Issue 4 Summer 2017

BogLIFE

Bringing Lowland Raised Bogs to Life

More Bogs Bounce Back to LIFE

Welcome to this summer edition of the BogLIFE newsletter.

As well as the usual updates from the Cumbria BogLIFE and Humberhead LIFE project teams, we are pleased to be joined by **Marches Mosses BogLIFE**, a partnership project between Natural England, Shropshire Wildlife Trust and Natural Resources Wales. You can read more about what they are getting up to on this exciting project on the next page.
Also in this edition:

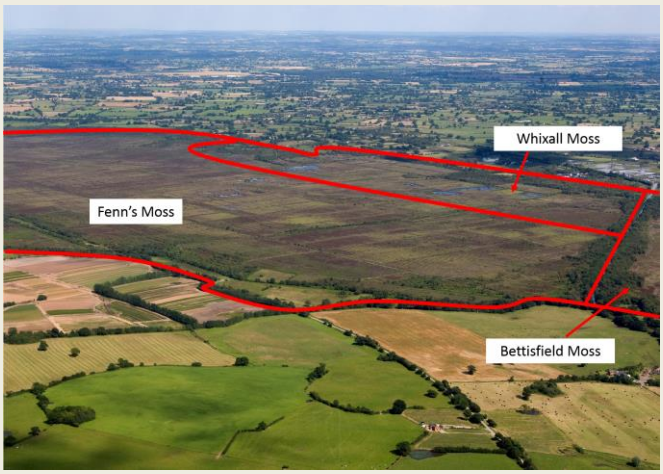
- A write up on the demonstration event at Thorne Moors, looking at how they have been trying to reduce evopo-transpiration on their bogs.
- How the University of York have been measuring the cultural benefits of the Humberhead LIFE project.
- A look at how Cumbria BogLIFE is monitoring Greenhouse gas emmissions at their restoration site at Bolton Fell Moss
- Why has Cumbria been invaded by UFO's?

Moths on the Moss
These bog specialist moths were recorded by volunteer Guy Broome on Bolton Fell Moss. Light Knotgrass (left) feeds on bog myrtle and Grey-Scalloped Bar (right) on *Calluna* and *Erica.*

LIFE+
The LIFE+ Programme is the European Union's funding instrument for the environment. Funding is awarded to best practice, innovative demonstration projects that contribute to the objectives of Natura 2000.

Marches Mosses BogLIFE project: An introduction

An exciting new five year EU LIFE/HLF funded project is underway to restore 665ha of raised bog SAC habitat at a complex of sites near Whitchurch, Shropshire and Wrexham, made up of Fenn's, Whixall and Bettisfield Mosses NNR and nearby Wem Moss NNR. The project, which started in 2016 and will run to 2021, is led by Natural England in partnership with Shropshire Wildlife Trust and Natural Resources Wales and will see a step change in the restoration management of the site. It is Britain's third largest raised bog and commercial peat cutting ceased in 1991 after a strong local campaign to save the bog. The project will also see the acquisition of a further 63ha of the surrounding peatland and the improvement of the water quality and levels across the NNR to increase the extent of bog including edge lagg habitat.



Aerial view of Fenn's, Whixall and Bettisfield Mosses NNR

Practical Restoration

Large scale restoration work commenced here in October 2016 with works to include:

Raising Water Levels to improve the health of the bog through better retention of rainfall, using a combination of both tried-and-tested and innovative restoration techniques including contour bunding, ditch damming and the readjustment of some of the current dams.

Improving Water and Air Quality through the diversion of a mineral-rich ditch, which currently runs across part of the bog, and the clear-up of a former scrapyard, which sits on deep peat besides Fenn's Moss. A programme of turfing, reseeding, scraping and mowing will be used to try to alleviate some of the effects of aerial pollution on the bog. We also plan to carry out an ambitious study of the aerial nitrogen pollution affecting the site, working to reduce this through engagement with local landowners.

Reversion to bog of selected areas of plantation conifers and secondary woodland on deep peat across all three sites.

Project work on the land south of Whixall Moss will include the removal of a scrap yard (central in the photo)

NATURAL ENGLAND

Marches Mosses BogLIFE Project continued….

Restored bog habitat at Fenn's and Whixall Mosses

Monitoring

Detailed monitoring will be carried out through the life of the project to inform the ongoing work, assess the success of the project and inform current and future restoration projects.

Fenn's, Whixall and Bettisfield Mosses and Wem Moss benefit from a long history of on-site monitoring, including an extensive network of water level monitors, long-term fixed vegetation monitoring plots and water and air quality data. As well as continuing to monitor these, we will be looking to extend this monitoring network into the new areas being worked on in this project. We will also be assessing the effect of the project on rare species which use the site, including the endangered caddisfly, *Hagenella clathrata*, Cotton's Amazon Spider, *Glyphesis cottonae*, and the near threatened Eurasian Curlew, *Numenius arquata.*

We will also be assessing the project's effect on ecosystem services and functioning, including global climate regulation, air quality and cultural services. As part of this, a study of the socio-economic impacts of the project will be undertaken as well as an assessment of the wider engagement of the project with both the local and professional communities.

Partnership Working

We are looking forward to working closely with both the Cumbria BogLIFE Project and Humberhead Peatlands Project, learning from the experiences of the project teams and sharing our own insights into best practice techniques for lowland bog restoration. Both of these projects are at the forefront of peatland restoration, using cutting edge techniques, and we are excited about sharing our experiences in a programme of events over the next 5 years.

The Cumbria and Marches Mosses BogLIFE teams on a recent knowedge sharing get together at Cors Caron NRW.

Genevieve Dalley

For more information about Marches Mosses BogLIFE project contact:
Robert Duff, Project Manager
Robert.Duff@naturalengland.org.uk

NATURAL ENGLAND

The Humberhead Peatlands LIFE+ project

This 3-year project was due to end in June 2017. We have now been granted an extension until the end of June 2018. This will allow treatment of rhododendron regeneration to continue through the summer months and further scrub clearance in the winter of 2017-18. The additional 2017 field season has also allowed us to extend monitoring for nightjar, invertebrates and vegetation.

Evapo-transpiration Demo Day

In May, we held two workshops to showcase our work to reduce evapo-transpiration and assist the stabilisation of water levels. They were led by Mark Outhwaite (Assistant Project Manager) with help from the LIFE+ estate worker team.

Evapo-transpiration workshop

The range of work across reserve compartments was explained, reflecting the different combinations of work force and method appropriate to each site.

For example, at “Casson’s Gardens” visitors saw the effects of intensive mechanical flailing by contractors on dense, impenetrable, 15 foot high *Rhododendron ponticum*. Pockets of heather and cotton grass were colonising the newly available space (below).

Elsewhere, 23ha of sphagnum and cotton grass were revealed by just 1 week of contractor work this winter, through the deployment of 4 excavator disc flails and a modified ‘snow cat’ mulcher (below).

Example of scrub cover in 2015

23ha site following clearance, May 2017

Ed Brightman, Project Supervisor
Humberhead LIFE+

For more information about the Humberhead LIFE+ restoration progam contact:
Edward Brightman, Project supervisor
Edward.brightman@naturalengland.org.uk

NATURAL ENGLAND

Cultural Benefits on the Humberhead Peatlands

Healthy peatlands deliver a range of vital ecosystem services such as carbon and water storage, but could also provide a number of important cultural ecosystem services (CES). These include opportunities for recreation, education, and aesthetic and spiritual experiences. Natural England is collaborating with the University of York as part of the socio-economic monitoring for the LIFE+ project. Together they are evaluating the impact of the restoration work on the cultural benefits provided by this unique landscape, as perceived by local stakeholders. To do this, the team is using a mixture of 'socio-cultural' valuation methods to identify cultural benefits, including: a questionnaire, specialist interviews and a visitor employed photography (VEP) method.

The Baseline

From April to June 2016, a survey of local residents and visitors was conducted to collect baseline data on CES benefits associated with the Peatlands. Three survey techniques were used: a postal survey distributed to local households, an identical online survey open to the public, and face-to-face administration of the same survey at local events.

A key part of evaluating CES benefits was to understand people's motivation for visiting the peatlands, thus revealing what is special and valued by people and how they expect to benefit from their visit. For this reason, the data collected in the questionnaire were designed to provide an insight into: visitor behaviour; which factors affect people's enjoyment or satisfaction with their visit; and any change in people's behaviour as a result of restoration activities. In total, data were collected from 320 visitors.

The Bigger Picture

This year, members of the local community were invited to take part in a series of 'Photo-Quest' activities on the peatlands. The activity was advertised as a way of giving people an opportunity to explore the value of the Moors through photography as well as learn how to use a GPS device. The aim of the Photo-Quest was to collect in-depth qualitative data and geo-tagged photographs. They will be used to explore CES benefits associated with peatlands and, crucially, why they are important and how they are underpinned by specific landscape attributes and the overall character of the peatlands. These data, combined with expert knowledge of restoration effects on different environmental features, will allow us to assess the overall impact of the LIFE+ project on the supply of CES benefits, now and in the immediate future.

Hannah Curzon, Doctoral Researcher, University of York

For further information about the Humberhead Peatlands LIFE+ monitoring programme contact:

Dr. Richard Smith, Monitoring Officer:
richardsmith@naturalengland.org.uk

NATURAL ENGLAND

Cumbria BogLIFE: Monitoring greenhouse gases during the restoration process

When lowland raised bogs are in poor condition with little vegetation, they will release large amounts of carbon dioxide, contributing to climate change. In contrast, a restored bog should help to store carbon, through more uptake of carbon than release. For this to occur, the native vegetation is particularly important, especially the *Sphagnum* bog mosses. Our monitoring work will help to show how carbon dioxide, methane and nitrous oxide emissions change after restoration, and how quickly these changes occur.

How we are doing it

To measure greenhouse gas emissions we are using 'static chambers' which sit on the peat producing an air-tight seal. We take air samples from the chamber every five minutes. These samples are sent off for analysis which shows us the build-up of greenhouse gases from that part of the bog. We have 20 of these locations around the site which we measure every month.

Light and dark chambers

We use two different sorts of chambers, which give us different pieces of information about greenhouse gas emission from the peat. One chamber is transparent which means sunlight reaches the plants and therefore measures changes in carbon dioxide caused by plant photosynthesis, as well as respiration from plants and living organisms in the peat.
The other chamber which is opaque, leads to dark conditions for the plants, and in turn leads to them shutting down photosynthesis. The opaque chambers therefore only measure the release of carbon dioxide from plants and the peat and reveals how much plant photosynthesis is counteracting the release of carbon dioxide.

Attaching one of the dark chambers

Gas samples are taken using a syring. This photo shows one of the transparent chambers.

Gas in transfered in to evacuated vials to send off for analysis.

Measuring surrounding conditions

As well as the greenhouse gas, at each sample site we measure soil temperature using a digital thermometer with a probe to stick in to the ground, and air temperature. Photosynthetically active radiation is also measured alongside each gas sample. This data is vital to discover how these factors influence greenhouse gases.

For further information about the Cumbria BogLIFE+ monitoring program contact:

Dr Andy Cole, Monitoring Officer
andrew.cole@naturalengland.org.uk

NATURAL ENGLAND

Workshops, Conferences and Demonstration days

History and Heritage of the Bogs and Peatlands of Cumbria and Surround Areas.

With Cumbria BogLIFE, Natural England, the British Ecological Society (BES), Peatlands SIG, UKECONET/Biodiversity Research Groups (BRG) and partners.

1st & 2nd November 2017
Burgh-by-Sands, near Carlisle, plus site visits

This event will explore the history and cultural aspects of peat bogs in and around Cumbria and the surrounding areas. It is aimed at both local people as well as professionals, with a view to produce a published volume from the event.

Day 1 – indoor lectures, Day 2 – field visit followed by indoor session to discuss and round up.
Themes and topics include:

- The history of peat bogs
- The history of peat harvesting and usage
- Heritage of peat cutting – tools, equipment, buildings etc
- Historic records
- Archaeology of peat-cut sites
- The oral histories and memories
- The conservation of peat cutting heritage
- And more!

Offers of papers and posters still welcome, contact Dr Ian Rotherham:
I.D.Rotherham@sch.ac.uk

For booking details: www.ukeconet.org

Dates for the Diary

Humberhead Peatlands LIFE,
End of project Conference:
Tuesday 15th –Wednesday 16th May, 2018, in Doncaster.

More details to follow soon.
For information, contact David Hargreaves,

David.hargreaves@naturalengland.org.uk

Demonstration Days

Exact dates are still to be confirmed, but Cumbria BogLIFE will also be running these demonstration events this winter. Keep a look out for more information!

Rhododendron Removal at Roudsea Woods and Mosses NNR, Cumbria.

A demonstation day for land managers, looking at the techniques the Cumbria BogLIFE team have been using to remove this invasive plant, as well as a look at some of the issues encountered.

Edge Work and Sphagnum Farming at Bolton Fell Moss, Cumbria

A chance to see progress to date, and a look at how the Cumbria BogLIFE team are tackling restoration of the bog edge. Also an introduction to the Sphagnum farming project being set up at this site by Deborah Land.

For more information, or to register an interest, please contact Keeley Spate
keeley.spate@naturalengland.org.uk

For further information about the Cumbria BogLIFE workshops, please contact Keeley Spate:
Keeley.spate@naturalengland.org.uk

NATURAL ENGLAND

Black Darter (R Petley-Jones, NE)

Contact us

Cumbria BogLIFE
Tony Devos, Project Manager
tony.devos@naturalengland.org.uk
www.facebook.com/cumbriasnnrs
@NECumbria

Humberhead Peatlands
David Hargreaves, Project Manager
david.hargreaves@naturalengland.org.uk
www.facebook.com/humberheadpeatlands
@NEYorksNLincs

Marches Mosses BogLIFE
Robert Duff, Project Manager
Robert.duff@naturalengland.org.uk
www.facbook.com/Fenns-Whixall-and-Bettisfield-Mosses-National-Nature-Reserve

The UFO's have landed @CumbriaBogLIFE

Ruth, Andy and Chris get to grips with gas sampling

Well, not quite, but its one way the scattering of gas chambers across Bolton Fell Moss was described in our Twitter take over day!

Dr Ruth Gregg, Senior Specialist for Soils and Climate change, and the Cumbria BogLIFE team, were invited to "take over" the twitter account of Natural England's Chief Scientist, Tim Hill. The focus was bog restoration, and greenhouse gas monitoring.

Co-ordinated by Dr Corrie Bruemmer, from the Specialist Services and Programs Team, the tweeting went out in the 18th July. All the leg work was done before hand to make sure the day went smoothly, including a day out in the field to take photos and writing up the tweets.Tweeting started at 7am all the way through to 6.30pm, with Ruth on hand to answer questions.

Was the take over a success? Well Tim increased his following by 33 people in one day, Ruth was contacted by a PhD student wanting to compare data, and has been asked to give a presentation at a conference for geography teachers next year. We even seemed to reach a new audience, with people interested in the "paranormal" re-tweeting our posts!

If you are interested in following Tim, you can find him @NEChiefSci

www.gov.uk/natural-england

Cover Photo © Rob Grange