Science & Evidence in Natural England

An update from the Chief Scientist Directorate (CSD) - March 2019

Natural Capital Accounts published for our National Nature Reserves

Tim Sunderland, Ruth Waters, Cat Hudson and Jane Lusardi (Specialists and Evidence staff from CSD), plus Dan Marsh from the University of Waikato, worked together to produce natural capital accounts for Natural England managed NNRs. Using an innovative approach, and building on our ground-breaking Natural Capital Indicators, this report has sort to understand:

- The state of our assets (their quantity, quality and location);
- What ecosystem services they provide;
- What the benefits are;
- The economic value of the benefits.

Including all of this information side by side in one extended balance sheet makes our accounts more useful for decision making than presenting economic values alone. Confidence ratings for all data used are also included in the report to be as transparent as possible.

The benefits which were possible to value economically were benefits to cultural wellbeing (~£24 million/year) climate regulation (~£12 million/year) and provision of food and timber (under £.5 million/year). However, we believe the value of the benefits that were not possible to value economically are likely to be much larger. Download the report here.

Lead author appointment to the Intergovernmental Panel on Climate Change

Mike Morecroft (Principal Specialist for Climate Change) has become a Lead Author for the next assessment report of the Intergovernmental Panel on Climate Change (IPCC). This appointment is made by the IPCC, following a nomination by national governments. Over the next 3 years Mike will work with a team of international authors to write a review of the impacts of climate change and adaptation needs of terrestrial and freshwater ecosystems which will be published as one chapter in a large multidisciplinary report. The first step in the process was a meeting in Durban, South Africa in January. IPCC reports are reports to the governments of the world and have been instrumental in the development of climate change policy, including the UN Framework Convention on Climate Change and the Paris Agreement. An important element of the report this time will be a focus on practicalities and how adaptation and mitigation can be most effective, so this is both a good recognition of NE's standing and an excellent opportunity to learn from others at the cutting edge of dealing with climate change.

Setting plant species indicators for restoration of calcareous grassland

Natural England adviser Kate Fagan and Richard Jefferson (Grassland Specialist in CSD) were part of a multi-author team including scientists from the Centre for Ecology & Hydrology and the Universities of Reading and Liverpool that has just published a paper in the journal Ecological Indicators entitled Species indicators for naturally-regenerating and old calcareous grassland in southern England' in the journal Ecological Indicators. This was based partly on data collected by Kate for her PhD and on work from the Defra-funded project BD5101 Setting Indicators of success for species-rich grassland 2 for which Richard was the nominated officer.

The research used recent botanical data from calcareous grassland sites of known different ages of origin to determine which species are indicative of particular stages of natural regeneration and used correlation analysis to test whether the species colonization patterns matched those found by previous studies.

The results confirmed a high degree of congruence with the order of species colonisation in previous studies and indicated that establishment limitation plays a key role shaping the order of colonisation. That is, species strongly indicative of old grassland appear to have stricter establishment requirements.

The results of the research provide an insight into colonisation processes which will help inform the evaluation of grassland restoration progress under environmental land management systems. The work also re-affirms the special conservation value of 'ancient' grassland and the need to put a high priority on its conservation.

Historic mapping helps inform our work

Historic mapping can be used for a variety of purposes to support our work including: risk assessments for site visits, identifying habitat change, opportunities mapping to inform schemes, and engaging the public.

To help encourage the use of this information and to stream line the process of accessing it, a new **View Historic Maps** tool has been added to our internal web mapping system (WebMap2). This tool has been well received by users who are already commenting on how much quicker and easier it is to access this information.

Since its launch at the end of January, users have been making use of the new tool in a variety of ways including:

- In Derbyshire the historic maps have been used as part of health and safety checks. There is a strong lead-mining history in the area and the tool has been used to identify disused mine shafts before a visit.
- The tool has been used to locate old drainage ditches on wetlands.
- The historic maps have also been used to look at rates of landscape change such as boundaries or extent of old settlements and parkland.

MAGIC - Latest News

The National Historic Landscape Characterisation (NHLC) dataset was added to MAGIC in February. Each grid cell has a single record with information about the historic landscape character types (both broad types and narrower, character types) and period information. When viewed alongside other datasets, the NHLC data can act as an indicator of historic landscape character and can therefore feed in to landscape management decisions amongst other things. Further information can be found here.

Photo: Chalk grassland at Pegsdon Hills, Bedfordshire

Tracking Oystercatchers on Exe

The Exe Estuary was designated a Special Protection Area (SPA), a site of European importance for a number of reasons, one is that it supported nationally important numbers of wintering oystercatcher. Numbers have declined by over 50% in the last decade. To understand the key drivers for this decline we need first need to be able to identify birds as individuals

In February 2018 Natural England staff and a team of 45 licenced bird ringers took the first cannon net catch of 190 oystercatchers at Dawlish Warren since 2004. All birds were aged, weighed, measured and fitted with a uniquely coded metal ring before being released. 150 of these birds were also each fitted with a larger uniquely-coded colour ring, which can be read by observers at distance, allowing valuable information to be collected without having to re-catch or disturb the bird.

Following the first successful catch, Natural England secured Defra Capital Funding to purchase GPS tags to allow us to monitor movements every hour to understand how the estuary and wider areas are used. In November 2018 we caught another 53 birds and deployed 10 tags in a trial run, which are already providing some interesting data – see figures 1-4 below. We plan to deploy another 30 tags this autumn. The tags will collect data for up to three years so we will also gain valuable information on where Exe birds breed too. The colour rings have generated an incredible 2,500 re-sightings, mainly on the Exe Estuary allowing us to estimate over winter survival, but also in breeding grounds in Norway, Netherlands and Belguim.

The project is a great example of Natural England's Conservation Strategy 21 in action and has led to close collaboration with GWCT (Game & Wildlife Conservation Trust) who provided staff to fit the tags, and Exeter University to analyse the data. We are now exploring getting a PhD student to look at the information this exciting project is generating.

Oystercatcher (2L) with GPS tag on its back about to be released.

Figure 1: This adult was observed at a Golf Course outside of the SPA (arrow) in November 2018. It appears to move between feeding on the golf course and other feeding areas in the Estuary used by other tagged oystercatchers, indicating the importance of the golf course as functionally linked land.

Figure 2: This adult is the only one of our 10 GPS tagged oystercatchers which often leaves the Estuary to the south west along the Dawlish coastline. However, the Dawlish Warren is still the key site.

Figure 3: This adult is typical of the other 6 birds not displayed, with key areas being Dawlish Warren and Cockle Sands and other sandbanks (arrows). Further work will focus on the bird's activity whilst at these areas.

Figure 4: The only tagged juvenile bird. This bird initially spends its time between Dawlish Warren in the south and the cluster of points in an area just to the north of the Warren, with occasional visits to the north of the estuary. However, from 20th November the bird moves to the north of the estuary, only visiting Dawlish Warren once on 07 December. Previous work on oystercatchers in the Exe suggests that sub dominate juveniles are out competed from ideal feeding areas into sub-optimal areas such as fields.

Tim Hill, Chief Scientist, 20 March 2019