

THE LITTLE OUSE HEADWATERS PROJECT

# News from the Ouse

## Special Peat Edition

October 2018



Helen Smith

Some very glamorous plants depend on peat - this is an unusual yellow-white example of the usually-pink Early Marsh orchid



Sally Mills - **The Fisherman**  
More art on page 7-8



Cooking on peat  
see page 6

Dev Blackburn

**T**his year the LOHP has been focusing on something easily overlooked but vital to the health of our valley fens - the peat beneath our feet.

Fen peat is a rare commodity that has played a role in our social history, providing hard-won fuel for past residents, as well as creating the unique wetland landscape and associated wildlife that we are restoring and managing today.

We hope you enjoy this special edition of the newsletter.



Chris Blackburn

A well-supported and well-attended art exhibition formed part of the Peat Fest in May

# Meet the Peat

Mike Harding is a local ecologist and specialist in fens and wetlands, who provides occasional advice to LOHP. Here he gives an overview of peat, its history, importance and the care it needs.

## What is peat?

Peat is an accumulation of the remains of dead plants which have not decayed or disappeared after they died. Peat is formed under waterlogged conditions: saturation with water severely reduces oxygen, inhibiting the animals and fungi which break down dead material, stopping decomposition. Plant breakdown is slowed even more in very cold conditions such as in the uplands, or in the acid conditions found in *Sphagnum* bogs. The result can be a spongy, soggy, dark-brown mass we know as peat. Where wetland conditions continue for centuries or even millennia, the deposit can be many metres deep.

## Where is it found?

There are peatlands in many parts of the world. Most are in the cold or temperate regions of the north – in Russia, Canada and Scandinavia. But they can be found



Mike Harding leads a walk at the Peat Fest

everywhere that saturated conditions exist all year – including the tropics. Because of our cool climate and high rainfall, peat is common in Britain, especially in the north and west. But East Anglia has a lot of peat too – the old Fenland of Cambridgeshire is mostly peat, and there are the famous Broads of Norfolk and Suffolk which were dug from deep deposits of peat in medieval times. At the heads of river valleys where aquifers historically oozed water at the ground surface, fens grew on the developing peat. These are the valley peat deposits we see at the top of the Little Ouse and Waveney valleys.

## How long does it take to form peat?

It is difficult to know exactly how long peat takes to form, but we do know it is slow. A good estimate is that 21-60cm of peat can accumulate in every 1,000 years. So, where it forms slowly, a metre of peat could be anything between 1,500-5,000 years old. In warmer conditions, where waterlogging is variable, or where the peat is flushed with less acid water, peat will accumulate more slowly. It is likely that the peat in our local valleys has built up quite slowly.

## Is peat useful?

Because it retains water like a sponge and is low in nutrients, peat grows wonderful wetlands. Wetlands where the peat is in good condition support many types of rare animal and plant communities. Healthy peat is the secret to the best areas of fen in the Little Ouse valley.

Peat is a great store of carbon. It's the youngest and softest part of the sequence that passes from peat to lignite ('brown coal') to true coal. When peat is dug and dried, the resulting turves will burn and can be used as fuel. In medieval times in Broadland, peat excavation and burning was on an industrial scale, but in the Little

Ouse valley, peat digging was a more domestic affair. Families dug peat for their own use from the local fens. This all ended when coal (which burns much hotter) became cheap and easily available when the railways arrived. Extensive peat digging rapidly declined at the start of the 20th century, but still happens on a small scale in parts of Scotland and Ireland. Because of its slow rate of growth and organic nature, peat is thought of as a fossil fuel. Like all fossil fuels, burning peat releases carbon and increases global warming.

Peat also plays an important role in absorbing rainwater and slowing runoff, so reducing flooding downstream.

## Why peat has no place in your garden

Peat was used for many years in gardening because it improves organic matter and soil nutrients. Horticultural peat is extracted on a huge scale and continues to be damaging to the wetlands it is dug out from. This harms wildlife, and for this reason gardeners are urged to use peat-free alternatives.

## Meet the family

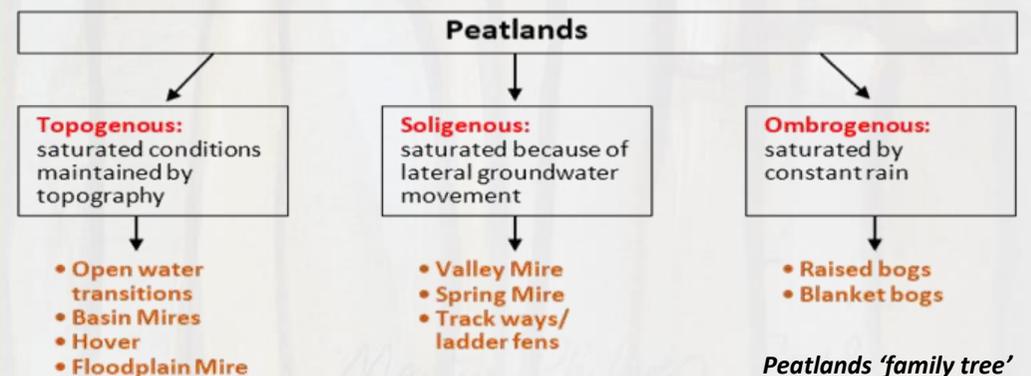
Different kinds of peat develop in different places in the landscape. They can be fed by different types of water which gives them a different character and ecology. This 'family' of peat has been studied for

decades. The family tree below gives a simplified introduction to it.

**Topogenous** wetlands form on flat ground or in hollows, where water from rain or surface water flooding collects. Water tables are maintained at the ground surface because of poor drainage. These kind of wetlands form in boggy hollows, around lakes and in the floodplains of 'lazy' rivers. The Broads are classic floodplain wetlands of this kind.

**Soligenous** wetlands are saturated by groundwater moving from aquifers in the chalk or the valley sands into the valley margins. These are common in the Little Ouse valley. Flows from aquifers to the ground surface are rare and depend on uncommon geological conditions. They are generally much smaller than topogenous peatlands.

**Ombrogenous** wetlands are fed entirely by rainfall, rather than water from aquifers, the ground or rivers. They are the most common wetlands in the west and north of Britain where rainfall is high. They are generally acid in character (rainwater is just on the acid side of neutral) and form raised bogs or the blanket bogs that cloak moorland. Built by spongy *Sphagnum* moss, they are the usual source for gardeners' 'moss' peat.



### The plants that make peat

Different kinds of peat are made from different types of plant. Because peat preserves things, we can tell which plants make up the peatland.

Topogenous and soligenous wetlands, fed by more nutrient-rich river and aquifer water from the catchment, are richer in nutrients and higher in pH than rain-fed ombrogenous wetlands. Peatlands sustained by catchment water generally develop from mixed fen: reed, sedges, grasses and other herbs. This is generally called *fen peat*.

Where fens have gone through a period of scrub or woodland cover, the peat can be full of woody debris from willow and alder. It forms a very dense material called *brushwood peat*. This is uncommon in the Waveney-Ouse valleys but very characteristic of deeper peat in the Broads.

The mildly acid, low-nutrient, rainwater-fed ombrotrophic bogs develop from bog moss (*Sphagnum*) and blanket bog plants such as cotton grass. *Sphagnum* has the ability to control its own environment by retaining water and making the soil water more acid. Both make the ground more favourable to *Sphagnum* and less favourable to many other plants. Hence *Sphagnum* is a real bog builder. Many bogs have great depths of *Sphagnum*/cotton grass peat which, unsurprisingly, is known as *moss peat*.



Archaeologists examining peat cores during the HLF-funded restoration of Framlingham Mere

### Peat tells us about the past

These are the main constituents of peat, but many varieties of each have been described by academics. Sometimes a peat deposit will have layers of different types of peat – possibly all three – and these tell us a lot about how past environments have changed, favouring first one type of peat and then another. Environmental scientists can use this information to understand how a landscape has evolved, or how climate has changed over time in a particular place.



Coring into the fen peat - 2017 Blo' Norton Fen

Well preserved peat also contains a complete record of the vegetation that grew in that location. Pollen from flowers falls into the water and becomes incorporated into the peat. We can tell which species of plant grew in that place from the pollen it shed, and hence reconstruct the changing sequence of habitats that dominated the landscape over thousands of years.

Peat, then, is a document that can be read by those with the eyes (and equipment) to read it. What a waste to just burn it, or tip it onto the garden!

### Rotten peat

When peat dries out through climate change or in more recent times because of drainage, it starts to rot. The structure of the dead plants progressively degrades and instead of consisting of whole plant fibres the peat starts to, quite literally, fall to bits. As the spaces between plant fibres fill up with plant fragments, the peat's ability to retain water declines. It becomes less spongy, more solid, and darkens to blackish brown or even black. Progressively, the plants become less recognisable, until in an advanced state of decomposition the peat is granular or even powdery, preventing water movement, and gradually releasing stored carbon into the atmosphere. The peat at the surface becomes 'earthy' and releases nutrients previously locked up in plant fibres. Because the wetland is now drier and more fertile, it grows less diverse plant communities, dominated by a few vigorous species, with more non-wetland species, more scrub, and far fewer of the smaller, less common fen plants so valued in conservation. This kind of degraded peat is called *humified peat*.



New pool restored at Redgrave and Lopham Fen

### Conserving peat

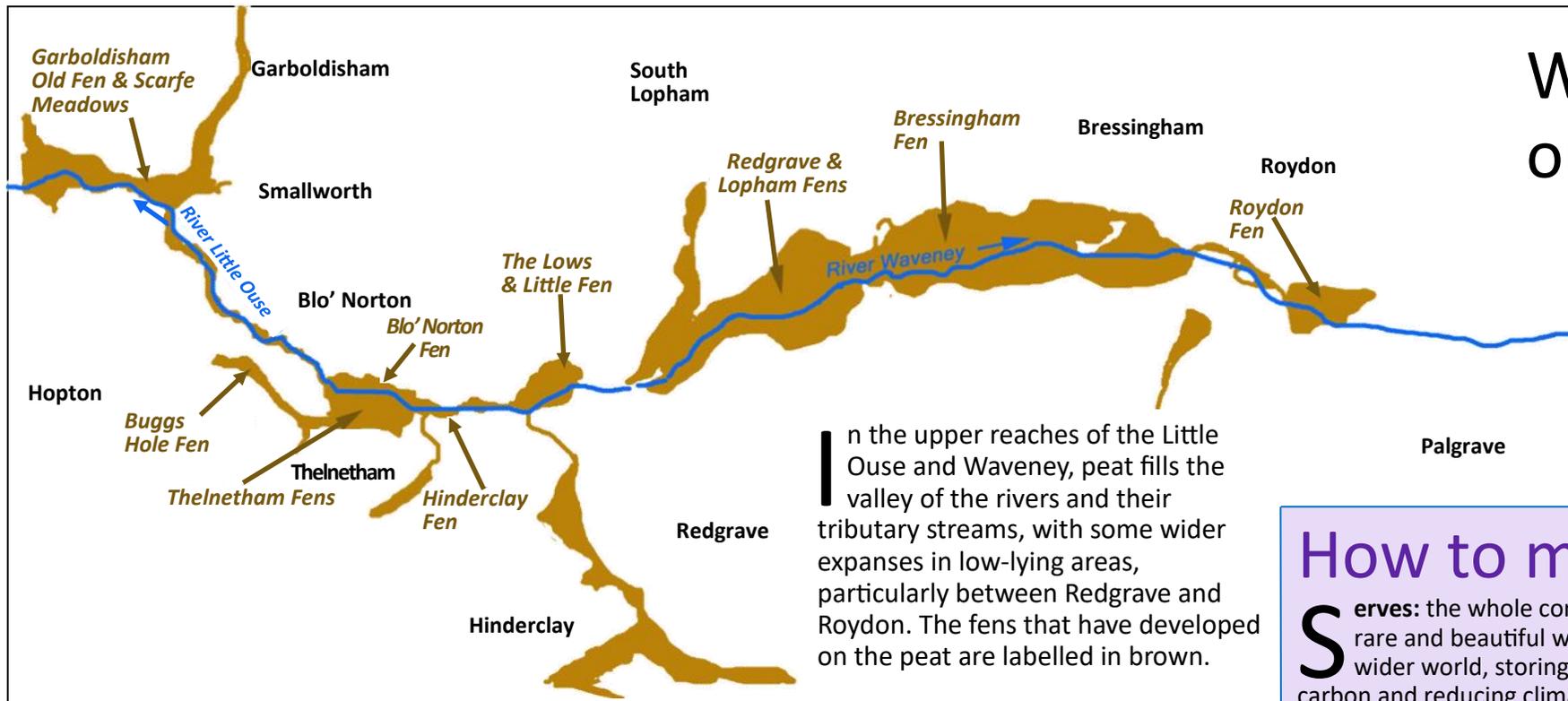
Peat is critically important. It is the brown gold under our feet. Peat underpins some of our rarest and most important habitats, and provides an irreplaceable archive of environmental change. Any effort to conserve our wetland wildlife must always start with conserving the peat itself and the water sources that feed it. Without these measures, no amount of mowing, grazing and scrub clearance will maintain wetland wildlife. Preventing drainage - or reversing past schemes - is the first step in restoring lost wetlands.

Mike Harding



A newly installed sluice for a fen restoration project in Broadland

# Where's our peat?



In the upper reaches of the Little Ouse and Waveney, peat fills the valley of the rivers and their tributary streams, with some wider expanses in low-lying areas, particularly between Redgrave and Roydon. The fens that have developed on the peat are labelled in brown.

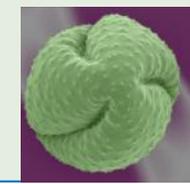
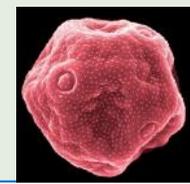
## How to make peat

**S**erves: the whole community, including its rare and beautiful wildlife. Also benefits the wider world, storing massive amounts of carbon and reducing climate change.

## Found in the peat



**M**ammal bones, beetle wing cases, reptile and snail shells, and microscopic pollen grains.



### INGREDIENTS

- Permanently waterlogged ground - e.g. a hollow in which water accumulates
- Wetland plants – such as rushes, reeds, sedges, mosses

**Ready in:** about 2,000 years. If left longer, the surface will rise by approx 1mm per year.

### METHOD

- As wetland plants die, allow their remains to accumulate in the water (low oxygen levels in the water prevent complete decay)
- Maintain a constant supply of water to the partially decayed plants so that new layers are added every year
- Leave without stirring/disturbing for at least 2,000 years, or until you have a thick black or brown soil (organic matter content of between 30 and 100%)
- When ready, use for heating, cooking or leave to grow amazing and rare wildlife
- Sit back and enjoy

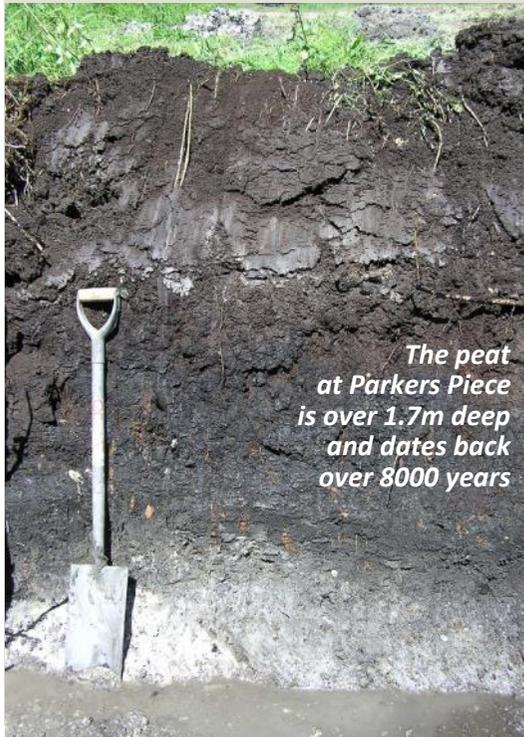
**Cook's tips:** vary the recipe by using either acid or alkaline (chalky) water. Peat made using only acidic rain water typically grows a relatively low number of species, including Sphagnum mosses and heathers; for a much richer mixture of plants, including Great Fen-sedge, Black Bog Rush and Marsh Orchids, use chalky ground water. The valley fens of the Little Ouse and Waveney headwaters are rich in plant species, and the animals that depend on them, because they are formed in hollows in the chalk bedrock and fed with chalky water.

*Helen Smith*

# How old is our peat?

In Britain, peat began to form in flooded hollows just after the end of the last glaciation – 8,000 to 10,000 years ago. Radiocarbon dating shows that peat growth on Parkers Piece, opposite the windmill, began around 8,050 years ago. In the Little Ouse/Waveney valley, peat formed in hollows created when the underlying chalk was dissolved by rain water at the end of the last Ice Age. Carbon dioxide in the air dissolves in rain making it acidic – the colder it is, the more dissolves and the stronger the acid.

*Jo Pitt and Helen Smith*



*The peat at Parkers Piece is over 1.7m deep and dates back over 8000 years*

# Stories in the peat: destruction and restoration

Drainage and ploughing for agriculture, particularly over the last 150 years, together with more recent abstraction of ground water for drinking supplies, led to loss and damage of surface peat layers.

Creating wetter ground conditions lets fen plants return from seeds deep in the soil or from surviving near-by fens. Mowing or grazing will then help maintain the habitat.

*Jo Pitt and Helen Smith*



*Parkers Piece in the mid 1980s*



*Parkers Piece today*



## Living history...

Over the years, LOHP volunteers have dug several 'turf ponds' in the fen for conservation reasons. These shallow holes, not more than a metre deep, recreate (in miniature) the conditions left by earlier generations of local people who dug out the peat they needed for fuel. The hollows fill with water and are rapidly colonised by stoneworts and other water plants, and soon haunted by dragonflies and damselflies. Without this kind of action, fens dry up, slowly becoming woodland and squeezing out the now-rarer plants and animals which depend on really wet conditions.

## ...lessons

Children at Garboldisham Primary School have experimented digging up peat, with LOHP volunteers, stacking it to dry and then burning it to boil water. It certainly brings home - to everyone involved - how much easier life is for us today when we can flick a switch to get power!

# Cooking and 'cooking' with peat ...

In the summer of 1967, I had a holiday in Co. Wicklow, Eire, and saw how Irish soda bread was baked using a lidded cast-iron pot - known as a bastible - as a portable oven. Peat or 'turf' was the ideal fuel.

Here was a chance to re-visit a youthful adventure and share with others the potential of peat as a fuel. Although loving the aromatic charm of smouldering turf, I have to admit to having a bit of a prejudice against it, regarding it as a low-grade fuel.

As well as owning a bastible, I had in

my possession a family heirloom from my great-great-grandmother, a Scotswoman. This was a blacksmith-made girdle plate, upon which girdle scones were made.

I thought that while bread was slowly baking, a quick turnover of Scotch pancakes could be produced, using the same fuel and the

same flour. This ingredient was produced about 100 yards away at the Thelmetham windmill.

Bev Blackburn kindly provided me with several bags of flour and a batch of yeast dough. I made up a mix of soda bread, and set fire to a pile of Scottish peat, which had been procured by John McCormack.



Baking bread in a bastible requires a fine level of judgement of the heat of the fire. When the dough has proved in the pot beside the fire, the peat embers are piled on top of the lid, and the pot placed onto the hearth, with a little of the heat still under the base.

The scotch pancake-making was very successful, thanks to the focused care of itinerant chef, Silas Tooth. The bread-making was quite successful, with some uneven results, the problem of multitasking - King Alfred's dilemma!

I had visited the Blo' Norton village hall where, among other exhibits, there was a display by the LOHP Creative Group, of images of pollen grains found in peat samples from the fen.

Some people round the cooking fire made enlarged models in clay, based on pollen grains, and these were successfully fired in the glowing embers.

Late in the day, Hannah Salisbury started to make a thumb-pot out of the brick clay. She made a very fine, thin-walled cup and went off home with a supply of peat and a modus operandi. I was full of apprehensions about the success of the



Surprisingly thin-walled pot, which rings when you 'ping' it.

Hannah Salisbury

next step. Would the pot fall apart before being fired? Would it fire thoroughly to become ceramic? Would the Fire Brigade be called? About a month later, Pete Fox forwarded to me the pictures of the pot firing in progress and the finished result. Huge congratulations should go to Hannah for such a successful conclusion to Peat Fest: pot intact, fired to a high earthenware temperature, and no callout of the emergency services.

I now have a greater understanding of the versatility of peat, and would like to thank all involved in the LOHP for giving me the opportunity to make this investigation and share it with you.

David Whatley



Hannah Salisbury

Successful firing technique, with peat, known as pot-in-a-bowl-in-a-bucket-on-a-tray-on-a-grill-on-a-balcony-of-an-apartment-building!



Jo Pitt



**Reed Reflection**

Martin Phillips, watercolour

*'You can get lost in the reflections of the winter reeds - an abstract using a limited palette.'*



**Banded Demoiselles**

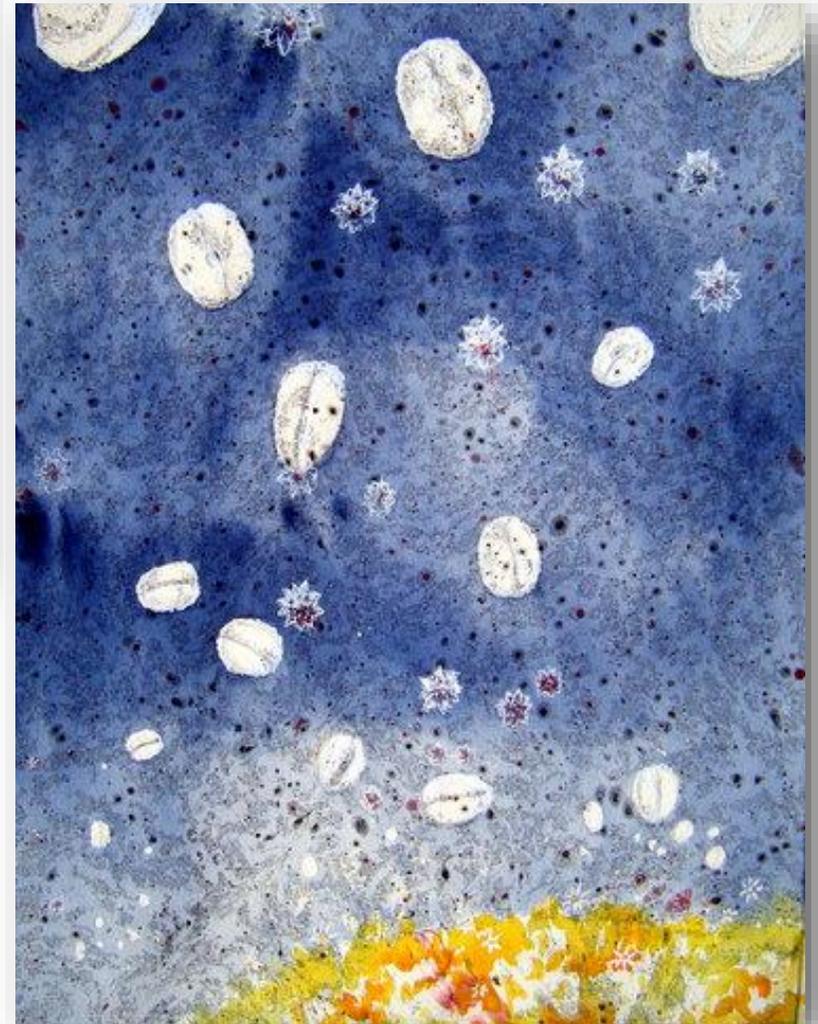
Sue Lawrence, watercolour



**Thelnetham Windmill with Redpoll cows**

Becky Whatley painted this in oils in autumn last year, after being inspired on a particularly beautiful day. *'I had been taking photos of the cattle over the last few years, and this day was lucky enough to get some of them by the mill.'*

**Buttercups and Daisies** Sue Downie  
*'This uses suminagashi and watercolour. The image is inspired by scanning electron micrographs of buttercup and daisy pollen.'*



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## The LOHP creative group

meets monthly and welcomes new members. Contact Sally Mills on 01953 681539 or [sally@davidandsallymills.net](mailto:sally@davidandsallymills.net).

# Peat Fest - May 2018



Nicky Rowbottom

Artist Rosemary Humphries helped children (and adults) to unlock their inner creativity and draw 'peaty' wildlife



Peat-cooked pizza

Hannah Salisbury



Hannah Salisbury



Jo Pitt

The overspill for Mike Harding's talk about peat



Martin Phillips  
Ruddy Darter dragonfly

## The Little Ouse Headwaters Project

Huge thanks to all the volunteers who made the Peat Fest such a wonderful event.

To find out more about our conservation and restoration work and how you can get involved see [www.lohp.org.uk](http://www.lohp.org.uk)

Contact us by email: [enquiries@lohp.org.uk](mailto:enquiries@lohp.org.uk) or phone: 07919 912045

Newsletter editor: Nicky Rowbottom



Hannah Salisbury



Rosemary Humphries

Exploring what can be found in different layers of the peat beneath our feet