

NATURE NEWS

Spring 2020



In this edition:

- Challenges of Covid-19
- Earth Observation innovation
- Fishing and Marine Protected Areas
- National Plant Monitoring Scheme

IN THIS ISSUE



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04 News in Brief



08 Meet the Expert



12 Montserrat and Pitcairn



16 JNCC at CoP13



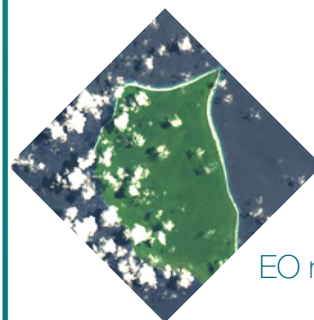
06 Challenges of Covid-19



10 Marine Biosecurity Toolkit



14 EO revolution



20 Fishing and MPAs



Introduction from Steve Wilkinson

JNCC Director

Welcome to the spring edition of Nature News, bringing you updates and information on our UK and international work. Since the last edition, the world has become a different place as we face the challenges of Covid-19. JNCC's response has been focused on protecting our people and partners to minimise the potential for the virus to spread, while continuing to deliver priority work where we are able to.

It is difficult to see how this will play out in the medium to long term, but despite all the hardships and concerns people are facing there have also been some signs of increased environmental awareness. Many will have discovered the natural environment that they live next to and perhaps value it more now. As a world we are finding that we probably don't need to travel as much as we thought. As a result, we are seeing improvements in air quality. There will obviously be huge pressure to restart economies as quickly as possible. The real trick here will be whether, as we catalyse these, we can start to put things on a more sustainable long-term footing. This is an area that JNCC is actively thinking about.



I took on the role of Director of Ecosystem Evidence and Advice back in August and gradually took on responsibilities from Paul Rose until his retirement in March. Paul joined JNCC in 1997 and during this time provided leadership to programmes for both marine and terrestrial work. I wish Paul a very happy retirement – he has been an invaluable friend and mentor to me during my time at JNCC and I look forward to building on his thinking and strategies. This is particularly true in the international arena where I am keen for JNCC's UK approaches and knowledge to create an impact abroad.

One such area is Earth Observation (EO) which is revolutionising how we manage and monitor the environment. With our partners we are already using EO data for environmental applications throughout the UK and our Overseas Territories. Our team are currently working on two new initiatives – Defra's EO Data Service and our Simple Analysis Ready Data (ARD) Service – that will help unlock the potential of using EO to restore and enhance the environment within the UK. The skills and tools we are developing here can also accelerate the application of EO data elsewhere around the globe.

The marine environment is what first inspired me as a child. The seas around the UK are a rich resource, providing us with food, an income, raw materials, and opportunities for leisure and recreation. Managing fishing activity in Marine Protected Areas (MPAs) will help to conserve these resources for future generations. Our experts have been working with partners from the fishing sector, regulators, the science community and academia, to develop an MPA Fisheries Management Toolkit. The toolkit will support those involved in, and affected by, fisheries management decision-making.

There is a real opportunity for JNCC to help support a post-Covid 'green recovery'. Some of the work is presented in this issue but further examples will be highlighted in future editions.

Steve Wilkinson, Director, JNCC

JNCC is the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation. As a public body we also work in partnership with business and society. Our people are dedicated to providing high-quality evidence and advice on the natural environment for the benefit of current and future generations.

Farewell to Paul Rose

At the end of March we bid farewell to JNCC Director Paul Rose. Joining JNCC in 1997 as Head of the Biodiversity Information Services Team, he was promoted to Director in 2010, initially as Director of Evidence and Advice.

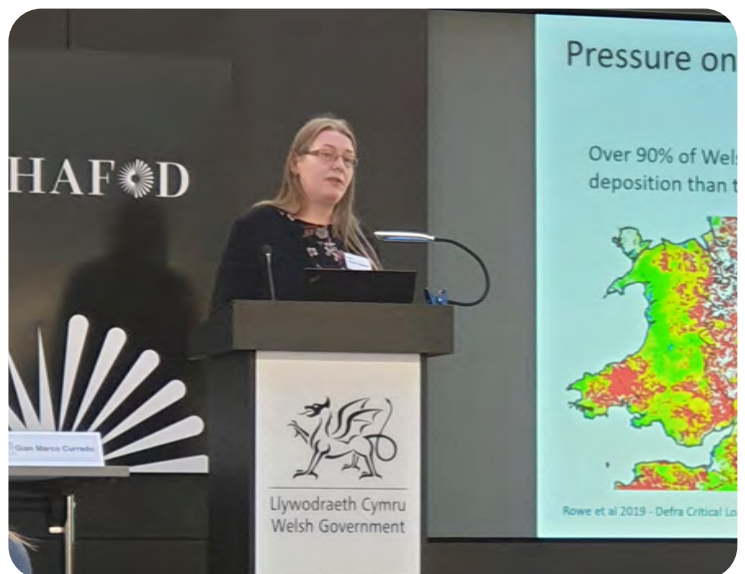


Paul served as a member of the Executive Leadership Team and the Science Management and Resource & Planning Boards. In his time at JNCC, Paul supported and provided leadership to work programmes for international advice, marine ecosystems and assessment, and ecosystems analysis. We wish Paul a very happy retirement.

Clean Air Plan for Wales

Susan Zappala and Alexandra Cunha attended two of the Welsh Government's Clean Air Plan consultation workshops for finalising their Clean Air Plan for Wales. Susan presented at both events giving an overview of JNCC's role in air pollution, its ecological effects and risk to ecosystems, and the ecological links to people's well-being.

JNCC also assists the Welsh Government and Natural Resources Wales through the Inter-agency Air Pollution Group and the Air Pollution Information System (www.apis.ac.uk). Welsh legislation such as the Future Generations Act and strategies such as the Nature Recovery Action Plan provide a strong foundation to protect and enhance Welsh ecosystems and their functions into the long term.



in Brief

RBBP Secretary retires

Mark Holling retired at the end of March after 14 years as Secretary to the Rare Breeding Birds Panel (RBBP). Throughout, Mark did a fantastic job building strong relationships with volunteers; improving data submission and management approaches, including moving data to a much-improved GIS-supported database; redesigning both RBBP's annual report and website; and continuing to provide essential data collations to the Country Nature Conservation Bodies.

He built strong relationships with county bird recorders and has gone the extra mile to attend local meetings and promote RBBP at events. Mark also promoted best practice in rare bird data management at European Bird Census Council meetings and represented RBBP in the Scottish Raptor Monitoring Scheme (of which JNCC is also a member), providing invaluable advice on data management there as well.



RBBP birds are those with UK populations of less than 2,000 pairs and include many for which protected areas are designated. Some have special legal protection being vulnerable to disturbance and persecution, thus requiring licences to visit nests; data are managed sensitively for this reason.

Because of the importance of RBBP data to statutory conservation, JNCC has partnered with the RSPB and BTO since its formation in 1973 to financially support its work. We thank Mark for his dedication over many years and wish him well in his retirement.

International Women's Day 2020

To celebrate International Women's Day 2020 Nichola Burnett and Jessica Taylor visited Peterborough schools to share their experiences of working in science.

Nichola, pictured showcasing a selection of wildlife artifacts, attended The Kings School to talk about her early career and progression to her current role, an overview of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and what her working day looks like.

Jessica visited Hampton Garden School and presented to the girls in years 7-9. She spoke about working as a woman in science, the offshore survey work JNCC undertakes and her journey to becoming a marine scientist.



We would like to thank both schools. The children were all very engaged and it was a pleasure to be invited.

For monthly updates on our work you can subscribe to the JNCC Bulletin! Email: communications@jncc.gov.uk

Challenges of Covid-19

Embracing new ways of working

The coronavirus (Covid-19) pandemic hit the UK with full force during March. In response to the government's social distancing requirements, JNCC's offices in Peterborough and Aberdeen were closed and all staff rapidly moved to working from home. This shift went remarkably smoothly, facilitated by strong IT support which has enabled us to make a step change in the use of tools to support communication and collaborative working. It has been a stressful and anxious time for many people, but I've been impressed by the extent to which everybody has pulled together and provided each other with mutual support.



JNCC's plans for the coming year have inevitably been disrupted by Covid-19. However, current indications are that many of our priorities are still achievable, though in some cases over a longer timescale than originally planned. Restrictions on

fieldwork have severely constrained our ability to undertake environmental monitoring, including the volunteer-based species

surveillance programmes that provide data on

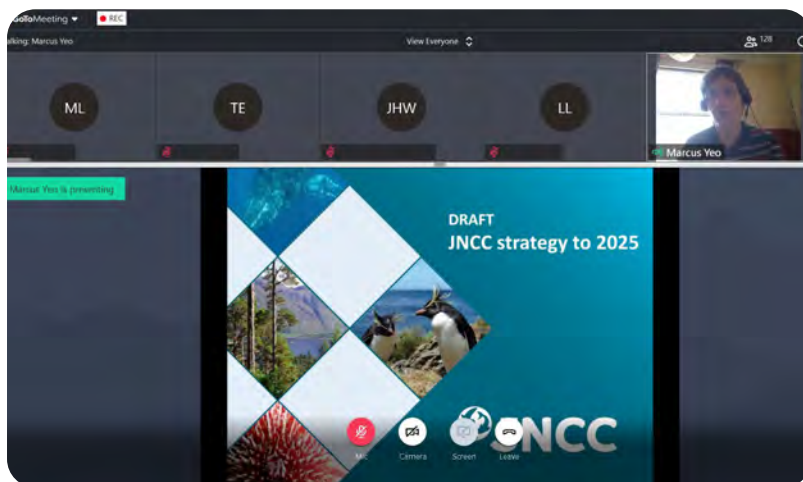
population trends across the UK. International engagement has also been scaled back, as many meetings in support of multilateral environmental agreements have been postponed or cancelled.

In both cases, we are engaging with partners to assess the implications and re-plan our work.

The urgency of dealing with Covid-19 mustn't diminish our focus on the long-term crises of climate change and biodiversity loss

The likely origin of Covid-19 has shone a light on 'wet markets' and wildlife trade, as well as on the potential links between zoonotic diseases and environmental degradation. JNCC has considerable expertise in this area (for example, through our role as the UK's Scientific Authority for animal under the Convention on International Trade in Endangered Species) which we will deploy to provide evidence-based advice to government.

Covid-19 is a global crisis that will have far-reaching social and economic consequences. However, the urgency of dealing with Covid-19 mustn't diminish our focus on the long-term crises of climate change and biodiversity loss. Taking action to address these problems will be as crucial as ever once the pandemic starts to abate. JNCC will be providing advice to government to support the development of a post-Covid economic recovery that fully incorporates environmental considerations, within the UK and internationally.



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Sharing survey samples with National Museums Scotland



Charlie Howarth sorting the fully labelled specimens © Kirsten Dinwoodie/JNCC

Back in January, two of us from the Marine Monitoring and Evidence team undertook a task involving invertebrate samples at the [National Museums of Scotland \(NMS\) Collections Centre](#) in Edinburgh. JNCC surveys of Marine Protected Areas (MPAs) in Scottish and English waters gather invertebrate samples that are held in the museum's collections for access by scientists and researchers. As surveys take place every year, the museum holds a large inventory of samples that need attention. Some older samples can be in unsuitable condition and need to be processed and re-labelled for future reference. On this occasion we were tasked with re-potting a collection from the [2008 survey](#) of [Dogger Bank](#), a Special Area of Conservation (SAC), located in the North Sea off the coast of Yorkshire.

The samples we were handling were all collected by 0.1 m² [Hamon grab](#) (a mechanical device that takes sediment and animals from the substrate), so all the creatures we were examining had lived on or in the seabed. There were a lot of worms (polychaetes), clams and mussels (molluscs) and crustaceans, with a few starfish and brittlestars (echinoderms).

Specimens were recorded in a database, matching species name to a reference code used by museum curators to store specimens – similar to how librarians organise books. Each specimen was then transferred into a small vial of 74% ethanol, to keep it "fresh" in storage. These vials were then placed inside a larger vial, along with a label generated from the database containing information on where and when the sample was collected. The larger vials were also filled with ethanol, so that if the vial inside cracks, the specimen will not dry out. A lot of the specimens were so small that you could hardly see them, whilst others were too large to fit into vials and had to be rehoused in bigger jars.

Finally, a tiny piece of paper with a hand-written number in special ink that will not break down was added. This number refers to an entry in the database and can be used to find the specimen information if all other labels are lost. These specimens were then stored according

to their reference code, in a huge facility for use by future researchers.

Watching the transformation of samples from a box of poorly-labelled, half-empty and dried-out jars to fully prepared specimens stored in a huge collection for use by others was incredibly satisfying.

We would like to thank Sankurie Pye and Fiona Ware at National Museum of Scotland for their invaluable help with this work.



Brittlestars, sandeel and razorshell specimens © Kirsten Dinwoodie/JNCC



Masked-crab © Kirsten Dinwoodie/JNCC



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Meet the Expert

In this issue we focus on Karen Hall, Marine Management Co-Team Leader

What prompted your interest in the natural environment?

Growing up in Liverpool we spent a lot of our holidays in North Wales playing on the beach, so my love of the ocean started there really. Some of my earliest memories are running around on a beach and playing in rock pools with my Dad. From those early rock pooling days, I fell in love with marine mammals by being introduced to seals and bottlenose dolphins on our holidays in Wales. My family have always been really supportive of my interests and they helped me start scuba diving. They then dutifully drove me around lots of university open days so I could choose a marine biology degree course (I eventually chose a BSc at the University of Newcastle-Upon-Tyne). And the rest is history as they say!

How did you become involved in your current role working in offshore industry advice and what does it involve?

As a research assistant at the University of Aberdeen I was working on a project to investigate the spatial and temporal distribution of marine mammals globally to help the Ministry of Defence with their impact assessments and planning their activities. Whilst doing that I was also helping conduct marine mammal surveys around the east coast of Scotland and Moray Firth in relation to baseline data for potential offshore windfarms. These interests meant I jumped at the chance when a case officer position was advertised at JNCC. Ten years on my current role involves overseeing nature conservation advice provision to Government, regulators, industry, consultants, NGOs and others on industry operations around the UK. This covers oil and gas, renewables, aggregates, cables, MOD operations, as well as advising on marine planning and supporting governments of Overseas Territories as requested.

We review applications for operations in relation to offshore marine nature conservation, so this can involve assessing potential impacts within our Marine Protected Areas or through wider environmental legislation (e.g. European Protected Species, OSPAR).

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

I think a huge challenge the team and I work on day to day is trying to understand and influence sustainable management of our seas. Whilst JNCC is not a regulator of any industry sector, we do advise regulators (and wider stakeholders) on a range of aspects from strategic assessments, planning and licensing rounds assessments, through to individual applications. It is a very competitive space out there in our seas, for biodiversity ambitions, climate change targets, and sustainable management. The UK has an amazingly rich marine biodiversity and protecting that, whether through Marine Protected Areas or wider conservation measures, alongside much needed sustainable development is a big challenge as an industry advisor.



Management

Another challenge we face is the rapid pace of industry applications and responding to such varied requests within statutory timeframes across multiple industries covering the whole of the UK. While this makes for challenging work, the breadth and scope of industries we advise on also keeps the job very interesting. It means I get to engage with a huge diversity of interesting and passionate people who all want to work responsibly within the marine environment.

What has been your biggest achievement working at JNCC?

From a personal point of view, I am very proud of being promoted to Co-Team Leader having joined JNCC in 2010 and working my way up the ranks within the same team I originally joined. I am very proud of the work JNCC does and being able to promote that as a Team Leader is something I thoroughly enjoy.

From a work perspective, a highlight for me was visiting the Falkland Islands to contribute to a workshop on marine planning. It was an honour to be invited and it was very special to be part of the work at the start of the process, concerning how the Falklands Government and community wanted to shape marine planning for their waters and the options available to them. Meeting local people and helping them work through potential options was very rewarding. My visit there also meant I got to explore the island and meet the local wildlife, including many species of penguins, which is an experience I'll never forget.



Looking forward, what do you think are the big challenges and opportunities in the offshore marine environment?

I think the main challenge we are all facing, which is not specific to the marine environment, is learning to adapt to the pressures we are placing on the environment. Given climate change, biodiversity declines, and increasing societal demands on our resources, we all need to adapt to this competition for space and the pressures we are putting onto our environment. There's a role and opportunity for us all there in adapting and by promoting new ideas and ways of achieving this – industry is no different and can be very inventive in response to these challenges.

How do you ensure the natural environment is a key consideration for the offshore energy industry?

We engage with regulators, industry and their consultants early on to ensure awareness of the natural environment, its value and its environmental protection. This means that they are aware of the aspects they may need to consider when planning their activities including the types of mitigation. We are also actively involved in research work across the UK in order to further understand potential impacts from industry operations and ways to manage them. This allows us to respond to new evidence as it arises and feed that into our advice as appropriate. We actively contribute, alongside a wide variety of stakeholders to, for example, the Department for Business, Energy and Industrial Strategy Offshore Energy Strategic Environmental Assessment (BEIS SEA) Working Group, are active members of the Offshore Renewables Joint Industry Programme (ORJIP) and Scottish Marine Energy Research (ScotMer) programme, and co-ordinate and facilitate the Offshore Wind Strategic Monitoring and Research Forum (OWSMRF).



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Marine Biosecurity

Tackling invasive non-native

Marine invasive non-native species are animals and plants that are found outside their natural range and are a threat to the biosecurity of a region due to a lack of natural predators. They can disrupt marine life by outcompeting native species and disturbing the balance of local flora and fauna. In addition to negatively impacting the biodiversity of an ecosystem, marine invasive non-native species can have negative impacts on local economies by causing damage to infrastructure.

With global maritime traffic predicted to continue increasing, there is a risk of more marine invasive non-native species being transported to new ocean ecosystems. The UK Overseas Territories (UKOTs) with their wide diversity of marine habitats are no exception. In response, our experts are providing evidence and advice to deliver solutions for tackling marine invasive non-native species in their waters.

JNCC, in collaboration with the Marine Management Organisation, has published a UKOT Marine Biosecurity Toolkit on behalf of the GB Non-Native Species Secretariat. The project ran from June 2019 – March 2020, following horizon-scanning exercises for the UKOTs to identify their priority marine invasive non-native species.

The work was funded by the UK Government under the Conflict, Stability and Security Fund. It contributes towards the UK Government's response to the Honolulu Challenge on Invasive Alien Species launched by the International Union for Conservation of Nature – this calls for greater action to tackle the issue of invasive non-native species across the globe.

The Marine Biosecurity Toolkit provides five key sets of documents for the UKOTs:

- **Vessel hull fouling assessment guidance** – a tool which can be used to assess the degree of biofouling on commercial and recreational vessels, enabling the identification of high-risk vessels.
- **Ballast water monitoring guidance** – a risk assessment tool for determining the level of hazard ballast water different vessels may pose, and a guide on how to check the ballast water log book.
- **Sampling guidance** – a guide for monitoring marine invasive non-native species and links to existing guidance and resources to help support the planning of sampling activities.
- **Species ID guides** – ID cards for 25 priority species that pose a potential future risk to biodiversity, human health and the economy. Each card provides labelled images with a description of the key ID features and information on habitat, ecology, distribution, impacts and pathway for species arrival.
- **Mitigation measures guidance** – practical guidance for priority species where mitigation strategies have proven effective in the past.

The toolkits have been sent to each of the UKOTs and include waterproof species ID guides which can be used in the field. All materials are available online at the GB Non-native Species Secretariat website, which also includes the OT Biosecurity Project and a Terrestrial Biosecurity Toolkit:

<http://www.nonnativespecies.org/index.cfm?pageid=656>.



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Toolkit launched

invasive species in the UKOTs

Asian Green Mussel

Perna viridis

www.nonnativespecies.org

Pathway • Hull fouling • Ballast water • Aquaculture

Impacts

- Biodiversity**
Once introduced they quickly expand and displace native mussel communities and oyster fisheries. Can carry diseases that native species may be vulnerable to.
- Human Health**
Can impact human health through shellfish poisoning if eaten.
- Economy**
Known to clog water pipes of power stations, increasing the risk of damage and reducing efficiency. Also known to cover fishing equipment and boat hulls, increasing operations costs.

The high risks and impacts caused by this species has caused it to be classed as one of the ten most damaging species and one of the ten most likely invaders.

Key ID Features

- Bright green edges
- Faint growth rings
- Downward pointing beak
- Iridescent hue to the inside of the shell
- S-shaped pallial line
- Kidney shaped adductor scar
- Concave ventral margin

Description

A smooth elongated shell with a distinctive downward pointing beak. The surface of the shell has faint, concentric growth lines that along the shell can be observed if examined closely. Can be distinguished by its kidney-shaped adductor muscle, concave ventral margin and S-shaped pallial line.

Size
80 - 100 mm in length but can grow as large as 165 mm.

Colour
Juvenile mussels have dark brown-green shells at the front which change to a vibrant blue green at the wider part of the shell. As they grow to maturity, brown patches cover much of the green, leaving this brighter colouration only at the edges. When opened the inside of the shell has a blue-green iridescent hue.

Distribution

Native range: Asia and the Asia-Pacific region, particularly prevalent on the Indian coast and the Indo-Pacific.

Non-native range: North America, Jamaica, Trinidad and Tobago, Venezuela, Australia and Fiji.

UK Overseas Territories Marine Biosecurity Toolkit



Marine Invasive Non-Native Species

These are the top 25 marine invasive non-native species identified for UK Overseas Territories. For more information please go to the GB Non-Native Species Secretariat website.

Striped Barnacle	Star Ascidian	Red Algae	Halophila Seagrass	Asian Green Mussel
European Sea Squirt	Ruby Bryozoan	Chlorophyllous Mussels	European Shore Crab	Blue Mussel
Harpoon Weed	Pacific Oyster	Green Sea Fingers	Blue Crab	Chilean Mussel
Decapod	Ascidian/Sea Squirt	Lionfish	Dwarf Mussel	Mediterranean Mussel
Pacific Acorn Barnacle	Sea Vase	Reticulated Barnacle	Orange Cup Coral	Asian Kelp

www.nonnativespecies.org





Delivering coral reef actions in Montserrat

Through the FCO and the Conflict, Stability and Security Fund – Official Development Assistance, JNCC has over the last six months been supporting the governments of Montserrat and Pitcairn to implement priority actions to support coral reef conservation and management. Coral reefs provide essential services to coastal communities including storm protection through the mitigation of hurricane-generated storm surges and food provision by supporting fisheries, and providing habitat and spawning and nursery grounds for economically important fish populations.

These projects contribute to the UK Overseas Territories Coral Reef Initiative country-specific Action Plans and, in the case of Pitcairn, the draft management plan produced with support from the Blue Belt Programme, in collaboration with Cefas and the Marine Management Organisation, as well as the Government of Pitcairn.

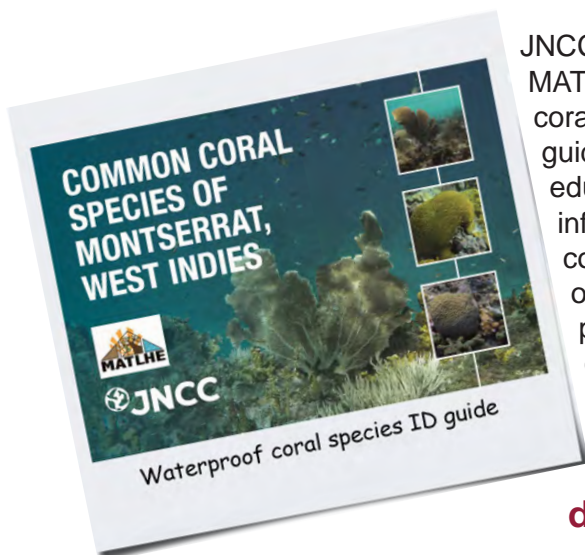
Coral reef monitoring, capacity building and education in Montserrat

Montserrat Ministry of Agriculture, Trade, Land, Housing and Environment (MATLHE) and JNCC worked with other government sectors and marine stakeholders, including fishers and dive operators, in a workshop to develop collective understanding of the threats facing Montserrat's reefs and to inform priorities for coral reef monitoring. Our experts produced recommendations setting out next steps for the Government of Montserrat to consider in developing their coral reef monitoring programme.

JNCC also partnered with MATLHE to deliver a waterproof coral species ID guide. The guide is designed as an educational tool to provide information on Montserrat's coral reef species and ecology. It raises awareness of the threats to Montserrat's reefs and how individuals can help to protect them. The ID guide is intended to be used for local community outreach, educational purposes with students and tourist outreach through dive shops.

Supporting Montserrat's fisheries decision making

Navigation buoys are set to be installed off the coast of Montserrat. These buoys will alert passing vessels to the locations of fishing grounds and the presence of fish pots. This will reduce the risk of vessels inadvertently dragging and losing fishing gear over the nearby reefs. It will also reduce damage to the reefs and offer security to local fishers whose livelihoods are reliant on their fishing gear remaining intact. The locations for the buoys were identified through a consultation process with fishers, other sea-users and relevant authorities and made use of iVMS data from Montserrat's fishing fleet. These data are essential to inform evidence-based management of Montserrat's coral reefs and the wider marine environment. To ensure continued collection of these data JNCC has purchased 15 new solar-powered iVMS devices.



reef conservation Montserrat and Pitcairn

In collaboration with the Montserrat Department of Fisheries, JNCC and Cefas also produced advice on Montserrat's capacity to expand its Fish Aggregation Device (FAD) fishery. FADs can reduce dependence on reef fisheries by making pelagic species more accessible, and therefore profitable, to local fishers, diversifying their catch. As well as reducing fishing pressure on coral reefs, this builds resilience in the fishing sector. The advice considers the productivity, sustainability and longevity of FAD-based fisheries in Montserrat. It contains recommendations on appropriate locations and numbers of devices and suitable sustainable materials from which to make them.

Lionfish festival

In December, MATLHE and JNCC co-ordinated a catching and cooking festival to target the invasive lionfish and showcased how developing the lionfish fishery can both control invasive species and taste great! The event engaged the community on conservation issues, showcased some of the island's top chefs and demonstrated innovative ways to eat lionfish, and removed 100lbs of the



Lionfish catching and cooking festival, Montserrat

invasive species from the island's reefs. Our team is continuing to work with Montserrat to reflect the progress made in this project in their Coral Reef Action Plan and to identify follow-on actions and priorities to continue the progress made in conserving Montserrat's coral reefs.

Pitcairn Island coral reef mapping survey

Back in January JNCC and Cefas undertook a benthic ground-truthing and coral reef monitoring survey around the remote Pitcairn Island. The data from the survey will inform the management of

the marine environment within the

Pitcairn Marine Protected Area (MPA). The primary aim of the survey was to use underwater still camera and video to gather a dataset which

can be used to characterise and monitor Pitcairn's coral reefs.

Data collected will also be used to create a shallow water substrate map for Pitcairn to feed into zoning discussions and the Pitcairn Marine Management Plan. While on island, the survey team presented some of the initial imagery collected to officials and members of the Pitcairn community. In addition to informing long-term management decisions in Pitcairn, the data collected have been used to inform spatial planning in Bounty Bay, identifying suitable locations to install mooring buoys where they will not damage sensitive species such as corals.



Underwater camera in use, Pitcairn Island



Paul Whomersley (Cefas and Blue Belt Programme), Michele Christian (Government of Pitcairn Islands) and Joey O'Connor (JNCC) on Pitcairn



al sea users



Abbie Dosell
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Analysis-ready

Unlocking the potential of

Earth observation (EO) is revolutionising how we manage and monitor the environment

The quality and quantity of EO data are rapidly increasing, providing unprecedented opportunities to improve environmental decision-making and meet operational evidence needs

In particular, the Sentinel satellites in the European Space Agency's Copernicus programme provide openly accessible, high resolution data every few days.

JNCC and partners are already using EO data for environmental applications throughout the UK and its Overseas Territories, including habitat and crop mapping, habitat condition monitoring, natural capital assessment, and risk and resilience modelling. Defra's EO Centre of Excellence, of which JNCC is a founder member, was a driving force in facilitating collaboration and knowledge-exchange to develop these innovative applications.

Before it can be used, satellite data needs to be processed to correct for any distortions caused by the Earth's atmosphere and surface. This requires specialist skills and significant computer processing power, which can be a barrier to uptake and a source of inconsistency. To overcome this barrier, our experts led technical innovation to automate the processing of Sentinel-1 (radar) and Sentinel-2 (optical) data to global standards. Since 2016 we have produced analysis-ready data (ARD) on demand to support our global work and to meet partners' requirements. This saved the public sector time and money, facilitating pioneering research and development of practical applications, but there was still scope for greater efficiency.

Building on this success, two initiatives have been launched this year to increase efficiency of ARD supply and unlock the potential of using EO to restore and enhance the environment.

The **Defra EO Data Service** supplies Sentinel-1 and -2 ARD for England to Defra, its agencies and arm's-length bodies. This world-class service comprises a user-friendly data portal, web services to stream imagery into GIS and web-mapping tools, and an application programming interface (API) to enable users to access data programmatically. It supplies a rolling catalogue of 18 months' data, with new imagery added within a day of acquisition. JNCC played an important role in development of the EO Data Service – we provided project leadership, ran stakeholder consultations to ensure the service met requirements, supported internal and external testing, and created a suite of resources for users including a well-attended series of webinars.



Henderson Island © Copernicus
Sentinel-2 imagery processed by JNCC

ly, steady, go!

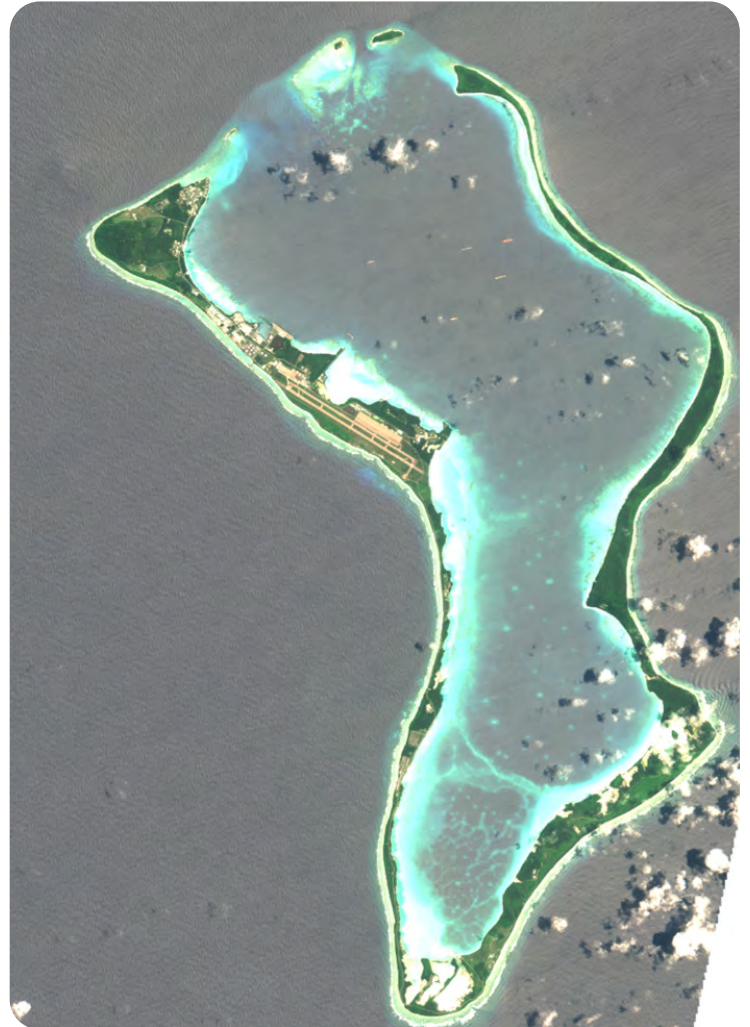
f Earth Observation data

JNCC's **Simple ARD Service** delivers S1 and S2 ARD to the public sector in Scotland and Northern Ireland. This uses the same processing chains as the EO Data Service, so data and metadata are standardised and can be used by organisations with a UK-wide remit. The catalogue consists of data from January 2019 onwards, with newly acquired data processed on a weekly basis. The S1 and S2 ARD produced by JNCC and the EO Data Service is available under an Open Government Licence through the Centre for Environmental Data Analysis archive (<https://www.ceda.ac.uk/>). We are also continuing to provide Wales with advice regarding their requirements and are currently discussing the next steps in securing the long-term provision of ARD. JNCC continues to provide ARD to the UK Overseas Territories and other overseas partners as required for specific projects. Recent examples include disaster resilience modelling in the Caribbean, coastal mapping in Chile, and monitoring impacts of the endangered landscapes restoration programme in Belarus, Ukraine and Portugal.

Automated near real-time processing of EO data coupled with user-friendly delivery mechanisms

will remove the final barriers to EO data use, putting processed imagery at our fingertips,

linked to tools we know how to use. Over the coming year, we will also be providing support in data analysis, including cloud computing, helping our partners develop ideas from proof of concept to operational delivery. Applications for EO data range from simple visualisation to inform routine operations to complex data analysis and modelling which can provide valuable new insight by combining EO with other data. Through continued collaboration and innovation, we will be able to take advantage of new and more frequent EO data and products for better and more cost-effective environmental policy delivery.



Diego Garcia © Copernicus Sentinel-2 imagery processed by JNCC



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JNCC provides advice at the 13th CoP t



The Convention on Migratory Species (CMS) is a United Nations Convention which provides a global platform for the conservation and sustainable use of migratory animals and their habitats. The UK has been a signatory since 1985. Every three years Parties to the Convention meet to review its implementation and direction going forward through resolutions, decisions, and concerted actions. The [latest Conference of Parties \(CoP\)](#) took place between 17 and 22 February, in Gandhinagar, Gujarat, India. James Williams and Alison Littlewood from JNCC provided science advice as part of the UK delegation.

A CoP is a week of intense discussion and negotiation, but for the JNCC team the

build-up starts much earlier. Papers started becoming available in October 2019, leading to the Sessional Committee of the Scientific Council in November 2019 in Bonn, Germany, when all the papers (about 75) with a scientific component were reviewed and comments provided. The role of the Sessional Committee and the CoP are different – essentially the focus of the discussions in the Sessional Committee is on the science but needs to stop short of making new policy – which is the role of CoP. JNCC adapts its advice role as needed. Back home, work continued for the next several months, with weekly UK delegation meetings to prepare positions and co-ordinate action needed.

India are to be congratulated for the huge amount of effort they put into CoP13. This included a live video address by Prime Minister Modi during the opening ceremony; three listing proposals (Mainland Indian Elephant, Great Indian Bustard, and Lesser Florican), and much media interest – including front page coverage in The Times of India. The CoP even had a theme song – sung by one of the Ministers of the Environment – he is a Bollywood star! See <https://m.youtube.com/watch?v=UtQffW8Q0pU>

We reviewed a huge number of documents, and there isn't space here to cover many of them, but a few topics may give a flavour of the discussions that took place.

- Ten new species were added to the CMS Appendices, including the Mainland Asian elephant, jaguar, antipodean albatross and the Oceanic white-tip shark which were added to Appendix I. The urial sheep, smooth hammerhead shark, and the tope shark were listed for protection under Appendix II.
- This year a new framework for international biodiversity targets – post-2020 – is being negotiated under the Convention on Biological Diversity. That framework needs to be relevant to all of the biodiversity conventions. India picked this up as part of the theme of the CMS CoP, and it led to a high-level 'Gandhinagar Declaration' focused on: connectivity, international co-operation, species conservation, and linkages between Conventions in Parties national biodiversity strategies and action plans.

to the Convention on Migratory Species

- Article III is the provision in the Convention text that bans the take of Appendix I listed species except under very specific circumstances. Alison spent a lot of time working with Defra on a draft resolution about this, as there are cross-overs to listing on the Appendices of the Convention on International Trade in Endangered Species (CITES) and regulation of trade – particularly if a species is listed on both CITES Appendix II – under which trade is allowed, and CMS Appendix I under which take is not allowed.

- There are strong links between migration and the effects of climate change. Colin Galbraith – JNCC's Deputy Chair, and a former JNCC staff member – is the CMS CoP Appointed Councillor for Climate Change. The outcomes from the CMS CoP should feed into the, now postponed, UN Climate CoP in Glasgow.

- Concerted actions are a CMS process for focusing international co-operation to improve the conservation status of particular species. Over the last couple of CoP cycles this process has been reinvigorated. It was really good to see new concerted actions being brought forward for some of the species being proposed for listing at this CoP, which means Parties do not just add species to the lists on the Appendices, but also propose action to enhance their conservation status.

This was the first big biodiversity negotiation meeting since the UK left the EU, and it wasn't easy at times to strike the right balance between presenting a strong and confident UK voice and meeting our obligations under the Withdrawal Agreement. But we all felt our way towards a new normal. As the week progressed, the EU began to see the value of having the UK as a second strong voice on areas we agree on, and we continued to help negotiate the language compromises we are well known and respected for. Many observed privately that it was good to hear a positive UK voice.

At the end of the meeting James was re-elected as an alternate member for Europe on the Sessional Committee of the Scientific Council.



'Gibi' the enchanting Great Indian Bustard, representing all the endangered species that need our love, care, and protection.



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Promoting safe

The start of spring usually sees thousands of highly skilled volunteers heading out into the field to participate in the [long-term terrestrial monitoring schemes](#) that JNCC organises and runs with NGO and academic partners. However, in line with COVID-19 government advice, this year many surveys will not be carried out, with volunteers staying at home to protect the NHS and save lives. It's important to remember that the loss of some, or even a whole year's data, does not undermine the value of this long-term monitoring.

The National Bat Monitoring Programme (run by the Bat Conservation Trust in partnership with JNCC and supported and steered by Natural England, Natural Resources Wales, Northern Ireland Environment Agency and Scottish Natural Heritage), has a couple of activities that volunteers can carry out without the need to travel. The [Sunset/Sunrise Survey](#) is an entry level survey, where volunteers can identify bats and other nocturnal animals from their own private gardens. In 2018 this survey led to the discovery of 28 new bat roosts! Where volunteers have a bat roost at their property they can participate in this summer's [Roost Count survey](#), even if unable to leave their homes. Roost Count surveys contribute to the production of the UK Biodiversity Indicator on [mammals of the wider countryside](#).

Although many volunteers can't currently go out into the countryside, there is still plenty they're doing to help us monitor terrestrial biodiversity



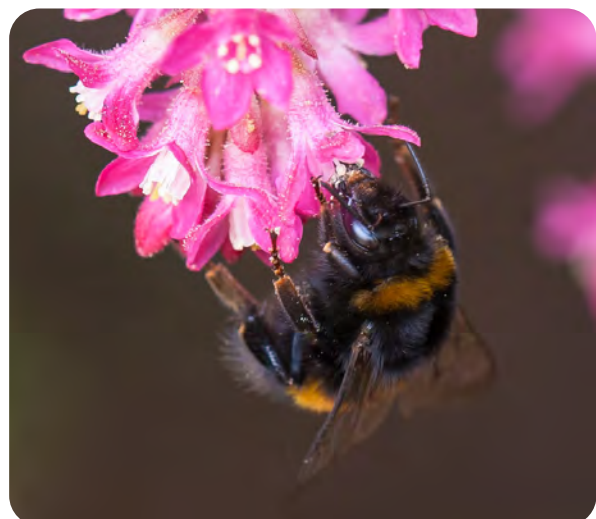
Bat garden survey © Bat Conservation Trust

The Pollinator Monitoring Scheme (run by UK Centre for Ecology & Hydrology, a collaborative project funded by Defra, JNCC, the Welsh Government, Scottish Government and other project partners) is another scheme where volunteers can carry out some surveys in their own private gardens. If volunteers have a small patch of certain flower species in their garden, they can take part in the [Flower-Insect Timed Count](#) (FIT), with short repeat surveys of pollinators throughout the summer months. FIT counts are helping to get more people involved in monitoring pollinators, and the data contribute to understanding how different insect groups use flowers and how this is changing.

Volunteers with a keen eye for birds who have spotted birds nesting in their gardens can participate in the BTO's [Nesting Neighbours survey](#). Or licenced bird ringers can carry out a standardised ringing survey of 24 species of common passerines in their garden as part of the [Constant Effort Site scheme](#) (CES). This produces highly

detailed information on bird demographics which help us understand pressures and drivers of change as part of the BTO/JNCC Avian Demographic Scheme.

The [National Plant Monitoring Scheme](#) (NPMS) has launched a series of online training events to hone volunteers' plant monitoring skills. Skills can be put into practice as volunteers participate in the Garden Wildflower Hunt, launched by BSBI, one of the NPMS partners.



Buff-tailed bumblebee © Natural England/ Allan Drewitt

Citizen Science

The current challenges are proving that people can be very resourceful and resilient, even in extremely difficult times. Although COVID-19 restrictions on movement may prevent much of our usual biodiversity monitoring from taking place, many of our dedicated and highly skilled volunteers, are still observing and recording the natural world around them. At JNCC, we partner and fund the Biological Records Centre (BRC) with the UK Centre for Ecology & Hydrology. The centre supports 85 national recording schemes and societies which can include ad hoc wildlife sightings in gardens. The BRC provides tools like [iRecord](#) to help capture these biological records and makes them available to others. Volunteers are being encouraged to use this summer to dig out past notebooks or unentered biological records and get them submitted. These types of records help us understand key biological trends such as the change in [distribution for priority species](#) or the [pressure from invasive species](#).

At JNCC, we are grateful for all the hard work of our partners who have been responsive to the changing situation and are liaising with volunteers to communicate guidance and support.



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Birds and butterflies in the spotlight

JNCC supports a number of long-term terrestrial biodiversity surveillance schemes, in partnership with NGOs and research bodies, and thousands of volunteer citizen scientist recorders. The schemes produce annual results, which are published as Official Statistics, which increases their credibility and impact. We recently published Official Statistics for the [UK Butterfly Monitoring Scheme](#) (20 March) and the [Wetland Bird Survey](#) (2 April).



The butterfly statistics were particularly good news showing that last year was the best year for butterflies in over 20 years. This was probably due to the warm summer, and the fact that it wasn't too dry is likely to have ensured good caterpillar food plant growth and their successful development. Four species had their best year on record in the UK in 2019 – Chequered Skipper, Orange-tip, Brimstone, and Marbled White. However, there are still just under a third of butterfly species showing a significant long-term decline in abundance.

Some waders have been experiencing long-term declines, and Turnstone and Knot were recorded at their lowest index values since at least the early 80s. At the other end of the scale, a number of recently colonising species are continuing to increase their UK populations, potentially due to climate warming. These include the Spoonbill, Great White Egret, Cattle Egret, and Mediterranean gull.



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Managing fishing activity in – a participatory approach

The seas around the UK are a rich resource, providing us with food, a valuable income, raw materials, and opportunities for leisure and recreation. Marine Protected Areas (MPAs) are tools to support the sustainable use of resources in the marine environment which helps ensure the conservation of the resource for future generations.



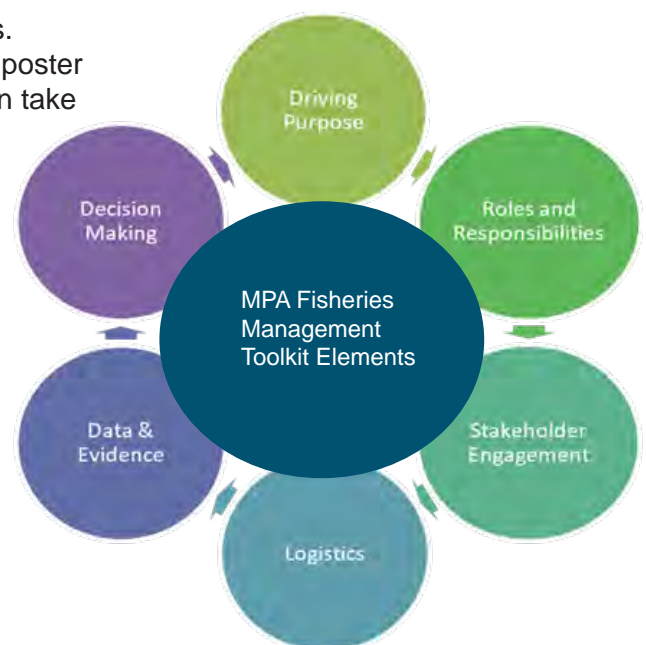
Funded by the European Maritime and Fisheries Fund (EMFF), JNCC, together with partners the Marine Management Organisation, Natural England, the National Federation of Fishermen's Organisations and Bangor University, have explored participatory processes for establishing, evaluating and adapting fisheries management measures in MPAs. The project has brought together the fishing sector, regulators, scientific advisors and academic researchers to aid the development of an MPA Fisheries Management Toolkit.

The toolkit aims to provide a resource for those involved in, and affected by, fisheries management decision-making and sets out the key elements to consider when establishing a participatory approach to management in MPAs. Using two existing MPAs as case studies to explore the challenges of managing sedimentary habitats, the project has focussed on mechanisms for enabling the fishing sector to engage positively with the management process and bring their perspectives and knowledge to the table.

The toolkit has been designed as a guide to help regulators assess the suitability of establishing a participatory approach, including governance structure, stakeholder balance, management objectives, and logistics. Each section comes complete with a standalone summary poster that highlights key information to help ensure that users can take away the key messages.

This project has contributed to JNCC's strategy by helping to support sustainable economic growth through a healthy UK offshore marine environment and ensuring the cost-effective delivery of devolved environmental priorities through shared solutions and joint working.

All resources from the project, including the MPA Management Toolkit, are available on the [webpage](#). We look forward to continuing to work towards achieving a common goal of conserving marine biological resources whilst enabling a sustainable future for our fisheries.



Louisa Jones
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in Marine Protected Areas ory approach

"The project has been a fantastic opportunity to share perspectives on how and why we all participate in MPA management, and has produced some great resources which will hopefully help decision makers and stakeholders make the most of opportunities to come together"

Nick Greenwood - Principal Marine Conservation Manager,
Marine Management Organisation



New Seabird Monitoring Pr



The Seabird Monitoring Programme (SMP) aims to ensure data on seabird breeding numbers and productivity are collected annually to enable their conservation status to be assessed.

Monitoring of 25 seabird species takes place throughout Britain and Ireland and is only possible through the dedicated work of approximately 500 surveyors, many of whom are volunteers.

The SMP database contains 85,000 colony counts and 18,500 productivity records (chicks fledged per pair). On average, surveyors contribute 1,900 records each year and these enable JNCC to deliver annual population (Figure 1) and productivity (Figure 2) trends.

Seabirds Count census

At the time of the last seabird census (Seabird 2000, 1998–2002), over 8 million seabirds bred in Britain and Ireland each year. Since then, evidence of widespread declines in productivity (number of chicks fledged per pair) have emerged which may be driving declines in breeding population size. To understand how seabird populations are changing, another complete census – Seabirds Count – is being undertaken to complement the annual Seabird Monitoring Programme (SMP) data.

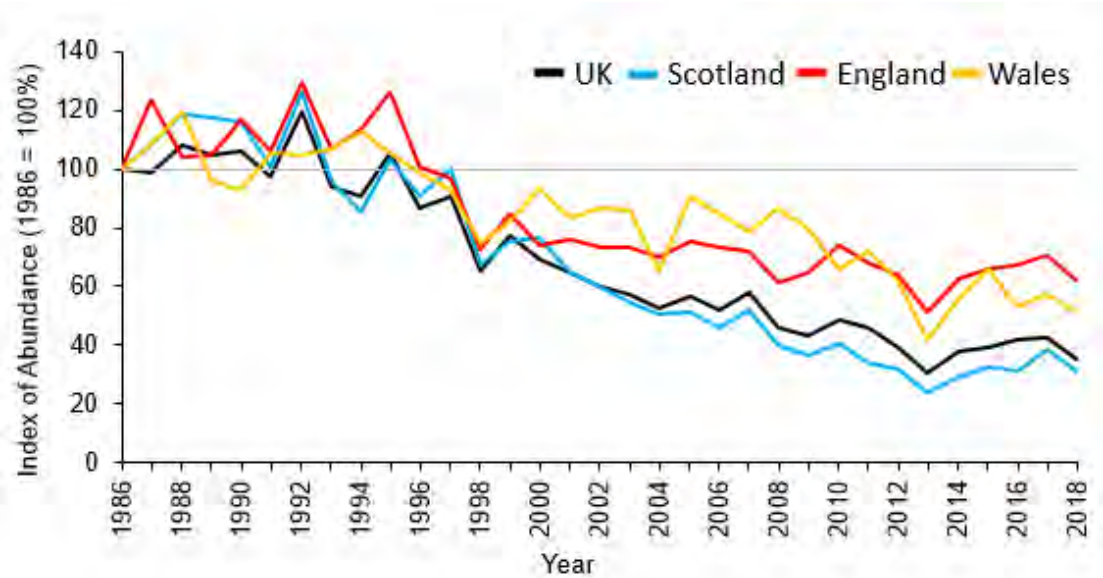


Figure 1. Trend in UK, Scotland, England and Wales abundance index of black-legged kittiwake 1986–2018. Based on SMP data; view the methods of analysis

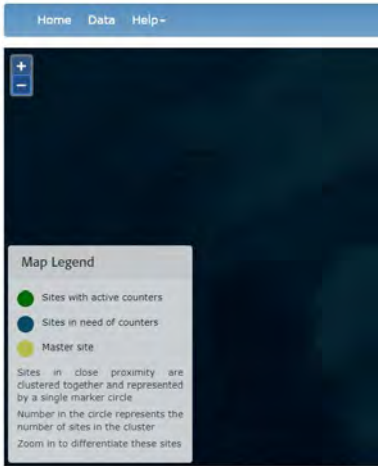


Figure 3. New seabird colony d

programme database launch

The SMP, which is co-ordinated by JNCC in partnership with 18 other organisations, launched a new seabird colony database on 30 April (Figure 3). The database, which was co-designed and built by BTO, provides a user-friendly environment to view and input breeding seabird data. It features a map browser, which includes Ordnance Survey and satellite layers, that allows users to search for colonies of interest and to download their associated data. The quality of data that are inputted will be improved through the use of validation functions. Data can be entered more efficiently by using drop-down menus and automated functions. In addition, colonies and sites can be allocated to registered volunteers more easily and provide the SMP with a better overview of counting progress and data input.

The data are freely available to view or download and comprise whole-colony counts going back to the 1960s and breeding success records since 1986. The database also includes count data from censuses that have been conducted since the 1980s: The Seabird Colony Register census (1985-1988), Urban Gull censuses (1976 and 1993-1995), Seabird 2000 (1998-2002), Seabirds Count (2015 to present) and the annual Seabird Monitoring Programme (1986 to present).

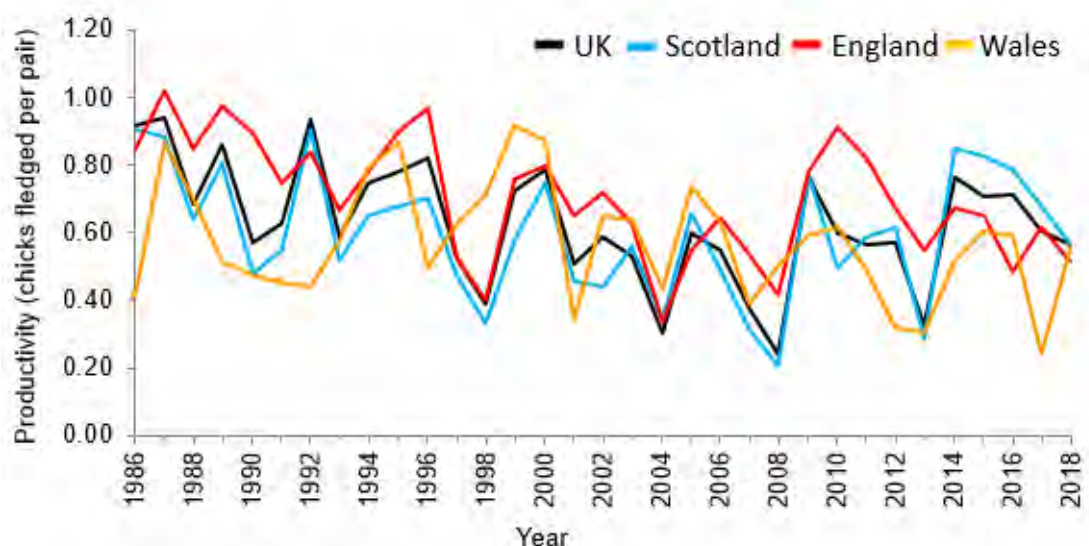
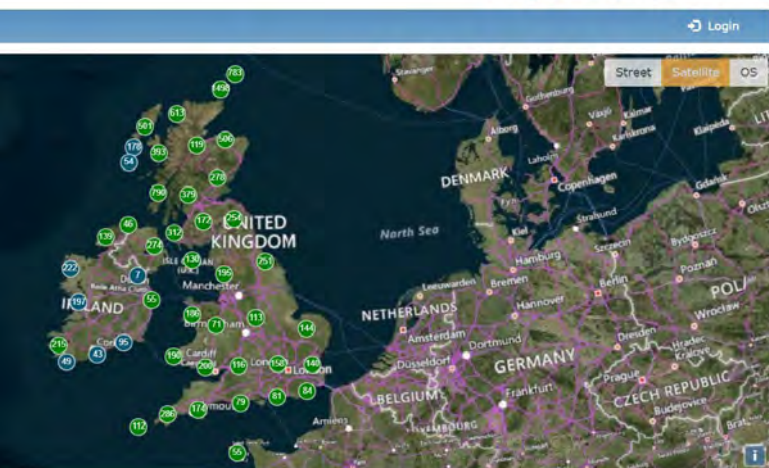


Figure 2. Trend in UK, Scotland, England and Wales productivity (number of chicks fledged per pair) of black-legged kittiwake 1986–2018. Based on SMP data; view the methods of analysis.

Seabird Monitoring Programme **SMP**



View the latest SMP report

The [Seabird Population Trends and Causes of Change: 1986–2018](#) for Britain and Ireland provides a single, comprehensive source of information on the latest trends in breeding seabird numbers and productivity, along with information on survival rates, diet and interpretive text on the likely causes of change based on the most recent research.



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Realising the BIG PICTURE



© Henk van Rein

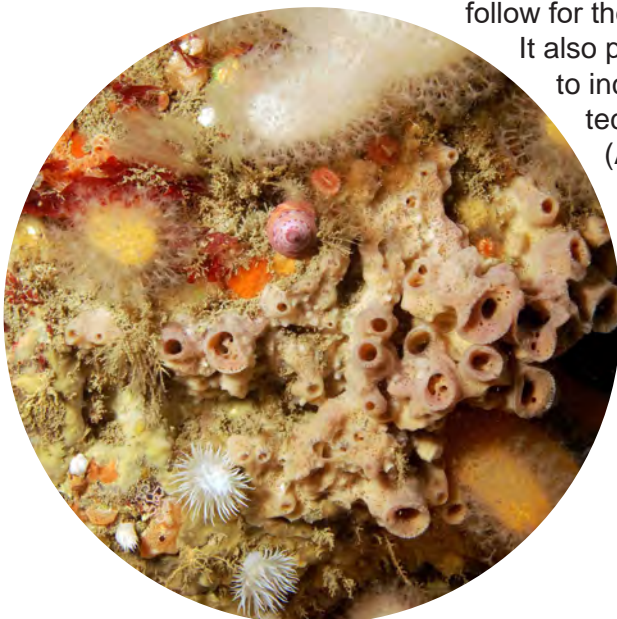
Last year JNCC led a three-day workshop, The BIG PICTURE, to tackle key issues faced by users of seabed photography and video imagery in the UK ([see Nature News article from May 2019](#)). These imagery media form the backbone of how the UK assesses the condition of biological communities on hard seabed habitats, including reefs, in national seabed monitoring programmes, forming a part of JNCC's commitment to provide high-quality evidence and advice on the UK's network of Marine Protected Areas.

The workshop was attended by a multidisciplinary group of 51 participants, representing 29 organisations spanning government bodies, research institutes, universities and environmental consultancies. Following informative and

productive discussions it was agreed that an action plan would be developed to take the work forward. Now, after a year's analysis of the workshop findings and close collaboration with our partners, the [UK Benthic Imagery Action Plan](#) has been published and is ready for implementation.

Under the governance of the North-East Atlantic Marine Biological Analytical Quality Control Scheme (NMBACQ), the Benthic Imagery Action Plan provides a strategic framework to coordinate necessary improvements to a wide range of seabed imagery analysis standards. This framework aims to serve as a 'road map' for collaborating organisations to follow for the next five years.

It also provides a means to incorporate cutting-edge developments in emerging technologies, such as autonomous underwater vehicles (AUVs) and machine learning, into future monitoring and assessment programmes.



© Henk van Rein



© JNCC

Given the variety of uses and variation in analytical methods, technology in this field, we need a co-ordinated effort to ensure collected is fit for purpose, consistent - Alison Benson

URE – a year further on...

JNCC continues to play an active role in the BIG PICTURE and implementing the Benthic Imagery Action Plan. A collaborative working approach will be explored to implement the plan across the UK, maximising the use of available knowledge, resources and technology across organisations. Support for this process is strong, best highlighted by Samantha Hornbrey and Stephen Thompson of the Eastern Inshore Fisheries and Conservation Authority (IFCA):

Eastern IFCA routinely use seabed imagery in support of responsible management of fisheries in Marine Protected Areas. We've our own relatively simple equipment to allow us to acquire the imagery, and we process and interpret data acquired in house. We've been very happy to be part of the "Big Picture" process since our attendance at the Birmingham workshop. As always, the opportunity to talk with other people working in the same field – with sometimes similar and sometimes very different approaches and challenges – is extremely interesting and informative. This is especially the case in a rapidly moving field such as the acquisition and processing of visual data. We applaud the project, and wish it future continued success - Samantha Hornbrey and Stephen Thompson, Eastern IFCA

The Benthic Imagery Action Plan makes a valuable contribution in improving the ways that we collect and process image data, which is an essential step for maximising the benefits of the community's research efforts and the successful implementation of marine policies - Dr Georgios Kazanidis, University of Edinburgh

For benthic imagery, the methods and the pace of we appreciate the value of a sure that the imagery, and that data is more n, Envision Mapping Limited



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Monitoring Celebrating five years of The N

In 2008, JNCC carried out an evidence review that identified an important gap that needed addressing – the ‘representative repeated sampling of habitats’. This led to a trail of events, including workshops, method development, field trials, the review and publishing of methods, that led to the 2015 launch of the new [National Plant Monitoring Scheme](#) (NPMS).

Throughout the process our experts worked closely with partners including UK Centre for Ecology & Hydrology, Plantlife, the Botanical Society of Britain and Ireland, the Department of Agriculture, Environment & Rural Affairs (Northern Ireland) and the country's nature conservation bodies.

Over the whole dataset, 3,413 plant species have been found on NPMS plots, representing 60% of the entire native flora of Britain and Ireland

Today we are celebrating the five-year anniversary of the NPMS. The scheme has made an impressive start; already over 1500 volunteer surveyors are signed up to the scheme, and approximately 15,000 surveys have taken place across the UK, with 150,000 plant records entered.

The scheme monitors habitat plots on random 1km squares, but these are weighted towards rarer, semi-natural habitat to encourage collection of sufficient data to tell us about these habitats. There are three difficulty levels that volunteers can survey at:

- **Wildflower level** includes a small number of easy to identify species;
- **Intermediate Indicator level** asks recorders to look out for a longer list of species that can indicate whether habitats are in good or poor condition;
- **Inventory level** caters for botanists keen to record all species in their plots.

Volunteers have been signing up across the range of levels, and we are thrilled that the scheme has welcomed an amazing 30% of volunteers who are new to plant recording!

With five years of plant records in the database, we are already seeing interesting stories emerge. Notably the results have been reflecting changes in climate, including the extreme weather event of the drought of summer 2018. During this time, the NPMS recorded increased bare earth as plants died, and also a change in the species composition of habitats. In particular, small annual plants and other delicate species struggled in the drought conditions, whilst other tougher species with deep roots were able to become more abundant. If extreme weather events like this become more frequent it is likely to have a significant lasting impact on the species diversity of our countryside.



ing focus:

National Plant Monitoring Scheme

Another climate-related observation is the shift in species ranges. Climate warming is likely to cause southerly species of warmer climes to move north, while those northerly species of colder climes may become threatened as the current habitat becomes less suitable, and there is nowhere else for them to go. With five years of data a short timescale to show robust evidence of such changes, the NPMS can be compared with other data sources (including historical biological records) to give an indication of impacts. The NPMS data indicate that some orchid species are expanding their range northwards. The Southern Marsh-orchid, a tall orchid of damp grasslands, was once restricted to the southern half of the UK, but results have come in from as far north as Newcastle upon Tyne.



© Anna Robinson

There is a wealth of information in the systematic data that have been collected through the NPMS, and with fieldwork temporarily suspended in 2020 due to Covid-19 restrictions, we are continuing to explore and analyse the data we already have. Work is underway to develop habitat indicators, so that we can bring the range of species records together to inform us about how different habitats are faring across the UK – whether they are doing well, or whether they are under pressure and in need of conservation action. This could be through targeted land management, or through more general policy measures such as those designed to reduce air pollution.

Data from the NPMS has also been of immense value in helping Natural England produce an easily updatable habitat map of England based on Earth Observation (EO) data. Field data is important to train and validate the EO models, and as more field data are collected the maps can be further refined.

The NPMS method is designed to be scientifically robust, as well as enjoyable and engaging for a range of volunteers with different levels of experience

The NPMS outcomes we are seeing now are the fruition of many years of preparation, partnership working, and the dedication of many citizen scientist recorders, without whom the scheme would not be able to run. So a big 'thank you' to everyone who has been involved, and here's wishing the NPMS a very happy fifth birthday.

The NPMS is organised and funded by the UK Centre for Ecology and Hydrology, Botanical Society of Britain and Ireland, Plantlife, Department of Agriculture, Environment and Rural Affairs (Northern Ireland), and JNCC. The NPMS is indebted to all volunteers who contribute data to the scheme.



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Conservation *Conversation*

This issue we focus on Steve Wilkinson, JNCC's Director of Ecosystem Evidence and Advice. During his PhD in marine biology he became more interested in analysis. Later, while working at the Great Barrier Reef Marine Park Authority, he realised the potential of making better use of computing and data sources to make better decisions in nature conservation. On returning to the UK in 1997

he took up a post with JNCC and went on to lead the Data Services team to do just that. He was appointed to his current post in August last year.



Q Species that inspired you as a child?

Marine molluscs and particularly chitons – a primitive and crazy looking group of molluscs. I was lucky to have parents who indulged my interest, including getting up at ridiculous hours of the morning to catch the tides to study them on the shores of Strangford Lough.

Q What concerns you most about the natural world?

Unsustainable development exemplified by climate change. This is a slow-motion train crash for the planet both from a humanitarian and biodiversity perspective. Covid has demonstrated that the world can act when it's an immediate crisis, but it seems incapable of really grasping this much more chronic and serious problem.

Q What do you do away from the office?

I've got into triathlons over the last year or so – it's a great way to leave the everyday stresses and strains behind. Beyond that we are still doing up the house we bought a couple of years ago and there are lots of little projects there. I still have aspirations to turn the cellar into a jazz bar (sadly not a vision my wife shares!).

Q Where is your favourite place?

Tough one – there are so many. Perhaps the Channel Islands. Lovely climate, geographically close, a network of green lanes, any number of honesty boxes with fresh local produce and fascinating beaches. A little glimpse of how the world was and what it could be!

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

David Attenborough, Douglas Adams, Lee Mack, Jacinda Ardern.

Q Who is your human hero in the natural world?

It's easy to choose the big names but I'd go for those that had time to encourage me when I was small – especially Bernard Picton at the Ulster Museum and the late Pat Boaden at Portaferry Marine Lab. We can't underestimate the importance of investing time in the next generation.

Q Desert Island Disc?

Dark Side of the Moon by Pink Floyd which I discovered in my student days and brings back good memories. Lots of good tracks on here for time alone on an island slowly going mad!

Q Place you'd most like to visit?

I've been lucky enough to get to quite a few but, with unlimited funds, Antarctica would be amazing to see and the trip would ideally include some diving.

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

To build a strong international advice function focused on integrating the importance of the natural environment within sustainable development. The potential impact here is huge both from a social and biodiversity perspective. I've been blown away by how the existing and emerging talent in JNCC has seized and developed opportunities in this space.

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

For me there never was another serious option. When I chose marine biology, I knew it wasn't going to be the easy career choice as there weren't that many jobs back then (I did wobble making that decision!). I'm now doing something I care about in an organisation where I'm surrounded by very talented and dedicated people and a good level of challenge. What's not to like?

