★★
Natural capital and marine environments		★	★★★	★	★★

Star (★) represents a priority area selected by a delegate.

According to the delegates, not enough progress has been made across natural capital themes. However, we are moving towards improved evidence and tools as well as mainstreaming adoption of the natural capital approach. Interestingly these scores are similar to those identified by delegates in 2014 when we last conducted this exercise. This does not imply that progress has not been made, but emphasizes the urgent need for more information on the practical implementation of the natural capital approach to enable case studies to be upscaled and mainstreamed.

As expected, similar themes come across in the future priorities exercise: natural capital in government policy, natural capital and business, and biodiversity and nature conservation. New themes such as natural capital in marine environment also emerge. We should be focusing on mainstream adoption of good practice - solutions are even more important than the problems. Overall, there is still a long way to go before the natural capital approach is mainstream but the more we do, the more we will learn.

## Key messages from the summit

### **A new way of working can engage more people**

We need to think about value in a broad sense and work across disciplines to understand problems and find solutions. Multidisciplinary working – using approaches from across science, technology, arts and economics – is needed to develop sound, workable and impactful approaches to protecting and managing natural capital.

We must now look for partnerships that that will deliver outcomes: between business, the public sector and NGOs, and between different generations of researchers and decision makers. We need holistic approaches to connect people and the environment from land to sea. This requires networks across sectors and local leadership to inspire and bring people together.

### **Data and tools remain key to informed decision making**

Different data speak to different people, so it's important how we collect, release and contextualize data, in collaboration with research providers and users. We should make our data, tools and analyses available and accessible to all decision makers, and use indicators that measure not only outputs but also outcomes of our actions.

We need to incorporate emerging technologies into our solution sets to accelerate and scale positive outcomes for the environment, without exacerbating existing environmental problems. To be able to use big data and AI approaches, we need to continue to collect and enrich environmental data.

### **Nature is essential for everyone's health and wellbeing**

Natural environments influence health outcomes but the benefits of nature are not distributed equally. To build healthy communities everywhere we need to address environmental inequalities, and reduce environmental burden.

Acknowledging socio-economic benefits of nature can help build support from local communities and support conservation on land and in marine environments. The benefits of well-managed environments and their fair distribution need to be captured and shown to regulators, decision makers and the public.

### **Natural capital thinking is a long-term investment across generations**

Ultimately, we are talking about people and nature. Our actions and consumption influence land and water use, which in turn determines how much land and water is preserved for other species – and other countries. At the same time changes in our environment influence our health and wellbeing.

The natural capital approach is all about long-term investment, and the same should apply to the people working with the approach. We need to engage with young people and extend the time between when they become engaged with environmental issues and when they become disillusioned about finding solutions, and disengage.

## Opening keynotes and panel discussion

Chaired by Professor Alison Hester, The James Hutton Institute

### Opening keynotes

#### Conceptual frameworks to approach natural capital management

Professor Ian Boyd CBE, Chief Scientific Advisor, Department of Environment, Food and Rural Affairs



Key messages:

- Global assessments concentrate on the *tragedy discourse* i.e. consumption exceeding planetary boundaries, whereas economists love to think that we can solve everything through science and new technologies (*adaptation discourse*). The challenge for natural capital is to drive change through these discourses.
- Do we want to maximize or optimize natural capital? Maximum sustainable yield is an example of where we have actually been using a natural capital approach for decades.
- We need to manage two major tradeoffs: (1) material consumption vs. production, and (2) using land for food vs. using land for carbon storage. Does natural capital help us to shift these tradeoffs to the right direction, and fast enough?

#### What are the key challenges and opportunities in taking natural capital action?

Professor Kathy Willis CBE, Professor of Biodiversity, University of Oxford



Key questions:

- What is the ultimate aim of a natural capital approach: to protect biodiversity or to protect those aspects of nature that have a significant societal benefit? Are the two mutually beneficial?
- Given that up to 80% of UK land is privately owned, how can we ensure that methods to determine natural capital stocks and flows are fit-for-purpose for these private landowners and not just in the domain of government/academic institutions?
- Where are the most important data gaps on the UK natural capital assets and how are we going to fill them in order to take full advantage of emerging AI and big data approaches to modelling natural capital stocks and flows?

#### AI and blockchain for the Earth

Ben Combes, Assistant Director, PwC



Key messages:

- Traditional policy and market responses have not been enough to tackle the scale of the global environmental challenges we face, from climate change to biodiversity.
- Emerging technologies offer opportunities to accelerate transitions to a low-carbon, and more sustainable, world. They also present a way to tackle non-linear environmental and species degradation of the Anthropocene with exponential solutions.
- AI and blockchain show particular promise in enabling and driving change. There are already hundreds of actual examples of these technologies being used to protect, or improve, the environment. Tens of these 'use cases' relate to biodiversity and conservation, so please consider emerging tech in your options set and, increasingly, as part of your environmental toolkit!



## Panel discussion

There are some positive improvements in natural capital, even though our focus tends to be on the negative. We have to acknowledge problems but we should not let the negatives over-dominate, and wake up to the wealth of information available to help with mitigation and improvements.

The UK Government is taking a systems approach to addressing environmental challenges by linking up strategies, including clean growth; industrial, clean air and marine strategies; food and farming policy; and the 25-year environment plan. The ultimate goal for natural capital action is *how* to halt the degradation of nature, regionally and globally, and conserve the critically important benefits that it provides to people.

Some other countries are ahead of the UK in assessing natural capital and using it to frame decisions. How can the UK learn from these countries and accelerate its research and action in this area? One challenge with natural capital is what to measure. Who decides the natural capital targets in an area? Is it local, national or global? What happens when these conflict? To get global and local decisions working well together, we need visibility of the values throughout the decision-making chain. We also need sound ground-truthing on the benefits delivered to ensure that our measurements are reliable.

Big data can be combined with accelerating technologies, open source software, and cloud computing to tackle environmental challenges. Unless the environmental community engage with new systems such as blockchains as they develop, we could end up with supply chains that have even worse consequences to natural capital than currently. Artificial intelligence and big data make it easier to understand the ecosystem services an area provides, but ground monitoring data is essential to ensure the data reflect the real situation. However, insufficient funding is reducing such monitoring activities.



## Speed talks

Chaired by Professor Paula Harrison, Centre for Ecology & Hydrology

### **We Value Nature – the new normal for business**

Paul Mahony, Oppla

The *We Value Nature* campaign was launched in November 2018 to empower businesses to account for the risks and opportunities created by nature - by accounting for nature, businesses can make better decisions that benefit themselves, society and the planet as a whole. *We Value Nature's* initial activities include taking stock and collating existing work on the Natural Capital Protocol, natural capital accounting, nature-based solutions, green infrastructure and related ecosystem-based solutions. This includes identifying bottlenecks and opportunities which impact businesses capacity to value nature, and how to overcome bottlenecks and scale up opportunities. The campaign will also highlight inspirational case studies which demonstrate best practice.

### **Delivering a Natural Capital Approach in Greater Manchester**

Krista Patrick, Greater Manchester Combined Authority

Under the leadership of Mayor Andy Burnham, Greater Manchester is growing in its status as a leading green city region with an ambition to be one of the best places in the world to grow up, get on and grow old. This is supported by its designation as the 'Urban Pioneer' for the Government's 25 Year Environment Plan testing new tools and methods for investing in and managing the environment. Greater Manchester Combined Authority's natural capital lead, Krista Patrick, provided an overview of the pioneering work that has been delivered to date such as natural capital accounting, ecosystem services opportunity mapping, strategic policy including biodiversity net gain, natural capital investment and engagement.

### **Exploring the application of Natural Capital Protocol in land-based business**

Paola Ovando-Pol, The James Hutton Institute

The James Hutton Institute applied the Natural Capital Protocol framework to explore risks and opportunities involving natural capital use and investment in land-based business. They analysed the changes in impacts and dependencies on natural capital that resulted from a shift in land management objectives from maximising agricultural production to agricultural production with increased environmental benefit over the last 20 years in a sheep and beef-cattle farming in Scotland. The results show that this shift in land management strategy has improved the condition of natural assets in the farm, and generated new opportunities to offset greenhouse emissions from farming activities, by increasing carbon sequestration potential and substituting fossil fuels by renewable energy sources. After this exploratory experience, and in more general terms, they considered the natural capital protocol a useful framework for guiding a systematic identification, measure and valuation of impacts and dependencies of land-based business on natural capital.

## **Challenges of implementing the nature connection-wellbeing-health nexus**

Frances Harris, University of Hertfordshire

While there is considerable interest in the application of nature-based activities to support health and wellbeing, the challenge remains to know more about how different professions, academic disciplines and practitioners interpret these concepts, as this informs the process of developing and implementing nature-based interventions to promote public health. Thus, implementation of a clear programme of nature-based interventions to promote health and wellbeing will require coordination among teams drawn from a wide range of backgrounds and disciplines to identify appropriate activities, assess outcomes, and ultimately embed such practices within the formulary of treatments doctors may prescribe, working as a transdisciplinary team.

## **Adding a new dimension – integrating heritage into natural capital**

Hannah Fluck, Historic England

The environment we have inherited today is the result of a combination of human activities and environmental processes. Although often perceived as natural, many of the UK's characteristic landscapes, distinctive places and unique habitats are the direct or indirect result of millennia of human activity. Understanding this is critical to valuing these places, and to making decisions about their management and their future. Historic England, along with a number of specialist partners, has been exploring the relationship between natural capital and the historic environment. This speed talk considered those assets that are both heritage and natural capital assets, how they are identified, how they are valued, and how the interests of advocates for the historic and natural environment might overlap and be presented.

## **The Conservation Right – a new property right for natural capital**

Jaime Ubilla, Conservation Right Foundation

The Conservation Right, already enacted as law in Chile, is a legal instrument that gives the holder the right to use a given piece of land to achieve conservation outcomes. It enables interested parties to register, manage and conserve intangibles, including ecosystem services, as assets of a particular property. The Conservation Right presents a significant shift in the way sustainable development can be funded and legislated. From the economic perspective, it facilitates the creation of novel markets for long-term investment in natural capital assets that deliver a multitude of benefits. From a social perspective, it enables the law to capture these intangible assets as the object of the entitlements of various groups and individuals.



## Second day opening keynotes

Chaired by Dr Ruth Waters, Natural England

### **Marine natural capital and sustainable marine management**

Professor Melanie Austen, Head of Science, Plymouth Marine Laboratory

Key messages:

- Natural capital can be operationalised for the marine environment.
- Government needs to (and is) recognising the importance of marine natural capital in decision making.
- The UK needs to support Official Development Assistance countries in managing their marine natural capital.



### **Including the value of nature in decision making**

Tim Sunderland, Principal Specialist Economist, Natural England

Key messages:

- We have worked out natural capital indicators that allow simultaneous presentation of monetary and non-monetary values, as well as uncertainty surrounding the estimates.
- We've produced an account which integrates ecological and economic information to support decision-making.
- Valuing nature in economic terms is important, but not enough to get it fully included in decision-making.



### **Nature, health and wellbeing**

Dr Rebecca Lovell, Research Fellow, European Centre for Environment and Human Health

Key messages:

- We now have a fairly extensive body of evidence demonstrating the multiple ways in which natural environments influence health outcomes.
- All social groups are likely to benefit from exposure to and/or use of natural environments. Some groups, including more socio-economically deprived and disadvantaged populations, appear to disproportionately benefit.
- A small but growing body of evidence indicates that we can provide, modify or facilitate use of natural environments for health promotion, however the evidence is not yet clear on what works best.
- There are a number of systemic issues which appear to limit if and/or how the environment is or could be used to contribute to health.



## Breakout sessions

### Artificial Intelligence for improving natural capital management and decision support

*Paula Harrison, Centre for Ecology & Hydrology, and Mark Rounsevell, Karlsruhe Institute for Technology & University of Edinburgh*

Artificial Intelligence (AI) offers many emerging opportunities to improve natural capital management and to influence real-world natural capital decisions and outcomes. AI methods, such as machine learning, can be applied with the aid of modern cloud computing power to make sense of the transformative potential of 'big' data including close-to-real-time satellite imagery, other remote sensing data, and Internet of Things (IoT) enabled devices. This session explored how researchers, businesses, government agencies, land managers and others are using these approaches to support decision-making on natural capital.

#### Speakers:

- Paula Harrison, Centre for Ecology & Hydrology (CEH; chair), with input from David Askew, Natural England
- Simon Willcock, Bangor University
- Alessandro Gimona, The James Hutton Institute
- Heera Lee, Karlsruhe Institute of Technology
- Mark Rounsevell, Karlsruhe Institute of Technology & University of Edinburgh

#### Key messages

- AI works just as well as a human operator in terms of accuracy, but completes analyses faster. AI thinks in non-linear ways that a human may not initially understand.
- AI can aid our understanding of natural capital and ecosystem services, and their valuation. AI allows social, as well as biophysical and economic, data to be included in models, resulting in better predictions and system understanding. It is important to combine AI data with on-the-ground monitoring. However, monitoring is completed less regularly now due to less funding.
- An interactive part of the session focussing on potential AI application areas proposed many opportunities for research and action, including informing targeting or incentivising of agri-environment schemes; automatic classification of images from camera traps or social media photos; planning urban green infrastructure in developments; incorporating different normative models and approaches to governance in agent-based models; integrating different types of data (e.g. from 'hard' science to citizen science); emulating complex mechanistic models; combining different natural capital approaches (e.g. simple scoring or qualitative approaches with machine learning).





## Key issues and future challenges for environmental governance

*Meri Juntti, Middlesex University of London, and Kerry Waylen, The James Hutton Institute*

Natural capital and ecosystem services have gained huge traction in research in the last decade, and are now beginning to inform policy and planning. The focus on natural capital provides an integrated approach for policy to respond to both economic and environmental imperatives, recognising the value of nature in underpinning societal and economic processes. However, issues of scientific complexity and social justice remain, and critics suggest that the language of natural capital foregrounds a commodification of nature. The session discussed policy responses to address the key challenges in environmental governance.

### Speakers:

- Alison Hester, The James Hutton Institute (Chair)
- Meri Juntti, Middlesex University London
- Jeremy Moody, The Central Association of Agricultural Valuers (CAAV)
- Janet Dwyer, the Countryside and Community Research Institute (CCRI)

### Key messages

- We need to consider whether government could be set up differently, also looking at the devolved nations. What are the levers available to make positive change and measure impact? Ultimately, we need to combine approaches to decision-making frameworks rather than keep reinventing the wheel.
- We need internationally-agreed innovation and science-based principles, but also better communication tools to share knowledge across groups working on the same problems across disciplines and sectors.
- We need positive reinforcement for beneficial land use rather than a focus on compensation. This requires a narrative to tell stories of farmers and other actors.



## Valuing Nature – what works? What we have learned from the Valuing Nature Programme

Ece Ozdemiroglu and Bill Bealey, Valuing Nature Network

The Valuing Nature Programme aims to improve our understanding of valuation in two areas: (i) the role of the natural environment in human health and wellbeing, and (ii) managing the natural environment to understand and avoid tipping points in ecosystem services, and undertaking activities that support a multidisciplinary network. In this session we heard from project leads of two of the projects about the wealth of experience developed in working on valuation concepts across disciplines as diverse as ecology, economics, social science, health, arts and humanities. We also considered lessons learned from the perspectives of end-users from policy, practice and business through group work.

### Speakers:

- Ece Ozdemiroglu, eftec (Co-chair)
- Bill Bealey, Centre for Ecology & Hydrology (Co-chair)
- Ruth Waters, Natural England
- Nicola Beaumont, Plymouth Marine Laboratory, CoastWeb project
- Tim Acott, University of Greenwich, WetlandLIFE

### Key messages

- The Valuing Nature programme showed that interdisciplinary approaches incorporating policy, governance, ecological modelling, arts and psychology work well in understanding problems and finding solutions. This requires disciplinary excellence, communication, respect and building relationships.
- We need to think about value in a broad sense, beyond the definitions within individual disciplines. It's about the people, our health and wellbeing, and about the environment.
- Disciplinary equality is key for collaboration. More attention is needed for art-based research. It creates new team dynamics and allows communities to contribute local knowledge and values to address the economic value of ecosystems.

## Implementing Wholescape guidance; challenges and opportunities to reconnect policy and people from land to sea

Edward Maltby, University of Liverpool & Mike Acreman, Centre for Ecology & Hydrology

This session focused on one of the key recommendations from the Valuing our Life Support Systems 2014 Summit on partnerships for land and water management: *"Wholescape thinking: towards integrating the management of catchments, coast and the sea through partnership working."* It discussed the practicalities of implementation, including leadership, policy, finance, law and natural capital science. It also summarised the essential messages to government, NGOs, local communities and businesses about a more joined-up approach to environmental management that enhances human wellbeing. The next step is to explore among the NCI task force and with Defra how Wholescape 'thinking' can be developed as a Wholescape 'approach' to integrated and partnership working.

### Panellists:

- Edward Maltby, University of Liverpool
- Mike Acreman, Centre for Ecology & Hydrology (CEH)
- Natasha Bradshaw, University of the West of England
- Alex Adam, The Rivers Trust
- Antonia Scarr, Environment Agency
- Ashley Holt, Department of Environment, Food and Rural Affairs (Defra)

### Key messages

- Wholescape thinking resonates with diverse interest groups. There is a need for a more holistic approach better connecting people, land, rivers and the sea.
- Implementation of Wholescape thinking will require a strong evidence base underpinned by appropriate natural capital assessments. Leadership will be an essential component for delivery.
- Bringing real change will be a long-term effort, requiring political commitment, funding and new governance arrangements.

## Pioneering natural capital approaches in the marine environment

*Aisling Lannin, Marine Management Organisation*

The Marine Pioneer (2017-2020) is trialling the application of a natural capital approach to managing impacts on the marine environment, integrating planning and delivery for improving and restoring the marine environment, exploring sustainable funding methods and sharing best practice. In this session, practitioners introduced their work on demonstrating the natural capital approach to real world management challenges in fisheries, protected areas, coastal habitat restoration and coastal community resilience. It discussed marine natural capital asset and risk registers, the assessment and valuation of ecosystem benefits, the development of environmental priorities for improvement and restoration action, and co-design of decision support tools.

### Speakers:

- Aisling Lannin, Marine Management Organisation
- Tara Hooper, Plymouth Marine Laboratory
- Sian Rees, Plymouth University
- Jenny Oates, WWF
- Chrissie Ingle, North Devon UNESCO Biosphere

### Key messages

- How to deliver the 25-year environment plan through sustainable initiatives at local level? We need to set up governance differently to decrease the silo effect and increase coordinated planning.
- Ultimately, it's about people and places. We need decision-making and governance tools that are flexible locally, with feedback to broader governance structures and adherence to wider objectives.
- Can we move from a more sustainable yield approach to a focus on sustainable maintenance of biomass?

## Valuing nature beyond economics: structures for sustainability

*Richard Gunton, University of Winchester*

This session explored ways in which different human values underpin natural capital conversations. It offered tools to help build such values into institutional cultures, governance structures and policy development, developed by the Centre for the Evaluation of Complexity Across the Nexus (CECAN) research programme. It looked at the values that are implicit or explicit in natural capital accounting, as well as the dangers of over-reliance on monetisation.

### Speakers:

- Ian Christie, University of Surrey/CECAN
- Richard Gunton, University of Winchester/CECAN
- Sam Healy, QinetiQ
- Adam Hejnowicz, University of York, CECAN

### Key messages

- Systems are complex and cannot be understood solely through the lens of economic value.
- Natural capital gets us a seat at the table but also makes capitalism appear as the only, and neutral, way of thinking. Cost-benefit analyses try to find common denominators, which leads to category errors and under-recognition of values.
- Pluralism is needed in policy decisions. We need to find overlapping consensus among stakeholders with different values to vocalise what else we value aside from economics (for example in local planning decisions).

## It's not fair: reducing urban health inequalities through better management of natural capital

*Ruth Waters & Dave Stone, Natural England*

Good quality natural capital benefits health and wellbeing. But these assets are not distributed evenly or fairly throughout society. Consequently, there are environmental and health inequalities which are particularly marked in urban areas. The session looked at the evidence around health and wellbeing inequalities that arise from the uneven distribution of natural capital. It also explored opportunities and potential solutions to issues such as air quality and access to greenspace through the management of natural capital, or through better tools and guidance.

### Speakers and panellists

- Ruth Waters, Natural England (Chair)
- Gordon Mitchell, Leeds University
- Dave Stone, Natural England
- Becca Lovell, European Centre for Environment and Human Health (ECEHH)
- Dan Osborn, University College London

### Key messages

- The environment has a large role to play in health and equality. UK nationwide studies have shown an unequal distribution of environmental benefits, showing a strong social gradient with higher potential impact of improvements in deprived areas.
- We need to address the quantity and quality of green spaces. Environmental justice requires equal access to clean environments and fair treatment before environmental laws. However, it is hard to determine when to take action (e.g. regarding air quality).
- The UK recognises the environment as a source of health and wellbeing. To address environmental inequalities, we need to reduce environmental burden and build healthy communities everywhere. We also need to recognise cultural differences in urban areas.

## Integrated natural capital approaches for land managers

*Paola Ovando, The James Hutton Institute, supported by AECOM and Marta Santamaria, Natural Capital Coalition*

The session discussed how private and social objectives can be brought together in land use decision-making and how natural capital assessment, valuation and accounting can inform decision and policymaking. It focused on two questions: (1) What are the main challenges and opportunities of natural capital approaches for decision-making? (2) How can we better align the progress of the private and public sector on natural capital?

### Speakers:

- Gordon Rogers, Yorkshire Water
- Chris Dodds, Scottish Government
- Hannah Whyte, Crown Estate Scotland
- Chris White, AECOM
- Charles Russ, AECOM

### Key messages

- Natural capital approaches are useful for identifying opportunities and providing evidence to partner organisations, as well as making better decisions about land use.
- Each application has its challenges to overcome. Difficult language can be an issue for engaging stakeholders and communicating results, both with land-owners and decision makers.
- Public and private collaboration can help to scale up natural capital work. Creating new financial opportunities is key to mainstreaming natural capital approaches.



## Delivering biodiversity AND environmental net gain using the natural capital approach – practical implementation

*Martina Girvan, Arcadis & Jenny Merriman, WSP*

Given existing and emerging UK policy, it is important that industry be prepared to implement biodiversity and environmental net gain in development projects of varying sizes. The session discussed how advances in natural capital science and policy are being practically implemented within developments to maximise natural capital value and demonstrate biodiversity net gain. It presented challenges and lessons learnt from case studies that have used the natural capital approach to deliver biodiversity and environmental net gain in development planning projects, including the use of metrics within the design and planning process.

### Speakers:

- Martina Girvan, Arcadis
- Brandon Murray, Arcadis
- Jenny Merriman, WSP

### Key messages

- Net gain indicators and metrics are being used and developed in collaboration with NGOs, academia, government, consultancy and clients. Transparency and context throughout the process is essential to ensure that the mitigation hierarchy is followed and that offsetting, where used, truly compensates for ecosystem services lost to local people.
- Local, national and global priorities for net gain can be conflicting. The indicators and metrics show the trade-offs we, as a country, are making, for example, soil in its current context is a finite resource and the provisioning services that come from it on agricultural land are being traded for place-making which delivers amenity, recreation, education and social cohesion. What is essential is that despite these trade-offs between different elements of natural capital and ecosystem services, biodiversity net gain must be delivered in every scenario, and wider benefits suited to local needs and priorities.
- The natural capital approach can be applied at all stages of a project, plan or strategy and needs to include multiple disciplines and stakeholders to deliver appropriate environmental net gain. While there is a question around sufficient skillsets and resources in local government to implement the approach, it is clear that continued collaboration is the key to success.





## Marine natural capital accounting within the UK, its Overseas Territories and the Commonwealth

*Vicky Morgan, Joint Nature Conservation Committee*

Defra and the UK have been pushing ahead to quantify and value the services, goods and benefits which flow from marine natural capital. This session shared the results from the latest work at different geographic scales from the local Marine Pioneer pilot in England, through UK's first marine natural capital accounts, to Atlantic Overseas and Commonwealth Territories, including what values have been revealed, successes, challenges and gaps. It explained the methods used to identify critical indicators and provide an economic valuation of the flow of key goods, services and societal benefits from natural capital, and also discussed priorities for future work.

### Speakers:

- Anne Thornton, Joint Nature Conservation Committee
- Tiziana Luisetti, Cefas
- Siân Rees, University of Plymouth
- Tony Weighell, Joint Nature Conservation Committee
- Gaetano Grilli, Cefas

## How do we quantify the benefits of urban greenspace and natural capital to health?

*Sari Kovats, London School of Hygiene and Tropical Medicine & Dan Osborn, University College London*

The management of urban environments for multiple benefits, particularly public health, economic growth and climate change adaptation, creates significant challenges for both evidence and policy. Research undertaken by the NIHR Health Protection Research Unit in Environmental Change and Health aims to understand the relationships and trade-offs between urban greenspace and the full range of benefits to health. This session discussed research on green infrastructure relevant to planning, human health and wellbeing, and with respect to social capital, air quality, control of climate hazards, the economy, and engaging young people and other groups in society with the natural environment.

### Speakers:

- Dan Osborn, University College London
- Peninah Murage, London School of Hygiene and Tropical Medicine
- Ian Alcock, European Centre for Environment and Human Health
- Sian De Bell, European Centre for Environment and Human Health

### Key messages

- Pollutants in UK coastal waters are not recorded as in most other EU countries. We need indicator species for excessive nutrients in coastal ecosystems, which are particularly important for tourism.
- We need an integrated approach to land and water management. New tools to pioneer natural capital management can lift pressures and improve environmental management systems as a whole.
- Financial accounting frameworks should incorporate social considerations. It is important to match the natural capital assets to processes and beneficiaries. Microfinancing in less economically developed countries is an example of linking individual actors to natural assets and services.

### Key messages

- Greater exposure to or contact with the natural environment has an impact on health. Emerging evidence indicates that people spending two or more hours in natural environments a week are more likely to report good health and wellbeing. Groups in society with high needs may derive substantial benefit from activities in green space.
- Health effects are linked to land use and socio-economic factors. We need to make sure that the benefits of natural environments are distributed equally and that interventions do not widen health inequalities.
- Local councils should know the location and value of green spaces to their communities. Policymakers could make better use of cost-benefit analyses and tailored approaches to evaluation. This could ensure green space research benefits all groups in society. Evidence of delivery and impact across the wide range of associated health and well-being outcomes is required.



## Implementing a natural capital approach across local to regional scales: the importance of context

*Alison Holt, Natural Capital Solutions & Bruce Howard, Ecosystem Knowledge Network*

Achieving a more integrated management of land and water is key to ensuring our natural environment has the capacity to supply ecosystem services now and into the future. In recognition of this, various organisations are now applying the natural capital approach, as advocated in the Government's 25-year environment plan, and a diversity of methods is emerging to assess natural capital at different spatial scales. This session will discuss what lies at the heart of a natural capital approach, and how it connects with the needs and aspirations of organisations working at different spatial scales. What are the technical hurdles and practical challenges of natural capital work across England?

### Speakers and panellists:

- Jim Rouquette, Natural Capital Solutions
- Felix Eigenbrod, University of Southampton
- Bruce Howard, Ecosystem Knowledge Network
- Alison Barnes, New Forest National Park Authority
- Sarah Chimbwandira, Surrey Nature Partnership

### Key messages

- We need to create networks across different sectors, from local communities to research, government and financial organisations. Scale is important for the institutional set up for delivering a natural capital approach, as well as for looking at the ecological evidence. For example, financing investment may be more likely at a river basin scale.
- Agri-environment schemes and major development projects are big opportunities to use natural capital approaches. However, we need to think carefully about how to communicate complex science and context-dependent effects to policymakers.
- Natural capital approaches can be applied without top down legislation. We need local leadership to inspire, bring people together and help sectors talk to each other. A government programme to train local leaders would help. Individual actions towards a future we want also matter.

## Advancing and integrating methods for natural capital monitoring and assessment in the UK

*Tom McKenna, Scottish Natural Heritage & Lisa Norton, Centre for Ecology & Hydrology*

Assessing and measuring change in natural capital at a national level is vitally important for sustainable development. A wide variety of approaches have been taken by the devolved administrations and the Office for National Statistics. This session explored these approaches across England, Scotland, Wales and the whole of the UK, including a discussion of the benefits and issues associated with each of them. Observed data on the status and trends in natural capital is vital for all approaches, and hence the session will also focus on the future direction of natural capital monitoring within the UK.

### Speakers:

- Lisa Norton, Centre for Ecology & Hydrology
- Ann Thornton, Joint Nature Conservation Committee
- Jane Lusardi, Natural England
- Tom McKenna, Scottish Natural Heritage
- Adam Dutton, Office for National Statistics
- Russel Elliott, Natural Resources Wales

### Key messages

- Different parts of the UK are taking different approaches, with different priorities. The UK Environmental Observation Framework (UKEOF) brings together a community of environmental observation users to collaborate, share best practice and discuss their needs.
- We are good at biological recordings, including land cover and Ordnance Surveys, but there are gaps in our knowledge about soils, environmental net gain and agri-environment schemes. We need to understand the condition of our natural assets.
- New technologies and citizen science offer new opportunities, but there are also threats from lack of resources and baseline.





## (How) can marine protected areas deliver both conservation and socio-economic benefits?

*Daniela Russi, Institute for European Environmental Policy*

Marine Protected Areas (MPAs) are key conservation tools to protect ecosystems, habitats and species. However, they may face local opposition due to concerns about possible negative economic impacts on, for instance, local fishermen and tourist operators. Demonstrating examples of, and ways in which, MPAs may support and even generate local socio-economic benefits may help increase public acceptance, long-term buy-in and ultimately compliance. This session shared best practices in MPA management and governance with regard to optimising both local economic effects and achieving site conservation objectives. It reflected on key elements that can explain success stories in the UK and abroad and also explored the conditions under which they might succeed.

### Speakers:

- Mia Pantzar and Daniela Russi, Institute for European Environmental Policy
- Robert Clark, Southern Inshore Fisheries and Conservation Authority
- Caroline Hattam, Plymouth Marine Laboratory



### Key messages

- The socio-economic benefits of MPAs are rarely monitored and reported in a systematic way. However, there is an increasing number of MPAs that have been shown to bring benefits to local communities, and in particular to local small-scale fishermen and the tourism sector.
- Designation is not enough – planning, management and enforcement are essential aspects for MPAs to generate benefits (both ecological and economic).
- Governance arrangements are a key factor to enable the generation of benefits for local communities. In particular, co-management practices that actively involve local communities have proven effective in generating both buy-in and compliance. They can also be an effective tool for capacity building and supporting fishermen in the transition to more sustainable practices.
- Socio-economic benefits generated by MPAs can help build support from local communities, and short-term wins can facilitate support for additional and more comprehensive management measures, if necessary. A management strategy that actively aims to enable the generation of socio-economic benefits (in addition to ensuring the achievement of conservation objectives) can contribute to reducing opposition to conservation measures and improve compliance, and ultimately also MPA effectiveness.

## Combining forces on natural capital

Marta Santamaria & Mark Gough, *Natural Capital Coalition*

Many approaches to taking account of nature in the public and private sectors have been developed. However, the approaches are yet to have a significant influence on broader decision-making in business or government. The 'Combining Forces' program was established to bring together the public and private sectors' thinking on natural capital. The objective is to foster a greater mutual understanding of different approaches to the assessment of natural capital and to co-ordinate efforts to ensure that our relationship with nature is accounted for and included in decision-making. This session explored with delegates whether this approach resonates with them; how they see the challenge; and how we can work together to evolve this project.

### Key messages

- Natural capital approaches are yet to have a significant influence on broader decision-making in business or government. Natural capital gives a common cause, even if we define detail later.
- The importance of natural capital has not yet been properly communicated to the private sector, despite better communications around climate change and carbon. Private companies have greater risks (e.g. from investments and in their supply chains) and comply with international agreements.
- It is in both the public and private sectors' interest to protect natural capital. However, many approaches to taking account of nature in both sectors have been developed independently, with little focus on integration or alignment.

## Theatre workshop: Nature in action

Alexandra Bond Burnett, *Bond Ambition*

We organised a workshop that used performance techniques to communicate the values of nature. The techniques cultivate an empathetic approach to communication. Participants discovered how theatrical work helps build relationships and connections with the emotions behind the value of nature in research, policy and practice. Game playing was used to create scenes, resulting in a new perspective of the participants' fields of study.

### Key messages

- Empathy is key for understanding other people and roles. Adopting different mind-sets allows us to better understand each other.
- Every problem has a solution but we need to listen to each other. Changing the tone or approach can be useful when trying to get our point across. Ignoring is not effective.
- Using better communication techniques through theatre can help us to talk to each other better. Improvisation techniques are key to being adaptable.





## Closing panel

Chaired by Professor Louise Heathwaite CBE, Lancaster University



### **Professor Mark Rounsevell, Karlsruhe Institute of Technology and University of Edinburgh:**

- We have a global responsibility to protect natural capital and lots can be done in science and policy to make a difference.
- Thanks to international science-policy processes such as the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), we know the scale and causes of the problem – and so do governments.
- Science evidence is problem-oriented but governments need solutions. Clearly, current protection measures are not succeeding in halting species and ecosystem status decline.
- Consumption (including diets, food waste and pet foods) has a critical role in protecting natural capital but we need to better understand consumption-based trade-offs. How do we protect European natural capital without causing losses elsewhere in the world?

### **Professor Bridget Emmett, Centre for Ecology & Hydrology**

- In the last ten years the UK has lost a lot of its lead in terms of data collections and data monitoring. The UK is data rich but most of it is used for water monitoring.
- We need to be honest and aware of the limitations of natural capital approaches. There are always trade-offs - and some people will be unhappy.
- Natural capital accounts are always partial accounts, and adding one more ecosystem service always changes things.
- We need monitoring mechanisms that pick up change. What have we been investing our money in if there haven't been any improvements in our land management practices?!

### **Mark Gough, Natural Capital Coalition**

- Things are coming to fruition and people are coming together. 2020 is a big year with the IUCN World Conservation Congress in Marseille and the Convention on Biological Diversity (CBD) conference in Japan, looking at the 2020 biodiversity targets and adopting a post-2020 global biodiversity framework.

- The Combining Forces initiative brings together business and governance for people and nature. The Natural Capital Coalition has taken up the Social and Human Capital Coalition now too, which is important for understanding the trade-offs.
- Marine issues are on the rise. The Natural Capital Coalition is preparing an Ocean Protocol.

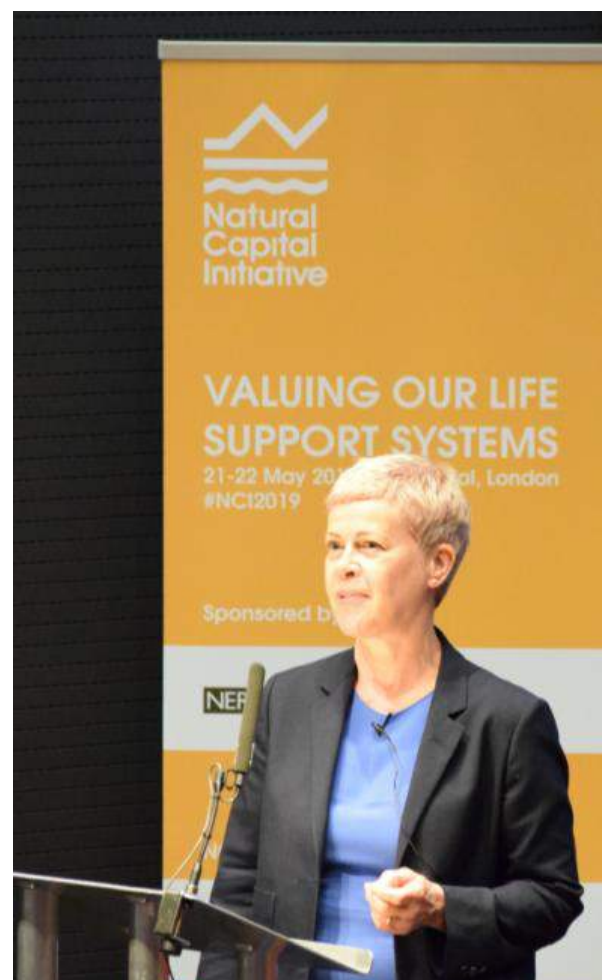
#### Rebecka Bergh, Scottish Natural Heritage

- We need to make the natural capital approach more approachable, especially if we want to engage with young people. From experience of working with Young Scot, “natural capital” sounds too technical and jargony to most young people, whereas “benefits from nature” and other terms can be more accessible. The concept itself they easily understand.
- If you want to engage young people, show how natural capital thinking relates to current youth movements such as the Youth Strikes 4 Climate or cutting out plastics.
- The natural capital approach is all about long-term thinking and investment, so the same should apply to the people working with the approach. A part of making the approach mainstream must be to have more people working with it. There must be more roles across all pay grades, but especially entry level ones.
- A lot of people have spoken about *where* we want natural capital work to be in five or 10 years but we haven’t spoken about *who* is going to work with it. Employ and train young people *now* to be natural capital professionals spreading the message in five years’ time

In the Q&As, the delegates discussed food and health too. Rather than “natural capital”, we are really talking about people and nature. Our actions and consumption influences land and water use, which in turn determines how much land or water is preserved for other species. At the same time changes in our environment influence our health and wellbeing too.

We need to think about starting points especially across generations, social groups and countries. Natural capital decisions are trade-offs and there are always winners and losers.

We need to change our mind-set and start making decisions based on what really matters to us. We can’t wait for the next generation to make the change but all have a responsibility to act.



## Annex 1 Programme

### DAY 1 MANAGING OUR NATURAL CAPITAL – THE NEXT DECADE

*Posters and exhibition all day*

9:30-10:30 Registration and coffee

#### 10:00-12:00 **Opening keynotes – Setting the challenge (Plenary)**

Talks with Q&A and panel discussion

Chair: Alison Hester, The James Hutton Institute

**Ian Boyd**, Chief Scientific Advisor, Defra

**Kathy Willis**, Professor of Biodiversity, University of Oxford

**Ben Combes**, Project Director for the AI for the Earth Initiative, PwC

12:00-13:00 Lunch and networking

13:00-14:30 Parallel sessions 1

#### **Artificial Intelligence for improving natural capital management and decision support**

Paula Harrison, CEH & Mark Rounsevell, University of Edinburgh

#### **Key issues and future challenges for environmental governance**

Meri Juntti, Middlesex University London & Kerry Waylen, The James Hutton Institute

#### **Valuing Nature - what works? What we have learned from the Valuing Nature Programme**

Ece Ozdemiroglu, Valuing Nature Network

#### **Implementing Wholescapes guidance; challenges and opportunities to reconnect policy and people from land to sea**

Ed Maltby, University of Liverpool & Mike Acreman, CEH

14:30-15:00 Coffee break

15:00-16:30 Parallel sessions 2

#### **Pioneering natural capital approaches in the marine environment**

Aisling Lannin, MMO

#### **Valuing nature beyond economics: structures for sustainability**

Richard Gunton, University of Winchester

#### **It's not fair: reducing urban health inequalities through better management of natural capital**

Ruth Waters, Natural England

#### **Integrated natural capital approaches for land managers**

Paola Ovando Pol, James Hutton Institute, supported by AECOM

16:30-17:30 **Speed talks (Plenary)** Chair: Paula Harrison, Centre for Ecology & Hydrology

- We Value Nature – the new normal for business, **Paul Mahony**, Oppla
- Delivering a natural capital approach in Greater Manchester, **Krista Patrick**, Greater Manchester Combined Authority
- Exploring the application of Natural Capital Protocol in land-based business and regional Ecosystem Accounts, **Paola Ovando Pol**, James Hutton Institute
- Challenges of implementing the nature connection–wellbeing–health nexus, **Frances Harris**, University of Hertfordshire
- Adding a new dimension – integrating heritage into natural capital, **Hannah Fluck**, Historic England
- The Conservation Right – a new property right for natural capital, **Jaime Ubilla**, Conservation Right Foundation

17:30-18:30 Drinks reception  
18:30-20:30 Conference dinner

## DAY 2 NATURAL CAPITAL IN PRACTICE

*Posters and exhibition all day*  
8:30-9:00 Registration for Day 2 delegates

9:00-10:00 **Opening Keynotes - Drilling down**  
Talks with Q&A  
Chair: Ruth Waters, Natural England  
**Melanie Austen**, Head of Science, Plymouth Marine Laboratory  
**Tim Sunderland**, Principal Specialist in Economics, Natural England  
**Rebecca Lovell**, Research Fellow, European Centre for Environment and Human Health

10:00-10:30 Coffee break

10:30-12:00 Parallel sessions 3

**Delivering biodiversity AND environmental net gain using the natural capital approach – practical implementation**

Martina Girvan,  
Arcadis & Jenny  
Merriman, WSP

**Marine natural capital accounting within the UK, its Overseas Territories and the Commonwealth**

Vicky Morgan, JNCC

**How do we quantify the benefits of urban greenspace and natural capital to health?**

Sari Kovats, LSHTM &  
Dan Osborn, UCL

**Implementing a natural capital approach across local to regional scales: the importance of context**

Alison Holt, Natural  
Capital Solutions &  
Bruce Howard,  
Ecosystem Knowledge  
Network

12:00-13:00 Lunch and networking

13:00-14:30 Parallel sessions 4

**Advancing and integrating methods for natural capital monitoring and assessment across the UK**

Tom McKenna, SNH  
& Lisa Norton,  
CEH/UKEOF

**(How) can marine protected areas deliver both conservation and socio-economic benefits?**

Daniela Russi, IEEP

**Combining Forces on Natural Capital**

Richard Spencer,  
ICAEW & Mark  
Gough, Natural  
Capital Coalition

**Theatre workshop: Nature in Action**

Alexandra Bond  
Burnett, Bond  
Ambition (supported  
by eftec)

14:30-15:00 Coffee break

15:00-16:00 Closing panel discussion (Chair **Louise Heathwaite**, Lancaster University)  
**Mark Rounsevell**, Co-Chair of IPBES Regional Assessment for Europe and Central Asia  
**Bridget Emmett**, Head for Soils and Land Use Research, Centre for Ecology & Hydrology  
**Mark Gough**, Executive Director, Natural Capital Coalition  
**Rebecka Bergh**, Scottish Natural Heritage

## Annex 2 Delegate affiliations

<p> Aberystwyth University BioInnovation Wales  AECOM  Agrii  Amphibian and Reptile Conservation  APEM Ltd  Arcadis  Bakerwell  Bangor University  Bank of England  BioSS  Bond Ambition  Bord Bia  British Ecological Society  CECAN  Cefas  Centre for Ecology and Hydrology  Centre for Environment and Sustainability, University of Surrey  Chartered Institute of Ecology and Environmental Management  Cheshire Wildlife Trust  Climate KIC  Conservation Law Center, Chile  Countryside and Community Research Institute  Crown Estate Scotland  Department for Environment, Food and Rural Affairs  Department of Agriculture Environment and Rural Affairs Northern Ireland  Devon Maritime Forum  Earthwatch  Ecosystems Knowledge Network  eftec - Economics For The Environment Consultancy  European Centre for Environment and Human Health  Field Studies Council  Global Garden Ltd  Greater Manchester Combined Authority  Historic England  Historic Landscape Management Ltd  ICF Consulting Services Ltd  Institute for European Environmental Policy (IEEP)  International Union for Conservation of Nature (IUCN)  Irish Forum on Natural Capital  James Hutton Institute and SEFARI  Joint Nature Conservation Committee (JNCC)  Karlsruhe Institute of Technology  Kings College London  Lancaster University  London School of Hygiene and Tropical Medicine  Marine Management Organisation  Met Office  Middlesex University  National Trust  Natural Capital Coalition  Natural Capital Initiative  Natural Capital Solutions  Natural England </p>	<p> Natural Environment Research Council (NERC UKRI)  Natural Resources Wales  New Forest National Park Authority  Newcastle University  North Devon Biosphere  Northumbria University  Office for National Statistics  One Beehive  Oppla  Ordnance Survey  People and Nature  Plymouth Marine Laboratory  PRESS  PwC  QinetiQ  Redding Consulting  Royal Society for the Protection of Birds  Royal Society of Biology  Scotland's Rural College  Scottish Government  Scottish Natural Heritage  Scottish Wildlife Trust  SEFARI Gateway  Simetrica  Southern Inshore Fisheries and Conservation Authority  Surrey Wildlife Trust  Thames Estuary Partnership  The Central Association of Agricultural Valuers  The Crown Estate  The Institute of Chartered Accountants in England and Wales  The James Hutton Institute  The Rivers Trust  The Royal Society  University College London  University of Aberdeen  University of Cambridge  University of Edinburgh  University of Exeter  University of Greenwich  University of Hertfordshire  University of Leeds  University of Oxford  University of Plymouth  University of Reading  University of Southampton  University of West of England, Bristol  University of York  Wildfowl &amp; Wetlands Trust  Wildlife &amp; Countryside Link  World Business Council for Sustainable Development  WSP  WWF  Yorkshire Water  ZSL Institute of Zoology </p>
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