



The one-hundred-and-twelfth meeting of the Joint Nature Conservation Committee to be held at 08.45 on 14<sup>th</sup> September 2017, at JNCC, Monkstone House, City Road, Peterborough, PE1 1JY

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# Natural capital work in JNCC

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## 1. Introduction

- 1.1 Natural capital is our 'stock' of land, air, water and biodiversity. This stock underpins the economy by producing value for people, both directly and indirectly. Value is attached to benefits deriving from ecosystem services which flow from natural capital, including clean air and water, food, energy, wildlife, recreation and protection from natural hazards.
- 1.2 The JNCC strategy for 2017-20 recognises that increasing awareness of the value of the natural environment in supporting economic growth and underpinning social wellbeing is one of the five key challenges/opportunities that JNCC must deal with in coming years. JNCC is seeking to embed this concept across the organisation to support the work of the country nature conservation bodies, strengthen our international work, and develop new niche work areas (for example working closer with the private sector).
- 1.3 Joint Committee was last presented with a paper on natural capital, and JNCC's potential role in implementing this concept, in September 2015 (see JNCC 15 27). The paper outlined the natural capital concept and work already undertaken by JNCC in this area. This paper provides an update on JNCC's current natural capital work and how this will develop over the coming years.
- 1.4 To date, natural capital work has been largely terrestrially focussed. JNCC and its partners are seeking to address this imbalance and increase natural capital application to the marine environment.

## 2. Natural capital work in JNCC

- 2.1 A theme running throughout JNCC's strategy is that a healthy natural environment provides the foundation for sustainable economic growth, prospering communities and personal wellbeing. This theme supports policy approaches based on the concepts of natural capital and integrated management of natural resources which will shape JNCC's future work. In this way JNCC will contribute to government policy priorities in which natural capital and related concepts are becoming increasingly prominent (for example, Defra's proposed 25 Year Environment Plan, Welsh Government's Natural Resources Policy, Scottish Government's Economic Strategy and environmental policies, Northern Ireland's Biodiversity Strategy).
- 2.2 Four of JNCC's strategic outcomes have components related to natural capital. JNCC has developed five workstreams that start to define the priorities and actions required to deliver the natural capital components of the strategic outcomes:

- i. Marine
- ii. Evidence, analysis and modelling
- iii. Private sector advice and support
- iv. International initiatives, including support to UK Overseas Territories
- v. Coordination

2.3 The five workstreams are described in sections 3-7 of this paper.

### 3. Marine

- 3.1 There is broad consensus that marine systems need to be better represented through the lens of natural capital thinking, as they are critically important to many services, goods and benefits that support human societies. Whilst there have been several studies to date, many have struggled to resolve issues associated with marine systems sufficiently to enable a meaningful analysis of their role as natural capital assets, or have been very location specific. There is a critical need to build a common and shared knowledge base (for example ecosystem delivery processes and pathways) and ensure that existing data can be effectively applied to describe and understand marine environments in the context of natural capital assets.
- 3.2 JNCC has identified several internal work areas which aim to build the knowledge base and demonstrate how existing knowledge and data can inform discussions relating to marine natural capital. These internal work areas include:
- i. Marine Natural Capital Asset Register for UK offshore waters
  - ii. Mapping marine ecosystem services (supply and demand)
  - iii. Trade-offs in marine ecosystem services
  - iv. Assessing marine ecosystem services status using existing UK MSFD and OSPAR indicators.
- 3.3 *Marine Natural Capital Asset Register for UK offshore waters.* JNCC is developing an initial structure for an asset register and a list of high-level marine assets (habitat and species) relevant to offshore MPAs. The register will be populated with information on the ecosystem services and benefits these assets provide. This will be achieved through a thorough literature review of existing academic research and grey literature, and will be evidence quality assured prior to inclusion in the asset register.
- 3.4 *Mapping marine ecosystem services (supply and demand).* This work will model the distribution and magnitude of ecosystem service provision (both potential and realised) for UK waters for a selected suite of ecosystem services. The models will be developed using a mix of information from the scientific literature and expert judgment and parameterised using a range of data sources. This work is currently being undertaken by JNCC staff and an intern from the Cambridge Biodiversity Internship Scheme.

- 3.5 *Trade-offs in marine ecosystem services.* The work aims to determine the ecosystem services generated by marine habitats and how supply varies in response to different anthropogenic activities (for example types of seabed use). The project will build upon existing JNCC work, for example Conceptual Ecological Models, and aims to deliver a prototype ecosystem service provision model through which different simulations can be tested. Planning for this activity has begun.
- 3.6 *Assessing marine ecosystem services status using existing UK MSFD and OSPAR indicators.* This activity will explore the use of UK MSFD and OSPAR marine biodiversity indicators as proxies to assess the potential of marine ecosystems to deliver services (i.e. supply-side), based on the assumption that ecosystems in good condition have the maximum potential for service delivery. A great deal of effort has gone into designing and testing marine biodiversity indicators over several years; the proposed approach would allow for optimisation of resources by making best use of existing indicators and metrics. Work on this activity is yet to begin.
- 3.7 JNCC has been working with partner organisations with respect to marine natural capital, including:
- i. *Defra Marine Pioneer.* This is a programme of work, in two geographic areas with local partners, demonstrating activities against the 25 Year Environment Plan priorities. It will test, at a local scale, how marine natural capital and other approaches can be effectively managed to deliver benefits to the environment, economy and people, and identify how best to share and scale up this learning. JNCC's role in the Defra Marine Pioneer remains uncertain due to the local, coastally-focussed, nature of the work.
  - ii. *European Topic Centre on Inland, Coastal and Marine waters (ETC/ICM).* This work aims to deliver a quick guide to assessing marine ecosystem capacity for service supply within an EU policy context. It is a culmination of work undertaken over the last four years by the ETC/ICM and the European Environment Agency.
  - iii. *Natural Environment Research Council Innovation Project (DECOM-MPA).* JNCC is a partner in a project that will quantify the ecological footprint and potential effects of offshore infrastructure decommissioning on sea-bed habitats, marine populations and biological communities. Using a selection of 'real world' case studies provided by industry partners, the project will create decision support products that are designed to inform industry and statutory advisors on best practice in offshore infrastructure decommissioning. The project is adopting a natural capital approach to assess opportunities and costs of decommissioning options and will deliver in December 2017. The project has the potential to grow into credible industry guidance and provide opportunity for JNCC to demonstrate global leadership on offshore infrastructure decommissioning.

- 3.8 A key limiting factor to progress, and successfully deliver, the marine natural capital work at JNCC is the availability of staff resources. To that end, several internship schemes have been approached including the Cambridge Biodiversity Internship Scheme, the Valuing Nature Network Placement 2017 and the NERC-funded Innovation Placements Call 2017.

#### **4. Evidence, analysis and modelling**

- 4.1 JNCC is developing a framework to better represent biodiversity in natural capital decision tools, and establishing new partnerships to enable the mobilisation and incorporation of high-quality biodiversity data into decision tools.
- 4.2 Adequate consideration of UK biodiversity in natural capital policy decisions relies on reasonable knowledge of species distributions. However, detailed information is often restricted to highly recorded species. There is an increasing number of models and tools being developed, designed to guide policy decisions on natural capital and ecosystem services. In recognition of a lack of effective representation of biodiversity in many of these tools, JNCC is creating a biodiversity module that will promote due consideration of UK biodiversity across a range of taxa. The module will be designed to operate as a stand-alone decision support tool, or be integrated to complement existing tools.
- 4.3 The module uses species presence and environmental variables data, along with a modelling framework, to produce probabilistic species distribution maps. The framework is designed to support data from as wide a range of taxa as possible, thereby improving species representation beyond only highly-recorded species. In addition, the module will project alternative states by incorporating climate change scenarios.
- 4.4 Appropriate methods for species distribution modelling depend on available data. The biodiversity module is a framework which uses specialised data processing to maximise the use of even low-resolution observation data, and tests a suite of eight models to evaluate and select the best modelled-estimate of species presence for each species individually. To better account for the random elements within the modelling, the process is repeated and final maps display a mean of the outputs from the best performing models from each iteration. The modelling uses a range of climatic, land cover and terrain data. By changing these data, alternative land use and climatic scenarios can be reflected, and species distribution changes predicted.
- 4.5 The module framework will be available open source, to encourage use by a wide range of stakeholders. Although designed with natural capital tools in mind, the framework is applicable to a range of environmental applications. JNCC will continue to improve the module framework, but ongoing focus will be on the use of the framework and tangible outputs, both from in-house development and engaging in collaborative partnerships. For instance, JNCC will be building on their expertise in Earth Observation and the biodiversity module to better quantify habitat condition.

## 5. Private sector advice and support

- 5.1 Natural capital is not only relevant to the environment sector, but also the private sector. Accounting for impacts and dependencies on natural capital can help businesses *inter alia* protect brand reputation and assess risks and mitigation factors associated with land-use change and infrastructure development. The finance sector is taking initial steps in factoring in natural capital to assess risk exposure in investment portfolios. For example, the insurance industry is using natural capital approaches to mitigate risks from extreme weather events and quantify risk exposure of global supply chain impacts of investment portfolios with regards to dependencies and impacts on global natural capital (including biodiversity).
- 5.2 Natural capital is taking a prominent role in helping businesses attain sustainable operational models. Yet much of the work to date focuses on demonstrating the relevance of natural capital to business value creation via accounting and valuation and corporate social and environmental reporting. The private sector is making marked headway in understanding how to use and capitalise on new natural capital knowledge and approaches to inform operational change required to sustain long-term value creation. JNCC can play a critical role in helping businesses co-ordinate action to conserve natural capital, improve understanding of the links between natural capital and biodiversity, and expedite the use of existing research, knowledge and data in emerging natural capital approaches being adopted by businesses.
- 5.3 Since the last paper to the Joint Committee, JNCC has worked on several projects linking natural capital and private sector interests. This includes the following commissioned projects:
- i. *Realising Nature's Value in UK Business*<sup>1</sup>. This identified motivations, approaches and barriers to businesses accounting for natural capital in three business sectors.
  - ii. *Integrated Reporting and Natural Capital Accounting*<sup>2</sup>. This examines how Integrated Reporting<sup>3</sup> can be used by businesses to improve the accounting for, and management of, natural capital. The project was mainly UK focussed, with some evidence drawn from international business practices.
  - iii. *Business Risks from Biodiversity Loss*. This ongoing research has identified business risks and dependencies (and associated costs and opportunities) related to biodiversity loss and ecosystem degradation. The project demonstrates benefits to businesses that result from sustainable biodiversity management practice and highlights how business managers can identify and account for associated biodiversity risks and dependencies.

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<sup>1</sup> [JNCC Report 558](#)

<sup>2</sup> [JNCC Report 587](#)

<sup>3</sup> Integrated Reporting is designed to bring greater cohesion and efficiency to corporate reporting processes and galvanise 'integrated thinking', breaking down internal silos. It improves the quality of information available to providers of financial capital to enable more efficient allocation of capital. It focuses on value creation, and the 'capitals' (including natural) used by businesses to create value, thus contributing to a more financially stable global economy.

- iv. *Sustainable Financing Mechanisms<sup>4</sup> (SFM) in EU Overseas Territories<sup>5</sup>*. JNCC commissioned research to explore practical application of SFM to conserve and enhance natural capital in the Caribbean Overseas Territories by developing a framework approach and identifying funding opportunities to support development of SFM to financially support conservation of ecosystems in the Overseas Territories.
- 5.4 JNCC has been working with international organisations and networks to strengthen the complementarity between biodiversity research and business requirements.
- i. *ERA-Net BiodivERsA partnership<sup>6</sup>*. JNCC is working with BiodivERsA to develop practical ways to bring business and natural science research communities together to improve the societal impact and uptake of research by business, develop partnerships between researchers and business to inform future funding calls, and provide business users with the knowledge and tools (including relevant guidance) necessary to incorporate natural capital and biodiversity into corporate decision making.
- ii. *UK Space Agency Project (EO4 Cultivar)<sup>7</sup>*. The project is creating bespoke Earth Observation (EO) data products designed to inform the development of natural capital based approaches to deliver sustainable and climate smart agricultural production in supply chains between importers in the UK and producers in Colombia and Peru. JNCC leads the work package developing case studies (in collaboration with international businesses and local communities) that demonstrate practical application of EO in delivering a natural capital approach to achieving sustainable livelihood generation and improved supply chain resilience.
- 5.5 JNCC is assessing the scope for building on several of these projects. For example, the sustainable finance work is being used to scope out future practical application in UK Caribbean territories.
- 5.6 Natural capital has an important role to play in the development of new incentive schemes for the use of land and sea once the UK leaves the EU. For example, the benefits sought from environmental and agricultural policy could be aligned with benefits to society by paying providers of ecosystem services which meet a range of local and national needs.

## 6. International initiatives (including UK Overseas Territories)

- 6.1 Whilst the concept of ecosystem services is embedded in some international agreements, there are currently few direct references to natural capital *per se*.

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<sup>4</sup> Sustainable finance is defined as the ability to i) secure stable, sufficient and diverse streams of financial resources; ii) allocate these resources in a timely manner in an appropriate form; iii) meet the full cost of sustainable management of natural capital (including biodiversity) conservation; iv) ensure effective and efficient management of natural assets and biodiversity; and v) guarantee long-term provision of ecosystem derived goods and benefits to local stakeholders.

<sup>5</sup> [JNCC Report 606](#)

<sup>6</sup> A network of 31 Agencies and Ministries that fund pan-European biodiversity and ecosystem services research see:

<http://www.biodiversa.org/>

<sup>7</sup> <https://www.gov.uk/government/case-studies/environment-systems-south-america-agricultural-satellite-data>

- 6.2 Ecosystem services, and their sustainable use, are explicitly recognised by the Inter-Governmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). Ecosystem services, their trends, and pressures affecting them, are integral to the global and regional assessments currently in preparation for IPBES. The recently published IPBES *Assessment report on pollinators, pollination and food production*<sup>8</sup> documents changes in animal pollination as a key regulating ecosystem service underpinning food security, gene flow, and restoration of ecosystems.
- 6.3 Ecosystem services are recognised in the Strategic Plan for Biodiversity and relevant Aichi Targets<sup>9</sup> of the Convention on Biological Diversity; explicitly targets 11, 14 and 15 but also implicit elsewhere despite the term not appearing in the text of the Convention itself. Global Biodiversity Outlook 4<sup>10</sup> provides a mid-term assessment of progress towards the Aichi targets.
- 6.4 In other multilateral environmental agreements (MEAs), principles such as the 'wise use' of wetlands in the Ramsar Convention are expanded in strategic plans. These plans recognise that ecosystem functions, as well as the goods and services they provide to people and nature, need to be fully recognised, maintained, restored and used sustainably. Additionally, the Convention on International Trade in Endangered Species (CITES) takes measures to address the sustainable use and trade of biodiversity.
- 6.5 JNCC provides support to Defra across the range of biodiversity relevant MEAs, providing scope to contribute thinking on natural capital into relevant Decisions and Resolutions. However, language used in various MEAs shifts over time; for example, IPBES recently decided to use the term '*nature's contribution to people*' instead of ecosystem services.
- 6.6 A preparatory process is now being initiated for the follow up to the Strategic Plan for Biodiversity post-2020. It is timely to begin considering how JNCC might want to further embed, or expand, thinking around natural capital, regardless of language used, in future targets. JNCC is supporting Defra in developing a collective UK approach to future targets.
- 6.7 JNCC provides advice to DfID in support of the environmental aspects of work undertaken in DfID's Research and Evidence Division. In addition, JNCC works with several international programmes, including REACH<sup>11</sup>, ESPA<sup>12</sup>, and the Darwin Initiative<sup>13</sup>. These initiatives link the concepts of ecosystem services security, underpinned by sustainable management of natural capital, to poverty reduction and sustainable livelihood development.

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<sup>8</sup> [www.ipbes.net/sites/default/files/downloads/pdf/spm\\_deliverable\\_3a\\_pollination\\_20170222.pdf](http://www.ipbes.net/sites/default/files/downloads/pdf/spm_deliverable_3a_pollination_20170222.pdf)

<sup>9</sup> CBD Decision X/2: <https://www.cbd.int/decision/cop/?id=12268>

<sup>10</sup> <https://www.cbd.int/gbo/gbo4/gbo4-summary-en.pdf>

<sup>11</sup> REACH is a UK funded global research programme designed to improve water security by providing better evidence to inform institutional and infrastructure development required to unlock growth opportunities and move people out of poverty.

<sup>12</sup> Ecosystem Services for Poverty Alleviation (ESPA) is a UK funded global interdisciplinary research programme that aims to give policy-makers and natural resource users the evidence needed to manage ecosystems for sustainable and inclusive growth and achieve poverty alleviation. A recently ESPA-supported conservation initiative won the prestigious Equator Prize 2017 awarded for "outstanding community and indigenous initiatives that are advancing nature-based solutions for local sustainable development".

<sup>13</sup> The Darwin Initiative is a UK government grants scheme that supports locally based projects promoting conservation of biodiversity and the natural environment together with poverty alleviation in developing countries worldwide.

Providing cross-Whitehall linkage facilitates the spread of the natural capital approach and highlights JNCC's leading role in developing the role of natural capital and biodiversity conservation in this context.

- 6.8 The UK Overseas Territories are highly dependent on the natural environment for their economic prosperity and social wellbeing. JNCC is implementing a suite of projects under the Overseas Territories CSSF Programme<sup>14</sup> in close collaboration with individual Territories. These will establish monetary and cultural values for critical ecosystem goods and services, identify measurable attributes that can be used to monitor changes in value through time, and map the spatial distribution of these valuable natural capital assets. This Overseas Territories natural capital assessment programme builds on a body of existing work and techniques supported and pioneered by the UK Government in the two regions and undertaken by JNCC.
- 6.9 Significant international opportunities now exist to build on current CSSF work by working with Defra and FCO, building on JNCC's international reputation with new partners and funders, supporting Defra's international strategy, and generating new income (for example through the facilitation of sustainable finance).
- 6.10 NCC expertise (across teams) is developing rapidly using Overseas Territories projects to increase in-house skills and foster key international partnerships. JNCC is in discussion with Defra to apply for funding (Windsor Fund) to extend the OT work to nine Caribbean Commonwealth States. JNCC are also using EO capacity in the EO Centre of Excellence to deliver strategic support in the Caribbean and South America. Additional FCO funding is possible for JNCC to assist Overseas Territories in managing natural capital and other data emerging from UK supported projects.

## 7. Coordination

- 7.1 The UK has been at the global forefront of natural capital and ecosystem services thinking for over decade. Pioneering work such as the UK National Ecosystem Assessment and its follow-on phase, the development of the Scottish Natural Capital Asset Index, the Welsh Environment Bill and English Natural Capital Accounting (ONS and Defra) indicate where natural capital thinking is an integral part of national reporting.
- 7.2 JNCC has hosted several meetings bringing country nature conservation bodies, government departments and other interested parties together to discuss work on natural capital and how to embed this approach into organisations. These meetings provide important opportunities to share knowledge and establish relationships for further working. JNCC has sought to promote UK experience through working with the European Commission's Mapping and Assessment of Ecosystems and their Services (MAES) and

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<sup>14</sup> CSSF Programme is supporting a programme of work 'Enhancing Economic Security through Environmental Resilience' in the Overseas Territories, with the intention of improving long-term economic planning to support growth and diversification. Embedding the role of the natural environment in economic and spatial planning through existing or new policies or legislation is one element of this support, the objective being to protect and enhance the value of the Territories' vital natural capital.

ESMERALDA Projects, through international fora such as IPBES, and with international groups such as the Arctic Council.

- 7.3 JNCC is working to increase staff knowledge and experience of natural capital. A natural capital portal has been created on the JNCC intranet which is updated regularly with new relevant content (for example videos, reports, case studies). JNCC is developing a natural capital seminar series to engage and upskill JNCC and other agencies in natural capital concepts and applications in a range of relevant work areas. JNCC will host webinars with external and internal speakers to provide their separate experience and expertise relating to various aspects of natural capital; hosting webinars is free beyond staff time. JNCC regularly screens selected videos during lunchtime seminars. These sessions can be extended to country agency partners if there is appetite.

## **8. Ambitions/targets for 2017/18 and beyond**

- 8.1 NCC has a small team of 2.2 FTE working on the coordination of natural capital related work across the rest of the organisation and delivering the work package on links to the private sector. JNCC also considers social and economic benefits in all that it does so increasingly all of its work makes a contribution to the delivery of the vision behind our strategic plan. This is delivering some progress on all of the five work packages but more could be achieved faster if additional resources were available. Income is helping to boost natural capital work greatly in the Overseas Territories and is raising JNCC's profile and skills considerably. More modest but nevertheless critically important income is helping JNCC to establish its role in natural capital related work in:
- i. the European marine environment through the work JNCC does for the European Topic Centre.
  - ii. the oil and gas sector through JNCC's partnership with Hull University and industry on the decommissioning research
  - iii. international food supply chains (asparagus from Peru), their sustainability and assessment through EO funded by the UK Space Agency.
- 8.2 Looking forward to 2018/19 it is anticipated that the internal work activities described above and the engagement in external projects will continue. It is hoped that further internships can be used to catalyse progress in the internal projects and that engagement in external projects will grow.
- 8.3 JNCC has raised its profile in natural capital related work, established some momentum in five work areas, started to receive some income and aligned its work to add value and complement the work of the country nature conservation bodies and governments. Now is an excellent time to accelerate the work.
- 8.4 JNCC needs to do more thinking on what tangible benefits it wants to deliver from the natural capital related work. The future must be based on turning the interest in economic aspects of biodiversity into action. The activities outlined

in sections 3-7 of this paper are a start, and further work is needed to identify medium term targets to enable JNCC to align the work with them.

## **9. Opportunities**

- 9.1 There are many potential opportunities for JNCC, for example:
- i. Further developing existing work such as EO4 Cultivar and NERC DECOM-MPA projects.
  - ii. Continued access to CSSF and ODA funding.
  - iii. Strengthening links with the private sector to provide links to governments and explore novel partnership opportunities.
- 9.2 The natural capital concept is firmly incorporated into key funding streams, such as the European Commission's Horizon 2020, Future Earth, Defra's Pioneer Projects and several existing NERC programmes such as the Valuing Nature Network. JNCC is well placed to seek links between programmes, expedite the uptake of results by users, and exploit opportunities to tender for relevant projects.

## **10. JNCC's niche and working relationships with partners**

- 10.1 JNCC already works formally and informally with government departments, statutory agencies, NGOs, research councils, academic institutes and other bodies. Maintaining and strengthening these relationships will be important for the implementation of natural capital focused working. New partnerships will be sought across a range of organisations, including businesses and other parts of government.
- 10.2 The five workstreams JNCC has chosen are designed to add value to the work of country nature conservation bodies and governments, and contribute to the delivery of government policies. They reflect JNCC's unique role in international nature conservation and the Overseas Territories which provide opportunities to disseminate and exploit UK expertise to wider benefit. JNCC also has a major role to collect data and provide evidence on behalf of the country nature conservation bodies so another element of work is to make this evidence fit for use in models and tools used to assess and manage natural capital. All of the country nature conservation bodies and governments are interested in engaging the private sector in valuing and helping to manage natural resources, and JNCC is focusing on the UK and international scale elements of the private sector. Finally, our work is helping to fill the gap in thinking around natural capital in the marine environment, to make our marine evidence and assessment work more relevant to natural capital work and to exploit some of the experience we have gained working on behalf of the European Topic Centre. Initial exposure of JNCC's plans for work in these five areas has been welcomed enthusiastically by all country nature conservation bodies and governments. The clearer communication of what JNCC is planning has been helpful to

country nature conservation bodies and continuing close collaboration and sharing of our collective activities will be essential.