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No.12

The science of peatland restoration

RSPB CENTRE FOR CONSERVATION SCIENCE



Where science comes to life

RSPB CENTRE FOR CONSERVATION SCIENCE

While the RSPB is well known for its wonderful, wildlife-rich nature reserves, and for its annual Big Garden Birdwatch, it is far less well known for the remarkable scientific work it undertakes behind the scenes, in the UK and overseas. Yet, in reality, our scientific programme is an amazing asset, matched by few other conservation organisations. Because our scientific work has had a low profile with the wider public, many are unaware of the depth and breadth of our scientific knowledge. And it is this knowledge that informs all of our conservation work. Be that the way we manage our reserves to make them better for wildlife, the advice we provide to others, or the policies that we adopt and advocate to change hearts and minds in favour of nature conservation.

This case study forms part of a collection that aims to highlight RSPB science from the last decade. We have chosen these studies as they demonstrate great science, and have had, or are likely to have, a major impact on conservation.

The first ten case studies originally featured as part of the report (shown above) about the RSPB Centre for Conservation Science.

If you would like to receive a copy of the report, please email: consciadmin@rspb.org.uk

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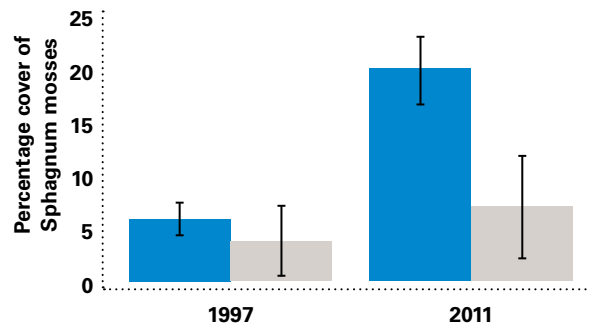
Peatlands in their natural state – which include wetland habitats such as bogs and fens – support a distinctive community of plants and animals of national and international conservation interest. These include characteristic Sphagnum bog mosses and wading birds like greenshank and dunlin. Peatland soils also contain huge quantities of carbon, accumulated from the atmosphere over thousands of years. When these soils are damaged, for example by drainage, cultivation or extraction, greenhouse gases can be released, contributing significantly to climate warming.

One of the most important peatland sites in Britain is the 'Flow Country' of northern Scotland, where RSPB has its largest reserve: Forsinard Flows. This area was extensively damaged in the 1980s by inappropriate forestry planting on deep peat soils. Work led by RSPB scientists has shown that, as well as direct habitat loss, this afforestation has deleteriously affected birds on adjacent intact bogs, probably contributing to major declines of breeding wader populations in the area.



The response of bog mosses to peatland restoration

Ground slope: ■ Less than 3° ■ More than 3°



Recovery of Sphagnum bog mosses in a formerly afforested peatland area on RSPB Forsinard Flows Reserve. Restoration - involving tree felling and drain blocking - commenced in 1997, with the most recent monitoring in 2011. Sphagnum cover has increased approximately four-fold in less sloping areas, which make up about 80% of this restoration area. But where the slope exceeds 3°, Sphagnum recovery may require further management.

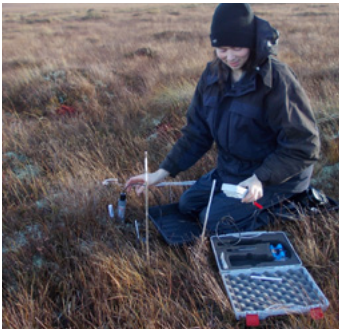
Since the late 1990s, we have been removing forestry plantations on deep peat soils in the Flow Country, and restoring them back to blanket bog. Tree-felling and drain-blocking helps to re-wet the ground, encouraging the recovery of bog habitats. We have monitored this restoration, measuring the gradual recovery of bog conditions, such as the return and expansion of all-important carbon-capturing Sphagnum mosses. Similarly, at both Forsinard and our Lake Vrynwy reserve in Wales, we have shown that blocking old agricultural drains on open bog leads to the recovery of bog hydrology and vegetation, with no detriment to upland farming, and with potential benefits to flood risk reduction by reducing peak flows in drains and streams.



Researchers from the universities of Stirling (PhD student, Renée Hermans) and the Highlands & Islands (ERI Field Technician, Rebecca McKenzie) investigating greenhouse gas dynamics in a peatland restoration area on RSPB Forsinard Flows Reserve, as part of a PhD study part funded by RSPB.



The dunlin - a small wading bird - is one of the special breeding birds of UK peatlands. Chris Gomersall (rspb-images.com)



RSPB research assistant (Paul Stagg) monitoring surface moisture content on RSPB Forsinard Flows Reserve, in an undamaged area of bog, to obtain comparison data for peatland restoration areas. Photograph by Mark Hancock

Recently, we have secured funding from the Scottish Government to measure the effects of bog restoration on the carbon stored within peat soils, and changes in water quality. Working with the universities of St. Andrews, Stirling and the Highlands & Islands, we have commissioned three new PhD studies, complementing a range of related work led by a number of other academic partners. Additionally, RSPB scientists are carrying out a new phase of monitoring, on areas currently being restored from forestry to bog, measuring the biodiversity effects of the latest restoration management techniques.

We are also involved in peatland science overseas. In partnership with universities (Greifswald, Germany) and NGOs (APB BirdLife Belarus), we have been studying the climate and biodiversity benefits of restoration of over 200 km² of damaged raised bog and fen complexes in Belarus. This work is estimated to have prevented over 30,000 tonnes of CO₂ equivalents per year being released to the atmosphere.

Our work on peatland restoration, originally developed for biodiversity objectives, has ever wider interest and greater urgency because of rapid, man-made climate change. Working with a wide range of partners, our science is focussed on providing the knowledge to support this crucial conservation action.

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RSPB is unusual, in employing both land management and science staff within one organisation. As well as nature reserve managers who are keen on science, we have scientists who are keen on nature reserve management - like me. My work focusses on testing conservation management techniques. Some of these are quite bold and novel: will they deliver the outcomes we desire? I work closely alongside RSPB reserve staff, who bring a hugely diverse set of skills and insights to these projects. Together, we set up monitoring schemes and where possible, replicated field trials. Luckily for me, my work is focussed in the stunning ancient pinewoods, the wide open blanket bogs and the lovely hill lochs of northern Scotland. Fieldwork can be fun, but my favorite part of the job comes when you analyse the data and open a new window onto the natural world.



Dr Neil Cowie

Senior Ecologist

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I have worked in Reserves Ecology team since 1997. Latterly I have taken on the role of Regional Reserves Ecologist for the North Scotland region, which includes the RSPB's largest reserve at Forsinard, and lies at the heart of the Flow Country peatlands. I take a lead role advising on the ecological management, research, survey and monitoring of upland, peatland and woodland habitats, along with inter-tidal habitat management and creation in Scotland. I am a keen naturalist and outdoor enthusiast, and spend as much time as I can outdoors exploring new places above and below water.

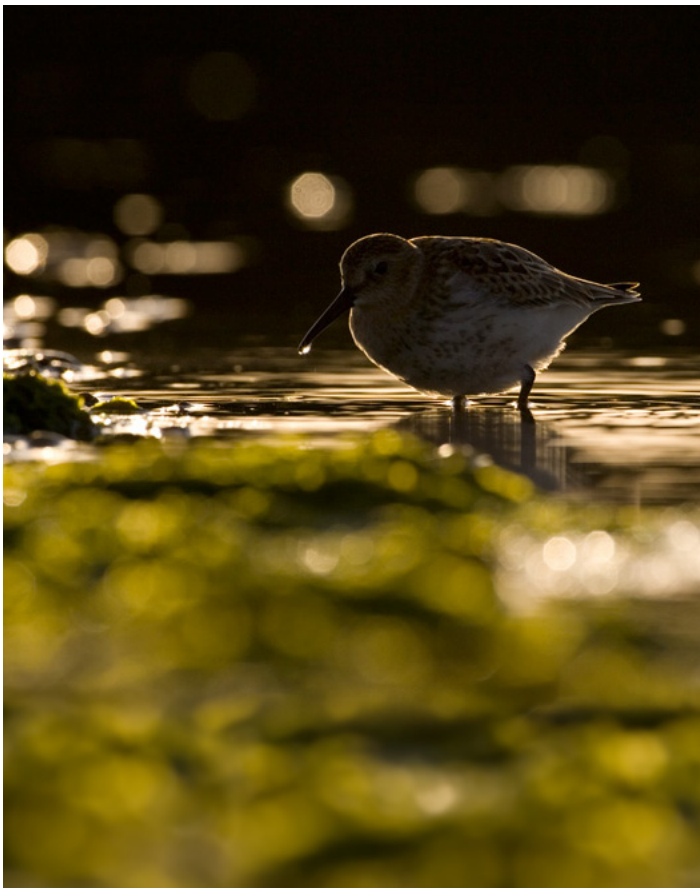


Dr Rob Field

Senior Conservation Scientist

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I study the effects of land management changes on wildlife and people; the interactions between Ecosystem Services and nature. I'm particularly interested in the carbon and nitrogen storage and cycling in ecosystems and their impacts on climate, using a variety of methods (mostly involving mud in some way!), from digital mapping to soil sampling, bird surveying to crop-yield mapping. Previously I studied farmland birds and farming techniques and marine fisheries. I'm a qualified bird ringer and enjoy all natural history, all on hold, as I'm building a low carbon house.



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