Nature News Autumn/Winter 2020

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Contents

Chief Executive's Introduction 1
News in Brief 2
Farewell to our Chairman Chris Gilligan 2
Air pollution Covid blip to Covid flip 2
Using EO for water quality management 2
JNCC Equality, Diversity and Inclusion 2
Offshore Wind Evidence and Change Programme 3
JNCC strategy – making a difference for nature 4
Understanding the environmental impact of UK consumption 5
Meet the Expert 7
From ridge to reef: Building an Environment Strategy for the Turks and Caicos Islands 10
2020 – a year of air pollution progress 12
ITAPA update: Typhoons, tech and tactical working to benefit ecosystems 14
Working together – JNCC Business Associates 15
EO4cultivar: Mapping Natural Capital and Ecosystem Services in Agricultural Landscapes in Columbia 16
Devolved Administrations and the UN – global to local conservation and the role of JNCC 17
UK Biodiversity Indicators 2020 20
Developing a new habitat indicator 21
No 'one size fits all' solution to protecting conservation sites from pollutants 23
West of Scotland Deep-Sea Marine Reserve 25
Paving the way for transition from the European Union 27
Seabird bycatch: Towards a UK Plan of Action 29
Understanding the impact of offshore wind developments on kittiwakes 31
New Scottish sites designated 32
Monitoring focus: The Wetland Bird Survey 33
Offshore seabed survey of Pobie Bank Reef 35
The Joint Cetacean Database – maximising our evidence for whales and dolphins! 36
Conservation Conversation 37

Chief Executive's Introduction

Welcome to the autumn/winter edition of Nature News, bringing you updates and information on our UK and international work. Over the last few months, we've continued to work from home as access to our offices has been restricted because of the coronavirus pandemic. We've successfully adjusted to new ways of working and have been driving forward the priorities in our new five-year strategy. In this issue we provide some examples of how we are implementing our strategy and addressing the inter-related crises of biodiversity loss and climate change.

Air pollution is a major environmental pressure that is felt at a range of scales from local to regional and global. Air pollutants can affect biodiversity and ecosystem services, harm human health and contribute to climate change. This year, global understanding about air pollution and its effects on people and nature has continued to grow. Our experts have been working with partners across the UK and internationally to build a better understanding of air pollution effects on ecosystems. The multiple layers of this work are explored by Susan Zappala and Alexandra Cunha throughout this issue.

Just as Nature News went to press, we said farewell to our Chair, Professor Chris Gilligan CBE. On behalf of JNCC, I'd like to thank Chris for all that he has done over the last six and a half years. His drive and energy will be greatly missed. We look forward to the appointment of a new Chair shortly.

There will be further changes next year. I will be leaving JNCC at the end of March after serving as Chief Executive for over 11 years. I'm delighted to announce that Gemma Harper (currently a deputy director in Defra) will be taking over as interim Chief Executive when I leave. In the next issue of Nature News I will share some reflections on my time in JNCC and Gemma will introduce herself.

Marcus Yeo, Chief Executive, JNCC

News in Brief

Farewell to our Chairman Chris Gilligan

At our December Joint Committee meeting we said farewell to our Chairman Professor Chris Gilligan CBE. Chris has led the Committee since 2014, following an extension of his term in 2017. We thank Chris for his support over the last six and a half years.

On behalf of staff and Joint Committee members, we wish him well for the future.

Air pollution Covid blip to Covid flip

Before Covid, the plan for JNCC's air pollution projects was to embark in an extensive programme of face-to-face workshops with stakeholders. Engaging with stakeholders is a key opportunity to build awareness and understanding of the projects. It's also a great opportunity to discuss project results and how they can be incorporated in the decision-making process.

With the prospects of travelling around the UK countries showcasing the projects dwindling down, our team developed a contingency plan with actions to ensure the information reaches an even larger group of stakeholders. This plan includes making project information webpages available with outputs such as non-technical reports, FAQ sheets, videos and feedback opportunities. To collaborate with us on this stream of work, and join our interactive workshops, you can sign-up to our stakeholder list.

Using EO for water quality management

In October our virtual workshop *Using Earth Observation for Water Quality Monitoring* was a great success. The delegates, from 19 countries, included representatives from government, public and private sector organisations, academia, research institutions and environmental NGOs.

The workshop was delivered by our experts as part of our Copernicus Project to raise awareness of how Copernicus satellite data can aid water quality monitoring in freshwater, estuarine and marine environments. Case studies demonstrated a range of applications, including seabed mapping, quantifying plastic pollution, detecting eutrophication and toxic algal blooms, tracking oil spills, and helping to predict responses to climate change. A set of resources from the workshop are available and a report is in preparation and will be published shortly.

JNCC Equality, Diversity and Inclusion

Our Equality, Diversity and Inclusion (EDI) group was initiated in response to the Black Lives Matter movement after the death of George Floyd. The group is inclusive, built in parallel to the Defra Project Race Strategy, and considers all aspects of EDI related to our work and workplace.

Our 2020/21 strategy sets out our vision, priorities and action plans. Our goal is to create a workforce representative of the diversity of our field, reflected at every level of the organisation, where every individual has equality of opportunity to progress and thrive in an inclusive culture. Our five priority objectives are to:

1. Make recruitment practices more inclusive and accessible to all candidates, enabling JNCC to build a diverse workforce.
2. Improve support for BAME staff within JNCC to ensure equality of opportunity.
3. Improve awareness of equality and diversity through education, training opportunities and sharing good practice, to facilitate a more inclusive working culture where employees from all backgrounds thrive, and to inform development of external projects and programmes.
4. Enhance our outreach to encourage more diversity in the wider environmental field.
5. Encourage EDI initiatives among our volunteer networks and partnerships.

Offshore Wind Evidence and Change Programme

We're pleased to announce our membership of the Offshore Wind Evidence and Change Programme – working to protect and restore the UK's precious marine environment, as the nation seeks to chart a course towards net zero emissions by unlocking the green energy potential of the UK seabed.

The partnership will be led by The Crown Estate, which has committed to a five year £25 million 'kick-starter' investment for the programme, alongside strategic partners: the Department for Business, Energy and Industrial Strategy (BEIS), and the Department for Environment, Food and Rural Affairs (Defra).

JNCC strategy – making a difference for nature

'Strategy' is a word that means different things to different people. In the corporate world, there is no shortage of lengthy textbooks on the subject, with a range of different approaches to choose from. I believe in keeping things simple. For me, corporate strategy is about defining a long-term direction for an organisation, underpinned by plans on how you will get there. An effective strategy provides a framework for making decisions, for example setting priorities and allocating resources.

JNCC published a new five-year strategy earlier this year. The context for our strategy is provided by the inter-related environmental crises of biodiversity loss and climate change. What contribution can JNCC make to address these global challenges?

Answering this question has required us to assess where JNCC can add the greatest value. One of JNCC's distinctive features is that we work across the four countries of the UK and internationally. In addition, we operate at the interface between science and policy, providing evidence and advice to enable governments and others to make informed decisions; and. we have deep expertise in biodiversity (covering terrestrial, freshwater and marine environments) and how it underpins the ecosystem services that benefit society and the economy. This is a unique combination of strengths.

Our strategy describes how JNCC will deploy these strengths within four strategic themes, in support of an overarching vision and mission.

JNCC was first established by the Environmental Protection Act 1990 and came into being a year later; next April will be our 30th anniversary. To remain relevant over three decades, JNCC has continuously evolved, for example to meet new government requirements and incorporate new approaches to nature conservation.

Change will remain a priority over the five years covered by the new strategy. We will emphasise the benefits provided by nature by embedding the concepts of natural capital and ecosystem services in our evidence and advice. Within the UK, we will strengthen our relationships with the four governments, providing scientific services that support the priorities of each administration by utilising the strengths derived from operating across countries. And looking beyond the UK, we will increase our international engagement, aiming to address the main drivers of global biodiversity loss.

Examples of how we are implementing our strategy are described elsewhere in this issue of *Nature News*. Several articles describe how we're using our expertise to take our work in new directions, whether it be mitigating the impacts of nitrogen pollution on protected sites in the UK, advising on the application of a natural capital approach in the Turks and Caicos Islands, or providing guidance on the impact of UK trade on global ecosystems. Both within the UK and internationally we are making a difference for nature.

Marcus Yeo Chief Executive

Understanding the environmental impact of UK consumption

The LET Guide (Linking Environment to Trade), produced by JNCC and funded by Defra, has been published and it aims to answer three key questions:

- What mechanisms are available to help measure the impact of UK consumption?
- How can we measure UK's impact on the environment overseas?
- How can these measures contribute to reducing the impacts?

50% of food and fibre consumed in the UK is imported from other countries. Production, processing and transport of these commodities across the globe has a major impact on ecosystems, driving land-use change, biodiversity loss and contributing significantly to global greenhouse gas emissions. As consumption increases globally, pressure for countries to take responsibility for and to manage their impacts overseas is increasing.

Quantifying this impact allows us to understand how and what we might do to reduce it. However, as supply chains have become increasingly complex with multiple stops or transfers before reaching UK soil, lack of traceability has become a huge barrier to progress. In recent years, increasing awareness of the UK's environmental impact overseas and its nuances has driven an explosion in approaches to measure and manage it. Not only are there hundreds of different initiatives, but these are dispersed across the internet and beyond, making it impossible to compare them or decide which is appropriate for use in different contexts.

To help de-mystify this area, building on work by the GCRF Trade, Development and the Environment Hub, we assembled and evaluated information on over 250 initiatives which link consumption to quantified production impacts. Using this information, we have produced a guide setting out 'the big picture' regarding trade and environmental impacts and 'pathways' to reducing this impact. The guide also includes an extensive tools and techniques section which provides high level definitions of approaches used and directs the user to further information on relevant initiatives.

Our work highlighted several fundamental approaches to measuring the environmental impacts of a country’s consumption overseas. These included modelling trade flows, use of Earth observation technology, due diligence approaches and the use of sustainability frameworks which foster a common understanding of sustainability. Then, we considered how the approaches can be applied to drive change through 'pathways to sustainability' applied to five sectors; land use and landscape management, raw material sourcing, policy and governance, financing and investing, and consumer purchasing. Finally, we were able to conclude the future direction of this work area and the knowledge gaps which are needed to be addressed in order to move forward.

Perhaps the most predictable yet most important finding was that interconnected and globalised communication and knowledge-sharing across sectors are keys to progress and achievement of sustainability goals. To this effect, we hope the LET will provide an accessible introduction to the field for multiple stakeholders across government, industry and the third sector, particularly as work aiming to reduce the UK's overseas environmental impact develops.

Contact:

Johanna Hawker, International Biodiversity Adviser

Meet the Expert

In this issue we focus on our Senior Environmental Ecologist Deanna Donovan who leads on Work Package 2 of the new Defra-sponsored ICF Nature-based Solutions Project in JNCC's International Team

What prompted your interest in the natural environment?

Having grown up in a farming community, I have long been interested in the natural environment. My family was always keen on outdoor activities and we would often go out to the countryside on Sundays, take picnics to the woods, collect fresh water from natural springs and swim in mountain streams. My grandparents had a cabin on the edge of the National Forest in California and when we would go to the cabin for BBQs, I liked to wander off into the woods and explore. At that time the most dangerous thing you might encounter would be a rattlesnake — not so any more though. I did not seriously think about getting into the environment as a profession, however, until I was well out of college and working in the big city. I was with a firm of consulting economists on Wall Street in New York City when a client came in with the question: 'what is the value of a fish killed by the 'thermal pollution of a nuclear power plant?' All the traditionally trained economists in the firm were scratching their heads over that question, at which point I had to leave for family reasons. Subsequently it was this issue that drove me back to graduate school, where I found that it was forestry economics and subsequently environmental economics which were addressing the issue of valuing non-market goods and services.

How did you become involved in your current role and what does it involve?

Currently most of my time is absorbed as manager of Work Package 2 in the ICF project in the International Advice Team. The focus of this project on nature-based solutions, and my background in forestry, including urban forestry, and developing countries, as well as environmental economics are the reasons I was tapped for this position. Many nature-based solutions involve trees, singly, in groups or forest ecosystems, and the benefits that they provide people. I am guiding a multidisciplinary team of researchers in setting up this new project financed by Defra to investigate the principles underlying NbS projects that enable them to work effectively and efficiently and contribute simultaneously to delivering for government policies on biodiversity, climate and poverty alleviation.

What are the biggest challenges you face in your current role?

Co-ordinating the work of a seven-person, multi- disciplinary team, remotely across three continents and three time zones in very uncertain times for a time- bound project is rather challenging, but approaching the new normal I imagine. I would add that although I recognised early on that there were several existing databases on nature-based solutions that we would have to investigate, I did not expect that we would find more than 30 relevant databases. It will be a challenge to get through them all in the allotted time, especially with the other constraints faced.

What has been your greatest achievement working at JNCC?

I am proudest of the work that I have done with the Department for International Development (DfID), now the Foreign, Commonwealth & Development Office (FCDO). Hammering home the fact that a healthy environment underpins a sound economy and sustainable growth has been no mean task, but after several years it is finally yielding results. I am pleased to say the concept of nature-based solutions, soundly rooted in ecological principles and biodiversity conservation, has taken off and will be championed at the upcoming 26th UN Climate Change Conference (COP25) which will take place in November 2021 in Glasgow.

Nature-based solutions now has cross- government interest and is seen as relevant for more and more sectors. It is not an especially new concept, but its time has come. The challenge of climate change is particularly urgent and although nature-based solutions will not deliver as immediately as many hard-engineered solutions might, they will deliver for longer and have the added benefit of making other necessary changes perhaps easier for society to accept.

How should the UK be investing nationally to ensure a green recovery?

My two biggest worries with regard to the ‘green recovery’ are that green will be interpreted too often to mean only ‘low carbon’ and ‘greening’ will be seen to be only the job of Defra or the country nature conservation bodies, rather than a cross-government responsibility at all levels of government. A green recovery can enhance our resilience to climate change and must be seen as not only a shift away from a dependence on fossil fuels but a re-greening of the landscape, which in turn can enable a revival and resurgence of biodiversity.

A truly green recovery will enable our landscape and nature-based industries to better resist the multifarious impacts of climate change from more extreme weather to invasive pathogens. Investment in low-carbon industry, natural capital restoration and blue- green infrastructure would not only provide many jobs and improve societal well- being, but could reverse biodiversity loss and enhance environmental and economic resilience to future shocks from a variety of sources.

Looking internationally, how do you think the UK can have the biggest impact to ensure more sustainable use of the natural environment?

Given the UK’s scientific and technological leadership in the world, and our great good fortune to have a mother tongue that is currently the lingua franca of the international stage, I think that the UK can have the biggest impact on ensuring the sustainable use of our environment through influencing the thinking and direction of international agencies and actors. Strategic involvement in the committees and multilateral agencies setting the ground rules for international interaction, especially regarding the production and trade of basic commodities and natural resources, can influence conditions on the ground.

In many countries it is often the trade in agricultural commodities responding to overseas consumption patterns that is driving land-use conversion and destroying natural habitats. In terms of demand our market in the UK is too small to really make a difference as compared to the more populous giants such as China, India and the USA.

However, we can set an example, provide innovative, sustainable alternative technologies and help shape the conditions of trade that show the way toward a more environmentally enlightened and sustainable future.

Contact:

Deanna Donovan, Senior Environmental Economist

From ridge to reef:
Building an Environment Strategy for the Turks and Caicos Islands

With its turquoise blue sea, sandy white beaches and luscious mangroves, it's easy to see why the Turks and Caicos Islands (TCI) are described as 'Beautiful by Nature'. It is widely recognised that people's way of life in the TCIs is highly dependent on its rich and varied environments – the seas have abundant fish to eat; the corals and mangroves provide protection from hurricane-induced storm- surges; and the natural land- and sea-scapes draw large numbers of tourists which help support a thriving industry, as well as the health and well-being of its residents. However, the environment is under increasing pressure from factors such as development, resource use and climate change, which threaten the livelihoods of all those in TCI who depend upon it.

To safeguard these environmental benefits for present and future generations and to support sustainable development, the Turks and Caicos Government, through the Ministry of Tourism, Environment, Heritage, Maritime, Disaster Management, and Gaming (MTE), is developing the first Environment Strategy for the TCI. Our experts are working alongside staff from the Department of Environment and Coastal Resources (DECR) to provide technical assistance to deliver the strategy.

In a recent workshop, Assistant Director Kathy Lockhart from the DECR remarked, 'TCI is relatively small and therefore, some individuals consider the whole of the TCI coastal.'

As threats to the environment increase in frequency and severity it is important that the Environment Strategy considers land to sea connectivity. Human activities on land inevitably impact the marine environment, especially in small island settings such as TCI, where the gap between 'the ridge' (albeit a flat ridge in TCI!) and the reef is much narrower than in larger nations. How the land is managed can change how freshwater, sediments, and nutrients impact coastal environments, and how natural capital assets, such as trees, regulate surface hydrology to reduce erosion and surface flooding during high rainfall. Preventing run- off protects soil natural capital, valuable fisheries habitats and maintains the quality of coastal habitats that provide flood protection and attract tourists and recreational users. To monitor and detect these environmental changes the Environment Strategy will be underpinned by an indicator framework based on the UK Government's 25 Year Environment Plan. Our team is using its expertise to help DECR to improve the evidence base and construct the indicators.

In recent years, JNCC has worked with DECR to understand the value of the services provided by TCI's natural resources and how this information can help to inform decision-making and management. Impacts on the environment can considerably alter the very environmental assets that support TCI's economy and communities. In 2018 these services were estimated to be worth over $100 million per year, with work on- going to improve the data and information used to make regular valuations. This natural capital approach, when combined with a holistic ridge-to-reef approach, can support scenario planning and decision-making for community and ecosystem resilience. It can help to identify how changes in land-use practices can be beneficial, where habitat restoration and other nature-based

solutions need to be prioritised and inform trade-off decisions. To support this approach, a new marine natural capital asset register (funded by Darwin Plus) is under development which, when combined with maps developed by the South Atlantic Environment Research Institute (SAERI), will produce ecosystem services maps that support management decisions and TCI's new Marine Spatial Plan.

This natural capital approach can encourage sustainable development while ensuring that the importance of biodiversity is recognised during planning and decision-making, and evaluating potential trade- offs. However, it is not easy to assign a monetary value to all of the diverse benefits provided by the ecosystems in the TCI, nor is it always necessary. A natural capital approach is not just about economic value but encourages a better understanding of natural processes, terrestrial and marine, that benefit all elements of island society. The Environment Strategy will allow for a coherent approach to environmental management that supports effective decision making and guides meaningful progress on the ground.

Increasing ecosystem resilience: coral reefs

A key component of building coral reef resilience hinges on improving understanding of what human activities are impacting coral reef health, determining how they are affecting natural capital and ecosystem services.

To address this, a Coral Reef Action Plan, developed under Defra's UK OT Coral Reef Initiative, will be integrated into the Environment Strategy and provide a roadmap for the protection and management of TCI's reefs. This could not be more timely, as Stony Coral Tissue Loss Disease (SCTLD) is rapidly spreading throughout the Caribbean and Western Atlantic and is now posing a threat to overall coral health and the livelihoods of people dependent on the reefs in TCI.

JNCC experts, with funding from Defra, are supporting DECR in their response to the threat posed by the current outbreak by providing technical assistance, training and advice, and supporting knowledge sharing with Cayman Islands and British Virgin Islands. Included in this work is consideration of the next steps required to protect and manage TCI's reefs, to help the ecosystem to be more resilient to diseases and other pressures, thus safeguarding the services they provide for future generations.

Contact:

Jane Hawkridge, International Implementation Team Co-Leader

2020 – a year of air pollution progress

In the Summer 2020 edition of *Nature News* we explored how engagement with our air pollution work has increased, and how global understanding about air pollution and its effects on people and nature is growing. Restrictions due to lockdowns put many things on hold, but the work we've undertaken with our partners this year to tackle the effects of air pollution on ecosystems has blossomed. Perhaps it's because this is a time of increased awareness of the importance of nature, air quality and social change. New evidence is emerging to quantify the changes in air quality in response to shutdown of major cities at global scale. In the UK a 55% reduction in nitrogen oxides was observed around UK roads when compared with 2019 (Higham et al 2020). This has helped more people realise the scale of change required to improve air quality to levels that will achieve goals for human health and function of UK ecosystems.

The devolved administrations across the UK are making commitments not only to prevent degradation of our habitats, but also to restore and invigorate them. We see this through individual country clean air strategies, the International Nitrogen Initiative, the UN Decade on Ecosystem Restoration, the Leaders' Pledge for Nature and in the enhanced provision for UK joint working through JNCC and the Inter-agency Air Pollution Group (IAPG). Reducing air pollution is an important part of ensuring habitat restoration can happen.

There is some good news as reported in the UK Biodiversity Indicators, which show a long-term decrease in the area of sensitive habitat vulnerable to nitrogen deposition. However, over 57% of UK habitat area still receives damaging amounts of nitrogen (Rowe *et al*. 2020). So, despite the national improvement, there is still more work to do and we need to ensure these interventions matter (see *Nitrogen Futures* article).

Our collaboration with the IAPG, devolved administrations and partners is important for a range of activities including:

- securing national emission reductions that maximise benefit for ecosystems;
- raising awareness of the vulnerability of nature to air pollution;
- understanding interactions with climate change and global ambitions, as well as
- supporting local actions required to protect and enhance our protected areas.

Air pollution advice is a broad work area, crossing country boundaries and requiring a wide range of partners. Researchers, policymakers and non-governmental organisations (NGOs) contribute data and evidence, as well as helping to deliver interventions on the ground. This not only allows us to understand issues with air pollution but also its impact on habitats. Partnerships mean the work is used by decision-makers, advisers and practitioners to design and implement solutions for the future. To truly implement strategic approaches to air pollution we have engaged with experts from a variety of disciplines – dispersion modellers, statisticians, GIS specialists, local planners, ecologists, economists, social scientists and even software architects!

Broad reaching and better together

Given its cross-cutting nature, these joint efforts to address air pollution have strong links to JNCC's recently updated Strategic Direction for 2020 to 2025. It's worth remembering that our air pollution advice includes effort from several teams across the organisation. Many individual projects contribute to the evolving workplan::

- UK conservation status and nature strategies – The IAPG has been sharing evidence with its partners and the devolved administrations to increase the impact of individual research projects and use UK-level joint-working to deliver the greatest benefit from investment. Biodiversity indicators are part of JNCC's core work. We are working with partners to pursue areas for research and development such as indicators of both damage and recovery of ecosystems from air pollution effects.
- Support for decision-making has been a key focus in 2020 as the IAPG and other partners grapple with case law and UK risk-assessment approaches. This has benefitted from significant investment recently with projects such as Nitrogen Futures, De Minimis and air pollution thresholds, Emission Source attribution dataset updates, enhancement of existing tools planned for APIS and a look at integrating UK risk- assessment tools through the Integrating Tools for Air Pollution Assessment Project. We will keep you posted in future Nature News issues as these projects evolve.
- Coordination and international influence are both core parts of our work and a developing area for air pollution advice at JNCC. Staples such as the IAPG and engagement in the Community for Air Pollution Effects Research mean we can ensure UK evidence gathering and capability are fit for purpose. As multi- lateral environmental agreements look to refresh ambitions around pollution, including from air pollution, our experts are working with the devolved administrations to leverage UK expertise and evidence at global level through enhanced joint working in the UK.

If you want to learn more please join the JNCC Air Pollution Project Stakeholder group to keep up to date on opportunities to input your expertise and for notifications on project developments.

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Contacts:

Susan Zappala, Senior Air Pollution Adviser

Alexandra Cunha, Nitrogen Futures Project Manager

ITAPA update: Typhoons, tech and tactical working to benefit ecosystems

Trying to work across our teams during a pandemic can be challenging. We all reflect on the lack of 'incidental' discoveries or happy coincidences arrived at during lunch-hour chats. Remote working with dispersed colleagues has also meant postponing a meeting for a few hours to let the electricity return after a passing typhoon. We're still progressing though!

In the last issue you heard about a project we're leading called ITAPA – Integrating Tools for Air Pollution Assessment. Funds were secured over the summer to start a pilot tool build and while there isn't much to announce, much has been happening behind the scenes from a technical point of view.

ITAPA builds on the work done by the Dutch Government on their free, online AERIUS tool used to implement the Integrated Approach to Nitrogen. The AERIUS tool will be adapted to meet UK needs and, as you can imagine, this takes a lot of planning and discussion. Our Digital and Data Solutions Team has been working hard to help us understand what an integrated tool will require to operate in the UK and make technology work for nature.

We've spent a lot of time talking about servers, hosting, and the technical and financial costs of various implementations. That may seem like putting the cart before the horse since we don't have a tool to host anywhere. But, starting these discussions early with the right people has meant we were able to innovate and identify more cost-effective solutions. An added bonus is that the project aligns better with wider Defra technological aims and that the key managers for that work have sight of the ITAPA project.

Now it's time to reach out about the tool implementation for the UK. Discussions are beginning with partners about the shape of the ITAPA Steering Group and Expert Advisory Groups. Please contact ITAPA@jncc.gov.uk to express interest and join the JNCC Air Pollution Project Stakeholder group to keep up to date as ITAPA progresses.

Contacts:

Susan Zappala, Senior Air Pollution Adviser

Alexandra Cunha, Nitrogen Futures Project Manager

Working together – JNCC Business Associates

JNCC is committed to the development of nature-based solutions as part of its wider and strategic development. With many competing demands on our environment, integrating and balancing the economic growth of industry with nature conservation requirements will be needed to protect UK's biodiversity both on land and sea. Over the past months, we have recognised the inherent value of nature to provide escape, respite and enable us some recuperative benefits. JNCC operates at the national, regional and international scale and we have a wide-ranging statutory nature conservation remit. To ensure our teams can meet this broad obligation we often require (sometimes at short notice) additional expertise to support delivery or provide additional expertise to enable our ongoing or future work programmes.

Rapid access to additional capacity not only augments existing skills but also offers the ability to diversify our skills offer through access to wider capabilities. To achieve this, we have created and implemented a Business Associates Procurement Framework that allows efficient access to a wide body of external independent experts. The Business Associates Framework (BAF) was launched in August 2020 after an open procurement exercise. The Framework enables us, as an organisation, to work with market-leading specialists, to provide timely specialist expertise to JNCC and thus to our customers. The aim of the Framework is simply to efficiently maximise our potential, by ensuring continued excellence in our technical innovation via easier access to leaders in their professions.

Our Business Associates (by definition, a "Business Associate" is any independent (often self-employed) person not directly employed by JNCC) are a wide network of trusted individuals who can take on specific tasks and activities, thus offering a mechanism for flexible delivery of projects whilst simultaneously reducing or maintaining our salary costs. Through access to this key family of technical experts we will more efficiently manage our delivery risks and alleviate pressure points on existing staff resources.

Our current selection of Associates was based on the outcome of an open competitive exercise that focused on strategic need, the role and credibility of the individuals responding, and their alignment to our values and ethics. The response was overwhelming and our final selection includes an impressive list of experts with diverse skills and competencies. In the future, we hope to expand our network to include more diverse skills such as graphic design and video-making.

Through utilisation of our Associates, we aim to improve our ability to maintain our excellence in project delivery and undertake more specialist or niche activities. Our Business Associates will also ultimately constitute a community, thereby affording opportunities for wider networking, shared opportunities and broader interactions. Currently, we are getting to grips with managing our Associates Framework, but we do hope to have wider network meetings and broader introductions.

Our Business Associates Framework membership will be reviewed annually. The next recruitment of new Associates will be after August 2021.

Contact:

Jason Weeks, Head of Business Development and Marketing

EO4cultivar: Mapping Natural Capital and Ecosystem Services in Agricultural Landscapes in Columbia

Strengthening the resilience and sustainability of commercial agricultural supply chains between Colombia, Peru, Paraguay and the UK is the aim of EO4cultivar – a project funded by the UK Space Agency under its International Partnership Programme.

Our experts have worked with partners from UK and international organisations, co-ordinated by Environment Systems Ltd, to deliver crop monitoring and forecasting products to increase production and landscape sustainability.

The EO4cultivar Sustainable Livelihoods work package includes two case studies co-ordinated by JNCC, one in each of the focal areas in Colombia and Peru. The case studies demonstrate how combining Earth observation data with local knowledge can be used to assess the ecosystem services that contribute to resilient production systems. They also demonstrate how this information can be brought into decision making at relevant scales within multi-functional landscapes.

The Colombian case study looked at sustainable land management in the Magdalena region in northern Colombia. This economically important area supplies bananas and other key commodities to the UK. The outputs of the Colombia case study demonstrate, through combining Earth observation data and ecosystem service modelling with local knowledge, a better understanding of how the adoption of a more integrated natural capital approach to land management can improve ecosystem resilience. This then improves the resources produced and ultimately the supply chain. The case study has been co-designed with stakeholder organisations local to the area, but the methods applied can be adapted for use in other production systems and landscapes across the world.

The key outputs of the case study include an interactive map which displays the different ecosystem services that have been modelled within the region, a series of management guides showing how the maps can inform land management decisions, and a set of reports and the accompanying data. More information on the case study can be found on the EO4cultivar webpage.

Contact:

Matt Smith, Biodiversity, Ecosystems and Natural Capital Manager

Devolved Administrations and the UN – global to local conservation and the role of JNCC

Negotiating inter-governmental agreements, the majority of which are conducted through the UN system, is a reserved matter for the UK Government. But that doesn't mean that the devolved administrations don't have an interest in these negotiations. This is particularly true when it comes to inter-governmental environmental agreements (known as MEAs – Multilateral Environmental Agreements), as the devolved administrations are responsible for implementing MEAs in nearly half of the UK's land mass and around two-thirds of the UK's seas.

JNCC is known for its role in supporting and being members of the UK Government's delegations to a variety of inter-governmental negotiations on the environment. However, JNCC has a statutory obligation to advise all four Governments of the UK on 'the development and implementation of policies for or affecting any nature conservation matter which arises outside the United Kingdom'.

So how do we fulfil our statutory role?

Four Countries' Biodiversity Group (4CBG)

The 4CBG is the forum through which the four governments of the UK discuss strategic biodiversity policy, including the negotiation and implementation of inter-governmental environmental agreements.

Since the group's formation, JNCC has played an advisory role to help better inform the discussions of the group. However, as 4CBG takes on a greater importance as a result of EU Exit, we have been asked to increase our engagement and become the Secretariat to the 4CBG. This has allowed our experts to provide improved guidance to all four countries of the UK on what inter-governmental environmental agreements the UK is party to, our obligations under them, and to advise on the key points of interests arising from upcoming inter-governmental meetings and their outputs.

Of note are the digital tools we intend to use for the Secretariat role. These will allow more effective and efficient dissemination of contextualised information on inter-governmental environmental agreements, allowing officials in all four countries to more easily engage in the discussions.

Supporting individual interests – Scottish Government and the EGMP

Not all inter-governmental processes on the environment are of equal interest to all countries of the UK. For example, arctic-breeding migratory geese predominantly winter in Scotland. These geese are a conservation success story, with their populations having grown enormously in the last 70 years. However, the large number of geese are now causing issues across their flyways – notably impacting on agricultural industries and damaging sensitive natural habitats.

To reduce the negative impacts of the geese, while ensuring the favourable conservation status of the populations, countries across the flyway need to work together to ensure no one country over-controls the populations in a manner which

affects the health of the populations or the conservation objectives of another country.

To facilitate their sustainable and adaptive management, the UN African-Eurasian Waterbird Agreement (AEWA) has formed the world-leading European Goose Management Platform (EGMP) to support conversations between all the countries in the goose flyways.

But from a UK perspective, the actions of the EGMP are only directly relevant to Scotland. This presents two issues. Firstly, Scottish Government lacks experience of negotiating inter-governmental environmental agreements (as this matter is reserved to the UK Government). And secondly, it is not an efficient use of Defra's time to support engagement on an issue that only impacts Scotland. This is where JNCC has been able to support both Defra and the Scottish Government. We have been able to use our knowledge of inter- governmental processes to support and upskill Scottish Government officials in engaging with the UN EGMP process. As a UK body, we've provided the oversight and UK leadership required for a matter reserved to the UK Government – saving Defra resources in the process.

Reporting and assessment

To allow countries to collectively assess their progress towards achieving the aims of inter-governmental agreements, Contracting Parties are obliged to assess and report on their progress towards achieving the aims and obligations of such agreements. JNCC uses its decades of experience of reporting and assessment to support all four countries of the UK monitor their progress towards implementing MEAs. Our experts then collate and compile the information into the UK's national reports, most recently in the UK's 6th National Report to the Convention on Biological Diversity.

Provision of ad hoc advice

One of the most important, but at times overlooked, roles JNCC plays is that of providing ad hoc advice on inter- governmental processes as and when an issue arises in any one of the four countries. Our staff are available by phone or email to quickly and authoritatively answer queries – both large and small – on inter-governmental environmental processes for colleagues in core government and arms-length bodies in all four countries of the UK.

Looking to the future, it seems likely that the role of MEAs will grow in importance to the UK. It is a cliché, but nature does not know or respect international borders. So, the UK can only effectively conserve its nature by engaging with other countries around the world. And it's the international agreements that provide the processes to facilitate such conversations.

But inter-governmental agreements not only aid conversations externally, they also have the potential to facilitate conversations internally. Just as nature doesn't know international borders, neither does it know internal boundaries. As policy increasingly diverges across the four governments of the UK, conversations between the four governments on shared objectives become more challenging. But that is where the structures, language, and intellectual frameworks provided by inter-governmental

environmental agreements can help facilitate conversations. And, as all four countries are obliged to implement these agreements, they are a natural starting point for such conversations.

Recognising the rising importance of MEAs, and in line with our 2020-2025 strategy, we will build on our decades of experience by boosting the capacity of our International Advice Team. Whether it's advising the UK's delegations to inter-governmental meetings, supporting the engagement of the devolved administrations in such negotiations, or facilitating joint-working across the UK's governments to assist the implementation of international obligations, JNCC will have an even greater capacity to support all four governments of the UK to understand and implement inter-governmental environmental agreements for global to local conservation action.

Contact:

Danny Heptinstall, Senior International Biodiversity Adviser

UK Biodiversity Indicators 2020

The UK Biodiversity Indicators were updated on 15 October 2020 on the JNCC website. The indicators are published by JNCC and Defra as a National Statistics Compendium, and are Government official statistics about changes in biodiversity.

The indicators are dependent on a wide variety of data, provided by government, research bodies, and the voluntary sector – in total nearly 100 organisations are involved. The presentation and assessment of the indicators have been verified by the data providers, and the production and editing of the indicators are overseen by government statisticians.

Of the 52 comparable component measures within the 24 indicators, over the long term 23 have shown improvement, 14 have shown deterioration, three have shown little or no change and two had insufficient data for assessment. The remainder have yet to be developed. The long term refers to an assessment of change since the earliest year for which data are available, although if the data run is less than ten years a long-term assessment is not made.

Over the short term 18 measures have shown improvement, eight have shown deterioration, 12 have shown little or no overall change and one had insufficient data for assessment.

The short term refers to assessment of change over the past five years, except in a couple of cases where a six-year period is used.

Key changes to the indicator set since the previous publications are:

- Methodological changes to the Pressure from climate change (Spring Index) indicator to allow more data to be used.
- Methodological changes to the Insects of the wider countryside indicator (Butterflies) to take account of colonisation of new sites.
- Publication of a new plant indicator based on the National Plant Monitoring Scheme.

Readers are encouraged to explore the detail behind the indicators – provided on the individual indicator webpages, and in the technical documents. All the graphed data are available for re-use in the downloadable datasheets. The indicators are used in a number of ways, including for international reporting, answering Parliamentary Questions, in other publications, and even in exam questions.

The UK indicators were comprehensively reviewed during 2011 and 2012. Since then, they have been refined to improve their relevance and quality, and new indicators developed to fill gaps. In this version of the publication, 46 of the 52 measures have been updated with new data. The indicators were developed to report progress against international goals and targets. A further review of the indicators is being planned for 2021 to ensure best fit with the post-2020 global biodiversity targets.

Contact:

James Williams, Biodiversity Indicators Manager

Developing a new habitat indicator

Despite the challenges and hardships faced in 2020, the year marks a significant milestone for habitat monitoring, with the publication of a new national habitat indicator based on data from the National Plant Monitoring Scheme (NPMS). This showed how plant species indicative of good habitat condition are changing over time for four important semi-natural habitats in the UK. Habitats are the backbone of wider biodiversity, so evidence on their condition is vital in our understanding of wider environmental issues and is needed to inform conservation action and policy decisions. The achievement of producing an indicator is a result of much hard work by many people over many years.

The story started over 10 years ago, when JNCC had just reviewed UK biodiversity monitoring, how far it was meeting our data needs, and what could be improved. A key data gap identified was regular habitat monitoring across the UK, and recommendations were made to address this in our 2009 'UK Terrestrial Biodiversity Surveillance Strategy'. This set the direction for a significant part of our work over the next decade, and beyond! We followed a two-pronged approach to address the habitat data gap. On one side we developed the use of Earth observation imagery, and in parallel, we applied our experience in mass participation citizen science biodiversity recording projects to set about initiating a new UK field-based habitat monitoring scheme.

We joined forces with the UK Centre for Ecology & Hydrology (CEH), the Botanical Society for Britain and Ireland (BSBI), Plantlife and British Trust for Ornithology (BTO) to design a field-based 'ideal vegetation monitoring scheme' – thinking through how to ensure it was scientifically robust and easy and enjoyable for volunteers to take part in. Following several years of scheme design, piloting of methods with potential volunteers, and with input from the country nature conservation bodies, Defra and DAERA, the new National Plant Monitoring Scheme was launched in 2015. After five years of running the scheme we were excited to have had 1,500 volunteers express an interest in taking part, approximately 15,000 surveys taking place across the UK, which resulted in a total of 150,000 plant records! This covers 60% of the entire native flora of Britain and Ireland! The run of data collected so far meant that for the first time this year we were able to use NPMS data to produce a national habitat indicator and publish this in UK Biodiversity Indicators 2020.

The indicator is based on abundance data of plant indicator species and is produced for four different habitat types – arable field margins, bog and wet heath, broadleaved woodland and hedges, and lowland grassland. It is presented as an experimental statistic, acknowledging that this year is the first time we have produced it, and it may be refined in future years. We would welcome views from readers on the value and quality of this new indicator. Does what we have produced look relevant and useful? And do you have any suggestions for what could or should be done? We are thrilled to be making the most of data collected by many hundreds of NPMS volunteer recorders and are keen to continue working on making the outputs as robust and useful as possible as we continue to collect more data.

Field data, Earth observation or both?

JNCC invests in both these areas, having concluded that the two areas complement and enhance each other. Field data is particularly well suited for providing fine-scale detail such as species composition, whilst EO data is great in quickly informing us about vast areas of land. Crucially, the two areas are interlinked – field data are needed to train and ground-truth EO mapping models, and EO-based maps can be used to target where to send field surveyors to collect more detailed data.

Contact:

Anna Robinson, Monitoring Ecologist

No ‘one size fits all’ solution to protecting conservation sites from pollutants

- Nitrogen pollution is a major driver of biodiversity loss in the UK.
- Over 57% of the area of UK’s habitat is threatened by excess nitrogen deposition.
- Exploring ways to protect UK’s nature conservation sites from nitrogen pollution.

Our experts have led the delivery of the Nitrogen Futures project, funded by the Department for Environment, Food and Rural Affairs (Defra).

Nitrogen (N) is an important nutrient for plant growth and is used in fertiliser to support food production for a growing global population. However, adding too much nitrogen to the environment can cause air and water pollution, and affect ecosystems and soil health, as well as contribute to climate change.

There is increasing evidence that nitrogen pollution has driven local extinctions of sensitive plant species across the UK, reducing the richness of habitats and contributing to declines in populations of insects and other animals that depend on nitrogen-sensitive species for food and habitat.

Nitrogen pollution is emitted to the air as ammonia (NH3) and oxides of nitrogen (NOx). Ammonia originates mainly from agricultural livestock manures and fertiliser use. Other sources of ammonia, albeit in smaller volumes, include waste management activities, road transport and industry. Oxides of nitrogen are mainly emitted from combustion processes, such as road transport, shipping, rail and air travel, power generation, industry and domestic heating. These pollutants are then dispersed as gases and particles into the air and deposited onto habitats, affecting biodiversity and ecosystem function.

The main objective of the Nitrogen Futures project was to explore how different emission mitigation measures could improve the long-term status of habitats and nature conservation sites in the UK. The project developed scenarios for nitrogen oxide (NOx) and ammonia (NH3) emission reductions to 2030 and beyond (2040+). Scenarios included bundles of mitigation measures with different levels of ambition for reducing emissions. These scenarios were used to predict atmospheric emissions, concentrations and deposition of nitrogen at UK designated sites at a 1 km2 grid resolution.

The predictions were analysed for the UK as a whole and for England, Scotland, Wales and Northern Ireland separately. Specific case studies for each country were further explored to illustrate how the national results could be applied in practice at local level. The analysis included indicative costs of the measures, wider environmental benefits and possible trade-offs resulting from each scenario. Nitrogen Futures used updated models with increased resolution and accounted for both NOx and NH3, at UK and international level, to produce an innovative piece of evidence.

Key messages from the project

The project highlighted that it is essential to implement a combined approach of UK-wide and targeted measures around nature conservation site boundaries to enhance benefits for sensitive habitats and species. These include:

- Ambitious UK-wide measures to decrease emissions, adapted regionally to each UK country. This will benefit both sites around source areas and remote sites subject to long-range transport of atmospheric emissions;
- Spatially targeted mitigation measures near protected sites by selecting relevant and ambitious measures from a “toolkit” and implementing these in buffer zones around site boundaries; and
- A clear framework for identifying priority actions in each locale with a menu of options that can be selected for optimal outcomes.

Contact:

Alexandra Cunha, Nitrogen Futures Project Manager

West of Scotland Deep-Sea Marine Reserve

On 25 September 2020, Marine Scotland announced the designation of the West of Scotland Deep-Sea Marine Reserve. This site is the largest marine protected area in European waters and covers 107,162 km^2, an area larger than the land area of Scotland and Wales combined. The deep seas (> 800 m in depth) around Scotland are home to some of the most vulnerable and diverse habitats and species on Earth. The designation of this site by Scottish Ministers reflects the important role the Scottish marine environment plays in protecting these habitats and species

Our experts supported Scottish Government in the development and evidence evaluation for the West of Scotland Deep-Sea Marine Reserve. The site makes a significant contribution to the protection of unique deep-sea ecosystems in the seas around Scotland. Their protection ensures the MPA can provide a range of benefits to society, including nutrient cycling and carbon storage.

The site protects vulnerable habitats and species considered to be of conservation priority in Scotland's seas — including fragile habitats such as cold-water coral reefs and deep-sea sponge aggregations, and deep-sea shark and fish species such as the Orange roughy and Gulper sharks whose populations are threatened or declining.

Cold-water coral reefs have a fragile structure and slow growth rate which means they can be easily damaged and take a long time to recover. The growth rate is thought to be about 6 mm per year implying that reefs of 1.5 m in height are at least 250 years old

This site is one of only 17 locations globally where Gulper shark has been reported and there is still very little known about this species. The Orange roughy is better studied but historically has been subject to intense fishing pressure. Like many deep-sea species they are slow to mature, first reaching maturity at 28 years, and may live to 150 years. This MPA protects a number of known spawning locations for Orange roughy where they form spawning aggregations around seamounts.

MPAs and particularly the West of Scotland MPA, at this large scale, have an important role to play in conserving our seas as they enable the focussed protection of habitats and species which are essential to the marine ecosystem. For example, microbial communities found within sedimentary seabed habitats play a role in the cycling and retention of carbon, nitrogen, silica, sulphur, phosphorus, methane and other nutrients in the deep sea. A particular type of deep-sea mud – 'Burrowed mud' – is important for the exchange of nutrients between the water column and sediments and the fixing of carbon. The 'bioturbation' or burrowing activity of species mixes the sediment and allows oxygen to penetrate into otherwise anoxic layers. In addition, many fish species, including those of commercial importance, are directly linked to deep-sea sedimentary habitats for feeding, reproductive or nursery services.

Two seamounts (Rosemary Bank and Anton Dohrn) are protected as large-scale features of the Deep- Sea Marine Reserve and for the rich seamount communities they support.

The seamounts create a very different environment to the sedimentary plains of the Rockall Trough. The dynamic hydrographic environment surrounding the seamounts increases food availability to suspension feeders such as sponges and corals that colonise the seamounts. The concentrations of fish and other prey species around seamounts also attract larger predators and marine mammals such as Atlantic white-sided dolphin and Sperm whale, which have been observed in high numbers around these features.

Deep-sea sponge aggregations, cold-water corals and coral gardens are known as 'habitat formers'. The three-dimensional physical structures they create provide an environment that other species can colonise, and they support a diverse community of associated species. Sponges may also play a significant role in silica regulation by providing a long-term sink for silica, while coral skeletons act as a long-term store of carbon.

Blue carbon – carbon stored and sequestered in marine ecosystems – is increasingly being recognised as an important factor in mitigating climate change. Around a quarter of the carbon dioxide released through the burning of fossil fuels is absorbed by the oceans each year. The designation of the West of Scotland Deep-Sea Marine Reserve supports the resilience of the protected features against the impacts of climate change by removing or limiting other pressures from human activities. Removing the pressures from human impacts reduces stress on features and allows them more capacity to cope with impacts from climate change.

Our experts are currently working on a science advancement plan for the West of Scotland Deep-Sea Marine Reserve. The overall aspiration of the plan is to achieve an informed ecosystem-based approach to deep-sea conservation in Scotland that has its grounding in the best-available scientific evidence. It will create a shared programme of research with academic partners from across the deep-sea research community to help shape the questions and drive the plan forwards. This is an opportunity to identify and ask very specific questions around how deep-sea habitats and species are responding to a whole host of pressures, and to increase scientific knowledge in relation to the deep-sea marine reserve and its designated features.

For further information please see our West of Scotland Site Information Centre.

Contact:

Jennifer Lawson, Marine Protected Areas Adviser

Paving the way for transition from the European Union

The UK left the European Union (EU) on 31 January and has since been in a Transition Period, during which existing EU legislation has continued to apply. As we move towards the end of the Transition Period on 31 December 2020, we look at the impact this will have on JNCC's work and how we have prepared for the changes ahead.

Habitat and species' protection remain

As of 1 January 2021, existing EU environmental legislation is retained in the UK, amended where necessary so that it can operate outside of the EU. This means that current environmental protections and standards remain, including the protection given to habitats and species in the UK and the associated assessment processes and procedures.

Preparing for the end of the Transition Period

That said, the end of the Transition Period will have implications for JNCC's work. Over the last few years, our staff have been working hard to prepare for these changes and to support government in its preparations. For example:

- We have provided support to Defra and other agencies with respect to the implementation of the Convention on International Trade in Endangered Species (CITES) after the Transition Period.
- We have worked across government agencies to co-ordinate and provide advice to Defra on how to improve implementation of an ecosystem approach to fisheries outside of the Common Fisheries Policy. We have helped preparations for the UK to represent itself in Regional Fisheries Management Organisations.
- We have been building our capacity to provide technical and scientific advice to government on multi-lateral environmental agreements, supporting increased UK ambition and global leadership.
- We have provided evidence-based advice to support the development of a framework for UK-wide marine ecosystem assessments and reporting.
- We are using our unique analytical capability and Earth observation expertise to support the development of post-EU funding regimes to replace the Common Agricultural Policy.

Looking ahead

Whilst there is a common starting point via the retained EU environmental legislation, it is likely that this legislation will evolve to meet the developing and possibly differing policy agendas in Scotland, Wales, England and Northern Ireland. Some of this evolution might be quite rapid, whilst some may take many years to develop its full post-EU identity. Our experts will continue to support the four countries of the UK to realise their policy ambitions, as well as providing a critical role in facilitating and co-ordinating areas of joint-UK working.

Getting ready for CITES advice after the Transition Period

JNCC provides scientific advice to support Government policy on endangered species and advises on permit applications for CITES-listed animal species. Using additional funding from Defra, we have helped government to prepare for implementing CITES obligations after the Transition Period. This has been a substantial piece of work for our specialist team of CITES advisers and has included:

- Intra-community trade analysis: providing an analysis of intra-community trade in CITES-listed taxa, to and from the United Kingdom, to provide a more accurate picture of the trade between the UK and the rest of the EU. This provided an estimate of the likely increase in permit applications and corresponding resource requirements. This exercise included undertaking a trader survey, stakeholder engagement sessions and analysing various datasets.
- Increasing staff capacity: recruitment and training of additional staff to support the anticipated uplift in permit applications (potentially doubling to >40,000 a year) to minimise disruption for UK businesses and trading partners.
- New Statutory Instrument: advising on the new Statutory Instrument required to bring the current EU Wildlife Trade Regulations into UK law.
- European Eel Non-Detriment Finding (NDF): leading on the drafting of European eel NDF and supporting EU engagement to negotiate continued trade between the UK and EU and GB to NI trade under Northern Ireland Protocol. This trade is worth about £3m per annum to the Northern Ireland economy and provides over 250 jobs.
- Northern Ireland Protocol: working closely with Defra on the implementation of NI Protocol with respect to CITES trade.
- Strengthening Scientific Authority resilience and capacity: including establishing new consultation protocols and relationships with third countries, and addressing additional research and evidence needs in lieu of EU Scientific Review group membership.

Contact:

Clare Whitfield, Senior EU Transition Adviser

Seabird bycatch: Towards a UK Plan of Action

Seabird bycatch — the accidental capture of seabirds in commercial marine fishing gears – has been identified as a global problem affecting birds such as the iconic albatrosses of the southern hemisphere. Initiatives such as the Agreement on the Conservation of Albatrosses and Petrels (under the UN Convention on Migratory Species) have made significant progress there.

However, rather less is known about the scale of this potential pressure on the UK's internationally important populations of seabirds, many of which are declining due to issues such as limitations to food supply caused by climate change and fishing pressure. The UK has made commitments to address the issue — for example in the UK Marine Strategy.

Our experts have led work over the past two years to provide scientific evidence to inform the development of a UK Plan of Action (PoA) on seabird bycatch. The PoA is led by Defra in collaboration with the devolved administrations and with the close involvement of stakeholder groups critical to achieving better understanding of the issues. These include the fishing industry, the scientific community, conservation NGOs, regulators, governments and their scientific advisers.

Two recent reports for Defra, commissioned by JNCC, provided some of the first evidence of the scale and nature of seabird bycatch from UK fisheries. The first report, produced by scientists at the University of St Andrews, investigated records from the UK Bycatch Monitoring Programme, in which specialist observers record rates of capture onboard active fishing vessels in a sample of fisheries around the UK. Estimates of bird mortality are preliminary, since sample sizes are small, but indicate that approximately 2,000 to 9,000 northern fulmars might be lost annually to bycatch UK-wide, with perhaps 2,000-3,000 guillemots and smaller numbers of an additional eight species, including gannet and cormorant. The second study, by JNCC authors, estimated through population modelling the gains to seabird populations that might be achievable if these mortalities could be eliminated. Northern fulmar might benefit most, by perhaps by 7% UK-wide over 25 years, but potentially by much more in some regions.

A major milestone towards PoA development was achieved in November when stakeholders met to discuss the issues in a workshop inspiringly titled Soaring to Solutions. Around 75 UK and international experts and practitioners joined together to share experiences, discuss what is known (and not yet known) about bycatch— and to offer potential solutions. Without exception attendees were united in one vision — a desire to better understand and reduce bird deaths caused by bycatch. We were reminded that the fishing industry wants to see bycatch reduction as much as anyone — their job is to catch fish not seabirds. Indeed, the meeting heard about the efforts of two operators who have already applied techniques to reduce bycatch in two very different fisheries — one an offshore longlining operation, the other a small inshore fishery using fixed nets to catch sea-trout.

Defra will be taking stakeholders' views on board and consulting on the PoA next year as part of a wider programme of work under an England Seabird Conservation Strategy. A Scottish Seabird Conservation Strategy is under development, led by Marine Scotland.

Contact:

Matt Parsons, Senior Marine Ornithologist

Understanding the impact of offshore wind developments on kittiwakes

A feasibility study to better understand how Black-legged Kittiwake populations will respond to potential mortality induced by offshore windfarms has commenced recently.

The project, funded by the offshore wind developer Vattenfall and to be delivered by JNCC, was identified as a priority by the Offshore Wind Strategic Monitoring and Research Forum (OWSMRF) Pilot Year, an industry-led collaborative partnership developing research on the effects of offshore wind development on marine birds.

Kittiwakes are a long-lived species, spending most of their time foraging at sea and nesting on steep coastal cliffs. This means that acquiring sufficient knowledge on how their colonies and populations are faring can be challenging. Our poor understanding of the kittiwake is limiting our ability to predict how resilient kittiwake populations might be to any additional mortality caused by offshore windfarms.

Following individual birds throughout their life-cycle using a conspicuous marking system helps record information on where kittiwakes nest, what colonies they visit during the breeding season, and whether they have survived or not from one year to the next. Colour-ringing, which is safe for the birds, offers a useful approach to address these questions: birds are equipped with a rigid colour ring that has a unique combination of letters and numbers and can be viewed at a distance with binoculars or a telescope, enabling the bird to be identified without recapturing it.

This project is a desk-based feasibility study to inform kittiwake researchers and reserve managers on how many kittiwakes need to be ringed and re-sighted, how often and where, in order to improve our confidence in understanding the possible impact of offshore windfarms on kittiwake populations.

Contact:

Lise Ruffino, Marine Ornithologist

New Scottish sites designated

At the beginning of December 2020, Scottish Ministers announced the designation of 12 inshore and offshore Special Protection Areas (SPAs) and four inshore Marine Protected Areas (MPAs) in Scottish waters.

The designation of the SPAs is the result of 20 years of gathering and assessing evidence, jointly undertaken by NatureScot, Marine Scotland, JNCC, and (in the case of the Solway Firth SPA) Natural England, to identify and support the classification of marine areas critical for 31 species of marine birds.

Two of the SPAs – the Seas off St Kilda SPA and the Seas off Foula SPA – are the first Scottish SPAs to be designated which are mostly in offshore waters. The classification process for these sites has been led by JNCC in collaboration with NatureScot.

Monitoring focus: The Wetland Bird Survey

The UK is fortunate in having a long-standing culture of volunteer wildlife recording, and the Wetland Bird Survey (WeBS) is a great example of this. A national scheme for recording wetland birds – focussing on ducks – was first developed in 1947, before most current WeBS participants were born! The original National Wildfowl Count, initially co-ordinated from the Natural History Museum, has been built on and adapted over the years, and JNCC now partners with the British Trust for Ornithology (BTO), Royal Society for the Protection of Birds (RSPB) and the Wildfowl & Wetlands Trust (WWT) in running the well-established Wetland Bird Survey, which covers all species of wetland bird in the UK, including divers, grebes, cormorants, herons, swans, geese, ducks, rails, waders, gulls, terns and Kingfisher.

The UK is of great international importance for wetland birds due to its large amount of coastal habitat, relatively mild climate, and its position along some of the major migration routes for arctic nesting species. The UK has signed up to a number of international conventions to protect wetland birds and their habitats, such as the African Eurasian Waterbird Agreement. Collecting data on waterbirds from across the UK is crucial in helping us to understand and support their status, and a key part of helping us meet our international commitments. Drawing on the enthusiasm and expertise of thousands of bird watchers who volunteer their time is a real privilege, enabling us to add to the long-running evidence base.

The Wetland Bird Survey involves ‘Core Counts’ of all waterbirds within defined count sites, carried out on specific ‘priority dates’ each month where possible. Each WeBS recorder has their specific wetland site, or ‘count section’ of a larger site, that they return to for each survey, and some recorders have been going back to the same site for decades. Recorders need to be able to identify wetland bird species and estimate flock sizes, and for more experienced bird watchers there is also the option to record the age/sex composition of flocks for some species. The use of ‘priority dates’ for counts is designed to give a more accurate national picture by helping to avoid birds being double counted or missed.

Core Counts at coastal WeBS sites are typically carried out at high tide, when birds are less dispersed and so easier to count. But alongside this, WeBS also involves a rolling programme of ‘Low Tide Counts’ on key estuaries across the UK to get a better understanding of how birds use the intertidal areas. The main estuaries in the UK are surveyed about every six years.

Data from both components of the scheme are presented on ‘WeBS Report Online’. This interactive web portal allows you to see bird density maps of estuaries, view population counts by species and by site, and see overall trends. The key population summary data is also published annually as a downloadable spreadsheet that’s freely available for anyone to use. The annual results are published as a JNCC ‘Official Statistic’, indicating that their production has followed the Code of Practice for statistics, increasing their credibility and impact. The results also feed into the UK Biodiversity Indicators, so forming part of this barometer for how biodiversity is faring in the UK, which can then influence policy decisions.

More detailed data from WeBS surveys can also be requested, and are highly valued by a wide range of users including the UK statutory nature conservation bodies, academia/research, and local land managers. The latest WeBS newsletter includes an article on the many uses that Natural England put the data to, including underpinning site designations, informing conservation objectives and targets, assessing site condition, and undertaking site impact assessments of proposed activities.

The Wetland Bird Survey is just one of a range of citizen-science based biodiversity monitoring schemes that JNCC supports with partners. A big thank you to the many thousands of volunteers who take part contributing to these valuable long-term data sets.

Contact:

Anna Robinson, Monitoring Ecologist

Offshore seabed survey of Pobie Bank Reef

JNCC and Marine Scotland Science have undertaken a seabed survey of one of the UK's offshore Marine Protected Areas, Pobie Bank Reef.

The scientists and crew of MRV Scotia sailed from Aberdeen in late August. This was the first offshore survey our experts had participated in since the start of the COVID-19 pandemic, and there were lots of extra precautions and new rules to follow to ensure no one joining the vessel had the virus and to prevent the spread. Precautions included wearing masks or visors, and social distancing.

Pobie Bank Reef is a Special Area of Conservation located to the east of the Shetland Islands and has been designated to protect reef features in the area. Two types of reef are found at the site — bedrock reef and stony reef. Bedrock reef is formed by exposed areas of rock which create jagged cliffs, peaks and smooth ledges. Stony reef is formed by cobble stones and boulders which pile up, creating a complex habitat for animals to grow on and hide within.

This survey was the first time JNCC has returned to Pobie Bank Reef since 2013. Our priority was to build on work started seven years ago to produce a full coverage map of the site. There is a particular interest in understanding where the different types of reef occur on Pobie Bank. Having an accurate map of Pobie Bank will help us to plan future work at the site which in turn will allow us to monitor change here over time.

To make this map, we collected acoustic data from large sections of the site. The acoustic data provide us with accurate information about the depth and topology of the seabed. Two types of sonar equipment were used for this, a multibeam echosounder and a side- scan. We also used a camera towed behind MRV Scotia to hover one metre above the seabed and take videos and photos of the seabed.

Using these methods, we hope to produce detailed maps by identifying bedrock and stony reef in the camera images and matching their location to features seen in the acoustic data.

The camera images will also be used to identify the animals living on the reef and monitor how their populations change over time. Some of the species observed living on the reef include cup-corals, squat lobsters, and a variety of sponge species.

Having completed a successful socially distanced survey the work to turn the data collected into maps and other products is in progress.

Contact:

James Albrecht, Marine Evidence Adviser

The Joint Cetacean Database – maximising our evidence for whales and dolphins!

Cetaceans, the scientific name for whales, dolphins and porpoises, are challenging to study. In the north-east Atlantic, 36 cetacean species have been recorded and 12 of these regularly occur in UK waters. Their distributions can be fairly localised, such as those of inshore bottlenose dolphins; or extend throughout the waters of the UK's continental shelf, such as the harbour porpoise. Coupled with the fact that they spend most of their time underwater, collecting data on cetaceans is difficult and costly. Despite the difficulties, there is a wealth of data collection activities: government-funded decadal international surveys and regional surveys (e.g. Scotland's strategic surveys of marine mammals and seabirds); industry surveys as part of offshore wind development; and a large volunteer 'citizen science' effort surveying cetaceans from platforms of opportunity, such as ferries.

JNCC is maximising the value of existing and new cetacean datasets through the Joint Cetacean Data Programme (JCDP). This project, funded by Defra, will collate datasets from throughout the north-east Atlantic into an online platform. This will require data to be in a standardised format but will mean that the data are securely stored and, crucially, available to all. Our experts are working with stakeholders including NGOs, industry, academics and the country nature conservation bodies to ensure that the JCDP aids their data collection efforts and delivers a resource platform that meets their aims.

The JCDP platform will be built by data experts at the International Council for the Exploration of the Sea (ICES). The survey data will be compiled into a database which can be scrutinised through a web-based portal. The portal will enable the data to be visualised for different species, areas and time periods, and downloadable, as well as making basic data products available, such as distribution maps. The JCDP platform will be live in Spring 2022.

JNCC is dedicated to providing high-quality evidence and advice on the natural environment, for the benefit of current and future generations. By bringing together the survey datasets from different sources, a strong and accessible evidence base will be built which can be used to inform research, policy and conservation. The JCDP will support a wide range of evidence-based products that will further our understanding of cetaceans and their ecosystems and support better decision making for their conservation. We will be able to better assess the status of cetaceans in UK waters and beyond, ensuring UK governments are better informed and therefore that national (e.g. UK's Marine Strategy) and international (e.g. OSPAR) obligations can be met. The JCDP exemplifies the work we are undertaking as a leading provider of environmental evidence.

Contact:

Kelly Macleod, Senior Marine Species Adviser

Conservation Conversation

In this issue we focus on our Senior Air Pollution Adviser Susan Zappala. Susan is on secondment from Natural England where she was Senior Specialist in Air Pollution and Ecotoxicology, advising on the protection of wildlife and habitats from toxic substances.

Species that inspired you as a child?

Geoducks (*Panopea generosa*) sparked my curiosity about unseen wildlife. Their rogue squirts of bay water from the mudflats were a constant source of fascination when the tide went out.

What concerns you most about the natural world?

Perhaps one of the less recognised conundrums is the varying definition of natural world and its effect on how the importance of nature is perceived by individuals. Often the definitions we use explicitly exclude people which makes nature an “other" that can be out of sight for some folks.

What do you do away from the office?

When I’m away from the office I get up to no good in my workshop making beautiful things with glass.

Where is your favourite place?

Although a bit unnerving when surrounded by glinting eyes at night, my favourite place is definitely the mangrove swamps around the Mississippi River delta.

If you could dine with any four guests who would they be?

Kermit Ruffins – lead of the Barbecue Swingers, Leah Chase – a restaurateur that has hosted generations of musicians, Jenny Jones – talk show host turned YouTube cooking sensation and Steve Vai … nuff said.

Who is your human hero in the natural world?

Beatrix Potter for bringing the beauty of nature to everyone and highlighting the charisma in fungi.

Desert Island Disc?

Jimbo’s upright bass always breaks through the procrastination fug – The Devil's Chasing Me by The Reverend Horton Heat.

Place you'd most like to visit?

After going to see my folks (it's been a while thanks to pandemic travel restrictions!), I'd like to visit Churchhill, Manitoba during the winter to see the wildlife and the Aurora Borealis over the Hudson Bay.

What would you like to achieve in your time at JNCC?

As a secondee I had to be realistic with the time available – raising the profile of JNCC's air pollution work and learning about other areas JNCC works on. My favourite so far has been deep-sea canyons!

If you could choose another job or career, what would it be?

That's hard to choose as careers these days are not exactly static. If I was not a civil servant, I'd be an artist in the week and food truck extraordinaire on the weekends.