Yorkshire Peat Partnership

10 years of restoring Yorkshire's upland peatlands

July 2009 to March 2019

Summary Report

By

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Yorkshire Wildlife Trust

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Contents

HEADLINES

This is a summary report of the considerable achievements of the first 10 years of the Yorkshire Peat Partnership up to March 2019 a full version is available for download from the Yorkshire Peat Partnership website www.yppartnership.org.uk

Landscape-scale Action

The Yorkshire Peat Partnership completed a remarkable 32,343ha* of peat restoration work by the end of March 2019 which is 37% of the estimated 86,377ha* of peatland in Yorkshire.

*this is defined as upland management units containing peat.

Key highlights included:

- **Securing £2,683,546 to cover core costs (e.g. staff, vehicles, equipment and office costs)**
- **Securing £16,760,543 of capital funds to carry out direct peatland restoration.**
- **Completing surveys of 50,403ha of the estimated 86,337ha of peatland units (101 sites covering 29,524ha of actual peaty soils) in Yorkshire plus an additional 392ha in the Forest of Bowland.**
- **Completing 48 archaeological assessments of potential restoration sites**
- **Carrying out Unmanned Aerial Vehicle (UAV) surveys of 10,000ha of peatland in Yorkshire and under contract elsewhere.**
- **Completing restoration plans for 46,545ha of peat units (54% of the estimated total for Yorkshire) plus an additional 366ha in the Forest of Bowland.**
- **Completed restoration works on 32,343ha (37% of total estimated area) of peat units in Yorkshire by:**
    - **blocking 1844km (38%) of eroding grips and begun blocking of 181km (7%) of eroding gullies**
    - **Re-profiling and re-vegetating 1682km of grips and 1497km of gully edges and hags.**
    - **Re-vegetating 108ha of bare peat & micro-erosion.**
    - **Restoring 58ha of dendritic gullying.**
    - **Sowing heather seed across 124ha of bare peat, hags, dendritic areas and micro-erosion.**
    - **Planting 124,775 cotton grass plugs in bare peat**

    - **Inoculating 404ha of bare peat, dendritic areas and gully and hag sides with 93,850 harvested Sphagnum clumps, harvested Sphagnum fragments, BeadaMoss beads® and BeadaGel™**
    - **Re-establishing Sphagnum in 58ha of existing degraded blanket bog vegetation by Spreading 20ha of BeadaMoss beads® and planting 50,018 BeadaHumok™ plugs.**

- **Supported the establishment of a long-term research programme with the Stockholm Environment Institute into the relative merits of burning versus cutting and stablished a long-term *Sphagnum* and ecosystem services study Funded by Yorkshire Water in partnership with University of Manchester.**

- **Established a project under the University of Leeds led iCASP programme to develop a hydrological modelling package Digibog-Hydro and methods for assessing the socio-economic benefits of peatland restoration.**

- **Estimated that Yorkshire's peatlands currently store 38,101,767 tonnes of carbon.**

- **Towards the end of the period YPP directly employed a communications officer leading to a considerable uplift in promotion of peatlands through a revamped website and social media presence. Significant coverage on traditional media culminating in Look North and BBC Radio 4 coverage.**

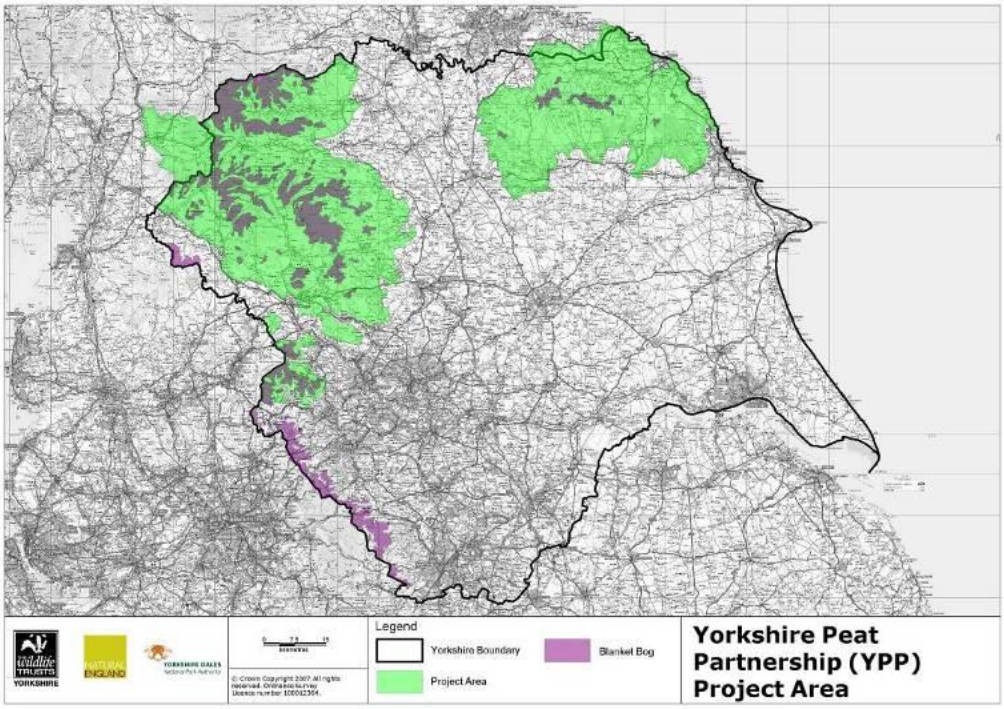
1. The Yorkshire Peat Partnership

The Yorkshire Peat Partnership (YPP) began in 2009 as an umbrella organisation to try to coordinate the restoration of the badly degraded peatlands in the uplands of northern Yorkshire. Since 2009 YPP has developed into the primary organisation coordinating the delivery of upland peatland restoration across the Yorkshire Dales National Park, Nidderdale AONB, North York Moors National Park and northern parts of the South Pennines.

Yorkshire Peat Partnership's mission is to substantially increase the amount of peatland restoration activity in northern Yorkshire's uplands through a combination of practical restoration work, monitoring and research.

- Through its restoration work YPP preserves the peat that remains and helps to reinstate functioning, peat-forming ecosystems that will restore hydrological processes, increase biodiversity, reduce flooding impacts and decrease the amount of carbon loss.

- Through its monitoring and research YPP is contributing to the development of peatland restoration science and guiding future restoration techniques.



Blanket Bog in North Yorkshire

- **14% of the UK's blanket bog is in England (3553 km^2) (JNCC, 2011).** The majority of this occurs in the hills of the Pennines stretching from the Peak District in the south to the English/Scottish border the north with other significant areas in Dartmoor and Exmoor in the southwest.

2. Aims & Objectives

To restore 50% (35000ha) of Yorkshire's blanket bog through a programme of grip blocking, gully restoration and bare peat re-vegetation by March 2017.

Objectives		Target Date
1.	Restore 21,262ha of degraded peatland using existing HLS committed funds. This will include: ➢ Blocking 2085km of grips ➢ Reducing erosion from at least 616km of eroding gullies & hags ➢ Revegetating at least 139ha of eroding bare peat	March 2017
2.	Complete a programme of desk based surveys of 45 individual peatland sites to provide restoration plan estimates and costs for sites on a long-list for restoration.	March 2012
3.	Secure funding and implement a works programme to restore at least an additional 13,738ha of degraded peatland from the long list to bring the total restored to 50% of the blanket bog in the Yorkshire Region. This should include: ➢ Blocking at least 500km of grips ➢ Reducing erosion from approximately 200km of eroding gullies & peat hags ➢ Revegetating approximately 30ha of eroding bare peat	March 2017
4.	Establish long-term research & monitoring at a minimum of 2 sites to assess the benefits of peatland restoration to a range of ecosystem services including flood reduction, water supply, water quality, biodiversity, grouse populations and carbon budgets	March 2013
5.	Complete a research programme to model the benefits of grip blocking in reducing the flood hydrograph	March 2013
6.	Produce an estimate of the carbon storage and sequestration potential of the Yorkshire region's upland peat.	August 2011
7.	Develop and secure funding for a communications and raising awareness programme to promote the importance of Yorkshire peatlands.	March 2012
8.	Seek and secure funding to enable the continuation of the Yorkshire Peat Partnership core team beyond March 2013 enabling the restoration of the remaining peatland sites and continuation of research programmes.	March 2013
9.	Develop a plan for restoring a significant proportion of the remaining 50% of degraded blanket bog and other peatlands within the Yorkshire Peat Partnership area	March 2015

3. Funding

Golden Plover (Margaret Holland)

YPP has become expert at securing and managing funds from a range of sources and finding ways to overcome bureaucratic and administrative arrangements in order to maximise the impact of these funds in delivering peat restoration.

Since 2009 funding for the YPP's **£2,683,546 of core costs** (e.g. staff, vehicles, equipment and office costs) has come from a wide range of partners with the main funders as follows:

Organisation	Amount £
Yorkshire Wildlife Trust – legacies	84,557
Yorkshire Wildlife Trust – fund-raising	30,971
Yorkshire Wildlife Trust – consultancy	77,753
Yorkshire Wildlife Trust – in kind overheads	135,677
Yorkshire Dales National Park Authority	300,100
North York Moors National Park Authority	93,146
Nidderdale AONB	1,000
North Pennines AONB	10,000
Environment Agency – direct	279,379
Environment Agency – via Pennine PeatLIFE	280,000
Natural England	588,845
DEFRA Peatland Fund – via YWT	33,000
Higher Level Scheme	248,864
Countryside Stewardship	63,567
Yorkshire Water – contracts	337,014
Yorkshire Water – via Pennine PeatLIFE	19,673
Peter de Haan Conservation Trust	100,000
TOTAL	**£2,683,546**
Average per annum	**£268,355**
Loans – Yorkshire Dales National Park Authority	£2,107,341
Loans – The Wildlife Trusts	£1,500,000

YPP has secured a total of **£14,846,154** of capital restoration funding in Yorkshire since it began in 2008/09. This has come from the following sources:

Organisation	Amount £
Environment Agency – Water Framework Directive	643,410
Natural England – Water Framework Directive	166,239
Higher Level Scheme (administered by Natural England through individual land manager agreements)	11,155,831
Countryside Stewardship Scheme (administered by Natural England and Rural Payments Agency through individual land manager agreements)	49,492
Yorkshire Water – contracts	2,279,335
Yorkshire Water – via Pennine PeatLIFE	235,817
DEFRA Peatland Fund – via YWT	258,313
DEFRA Peatland Fund – via Pennine PeatLIFE	57,717
TOTAL	**14,846,154**
Average per annum	**1,484,615**

Yorkshire Peatland landscapes, YPP

Unlocking funding

A major stumbling block in the early stages of the project related to the system of paying for works and claiming back from Natural England under the Higher Level Scheme. Under the scheme, 100% grant funded works such as peatland restoration required agreement holders to pay up front and then obtain a "receipted invoice" in order to submit a claim to Natural England. Given the high cost of peatland restoration and the size of invoices most landowners were reluctant to pay out such large amounts and then have to wait for an unspecified period of time while their claim was processed.

YPP was able to act as an "Authorised Payment Agent" to the agreement holder, pay contractors and claim back directly from Natural England without the agreement holder having to finance anything.

A further step was needed before this system could be implemented. As a small charity YWT would have suffered significant cash-flow problems if it paid a number of contractors on a number of different restoration sites and then had to wait for at least 2-4 weeks for claims to be processed. A system was needed to bridge the cash flow gap between paying contractors and being reimbursed by Natural England. This was solved with the generous help of The Royal Society for Wildlife Trusts and the Yorkshire Dales National Park Authority who provided interest-free "bridging" loans to cover this gap.

The combination of the Authorised Agent approach and the bridging loans enabled the unlocking of substantial amounts of HLS grant funding to deliver a massive programme of peatland restoration across the region. Without this administrative fix it is unlikely that YPP would have been so successful.

Cottongrass, YPP

Bog Asphodel, YPP

4. Achievements

4.1 Assessing the state of North Yorkshire's blanket bogs

Prior to restoration works taking place YPP carries out a comprehensive 4 stage survey of the restoration sites as follows:

- **Pre-survey mapping using GIS and aerial photography**
- **Field surveys - YPP staff have completed surveys of 50,403ha of peatland units (101 sites covering 29,524ha of actual peat)**
- **Archaeological assessment - A total of 48 archaeological assessments have been completed to date**
- **Drone surveys - A total area of over 10,00ha of Unmanned Aerial Vehicle (UAV) Surveys both within the YPP area and in contracts elsewhere.** As far as we are aware this if the biggest dataset of its type in the UK

YPP now holds a dataset of **over 20,000 individual survey point records together with GIS maps of classified grips, gullies, bare peat and other erosion features**

Peat area, depth & mass & Carbon store

Total estimated Peat area = 86,377ha

Overall the mean depth of peat across the North Yorkshire sites surveyed is 1.09m. The largest mean depths are in the Forest of Bowland (1.50m),Yorkshire Dales (1.02m) followed by Nidderdale (0.99m) and the North York Moors (0.92m).

The mean depth for deep peat (>0.4m) across the North Yorkshire sites surveyed is 1.25m. Forest of Bowland has the deepest peats (1.59m), followed by the North York Moors (1.12m), the Yorkshire Dales (1.10m) and Nidderdale (1.02m).

The **maximum site mean depth was 2.84m** at May Moss in the North York Moors although this site is more typical of a raised bog than a blanket bog.

None of the Units surveyed by YPP had mean peat depths less than the 40cm deep peat definition.

Estimated total stored carbon mass = 38,256ktonnes.

4.1.1 Physical state

YPP's survey results in detailed GIS layers that map the physical erosion features present within the surveyed area. Making the assumption that the remainder of un-surveyed sites will have similar levels of erosion YPP have used these figures to estimate the quantities of these erosion features across the full upland peatland in North Yorkshire.

Estimated quantities of erosion features across Yorkshire's upland peatlands as of 31st March 2017 (date of last analysis)

Feature	Administrative Area	Total
Bare Peat	North York Moors	21ha
	Nidderdale	45ha
	Yorkshire Dales	417ha
	South Pennines (in North Yorkshire)	7ha
	All areas	490ha
Length of eroding gullies	North York Moors	62km
	Nidderdale	377km
	Yorkshire Dales	2317km
	South Pennines (in North Yorkshire)	2km
	All areas	2758km
Length of eroding hag sides	North York Moors	5km
	Nidderdale	151km
	Yorkshire Dales	2317km
	South Pennines (in North Yorkshire)	0km
	All areas	2473km
Length of grip	North York Moors	109km
	Nidderdale	905km
	Yorkshire Dales	6487km
	South Pennines (in North Yorkshire)	5km
	All areas	7506km
Length of eroding grip	North York Moors	88km
	Nidderdale	558km
	Yorkshire Dales	4263km
	South Pennines (in North Yorkshire)	2km
	All areas	4911km
Area of micro-erosion	North York Moors	1ha
	Nidderdale	11ha
	Yorkshire Dales	3ha
	South Pennines (in North Yorkshire)	7ha
	All areas	22ha
Area of dendritic erosion	North York Moors	0ha
	Nidderdale	0ha
	Yorkshire Dales	58ha
	South Pennines (in North Yorkshire)	7ha
	All areas	65ha

4.1.2 Habitats & species

While not a fully comprehensive habitat assessment the YPP survey method provides a lot of useful data on the vegetation characteristics of upland peatlands in the project area.

These results are initially encouraging in that there are only small amounts of non-bog vegetation communities present. However, much of the blanket bog is in categories with *Calluna vulgaris* at greater than 25% cover even on the deep peat areas.

Bare peat, Grimwith, YPP

Summary of the percentage of survey points with each vegetation community present at the two peat depths for the peatland so far surveyed by YPP at 31st March 2017 (date last analysed).

Vegetation type	Percentage of survey points (%)		
	>15cm peat depth (n = 23,855)	>30cm peat depth (n = 20,498)	>40cm peat depth (n = 18,534)
Blanket Bog Pool (*Sphagnum* dominated)	<1	<1	<1
Blanket Bog (25% Heather cover)	9	11	11
Blanket Bog (50% Heather cover)	23	26	28
Blanket Bog (75% Heather cover)	27	30	32
Blanket Bog (Cottongrass) dominated)	1	1	1
Blanket Bog (Cross-leaved heath dominated) dominated)	<1	<1	<1
Wet heath	4	3	2
Dry heath	17	12	9
Acid grassland dominated by Heath rush	<1	<1	<1
Acid grassland dominated by Mat grass	<1	<1	<1
Acid grassland dominated by Purple moor grass	<1	<1	<1
Acid grassland dominated by Wavy hair grass	<1	<1	<1
Other acid grassland	<1	<1	<1
Acidic flush	3	3	3
Basic flush	1	1	1
Bracken	<1	<1	<1
Other vegetation	2	2	1

Blanket bog vegetation

YPP's survey results demonstrate the dominance of Heather across the surveyed bogs and there are some indicators of "drier" communities (Bilberry, *Polytrichum* spp.) at higher than expected levels while specialist bog species (Cross-leaved heath, Crowberry, Cranberry, Cloudberry, Bog Rosemary, Bog Asphodel, Sundews) are at very low levels. *Sphagnum* spp. presence is reasonably high although, unfortunately, without comprehensive species information we have no way of knowing if these are more specialist blanket bog species.

Sphagnum fallax was the most frequently recorded *Sphagnum* species. *S. fallax* is tolerant of a wide range of conditions so is not the best indicator of bog condition. All other species are present at relatively low levels.

Sphagnum mosses, YPP

4.1.3 Land management

The overwhelming majority (>96%) of YPP's work is conducted on private land largely owned and managed for the purposes of grouse shooting and sheep farming

As it is currently the primary land management tool on blanket bog, the YPP survey also records the amount of burning on each site; this is largely managed burning.

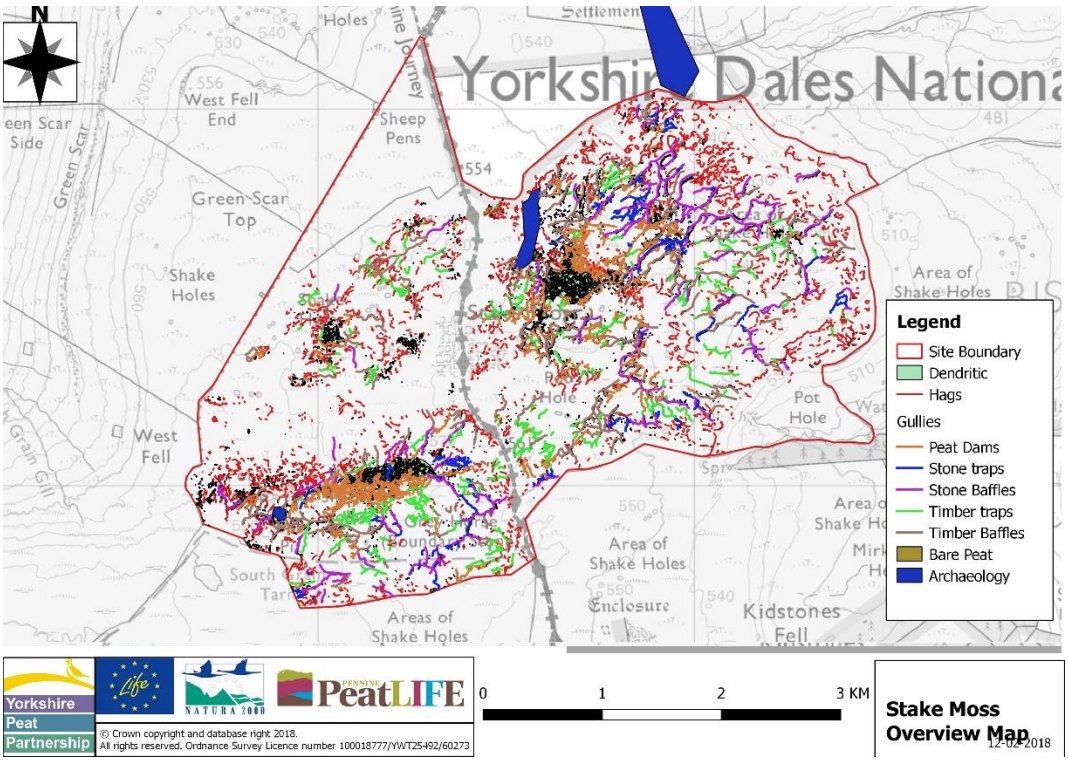
Burning

YPP's surveys show that 56% of the peatland sampling points in the project area show evidence of burning and the lack of tall old heather (just 6% or 7% of survey points) suggests that this may be on a relatively short cycle.

4.2 Producing a restoration plan

The ultimate end point of all of this survey and assessment work is to produce a Restoration Plan. Yorkshire Peat Partnership has developed a restoration plan template that acts as (i) a summary of the survey information, mainly in the form of maps and (ii) a specification for subsequent capital works, mainly in the form of tables of quantities.

A total of 88 YPP surveyed sites now have Restoration Plans



Restoration planning

- **46,544ha of Yorkshire's peatland management units have so far been taken forward to the restoration planning and implementation stage.**
- **In total YPP completed restoration works (including initial capital works) on 32,343ha of peatland by the end of March 2019 which is 37% of the estimated total area of YPP peatland.**
- **No capital works were proposed on 781ha of peatland (1% of total area) although with advances in *Sphagnum* spp. introduction techniques it may be appropriate to re-visit some of these sites in future.**
- **Detailed restoration plans were produced for 11,420ha of blanket bog (13% of total area) but were not implemented due to lack of funding or landowner support.**

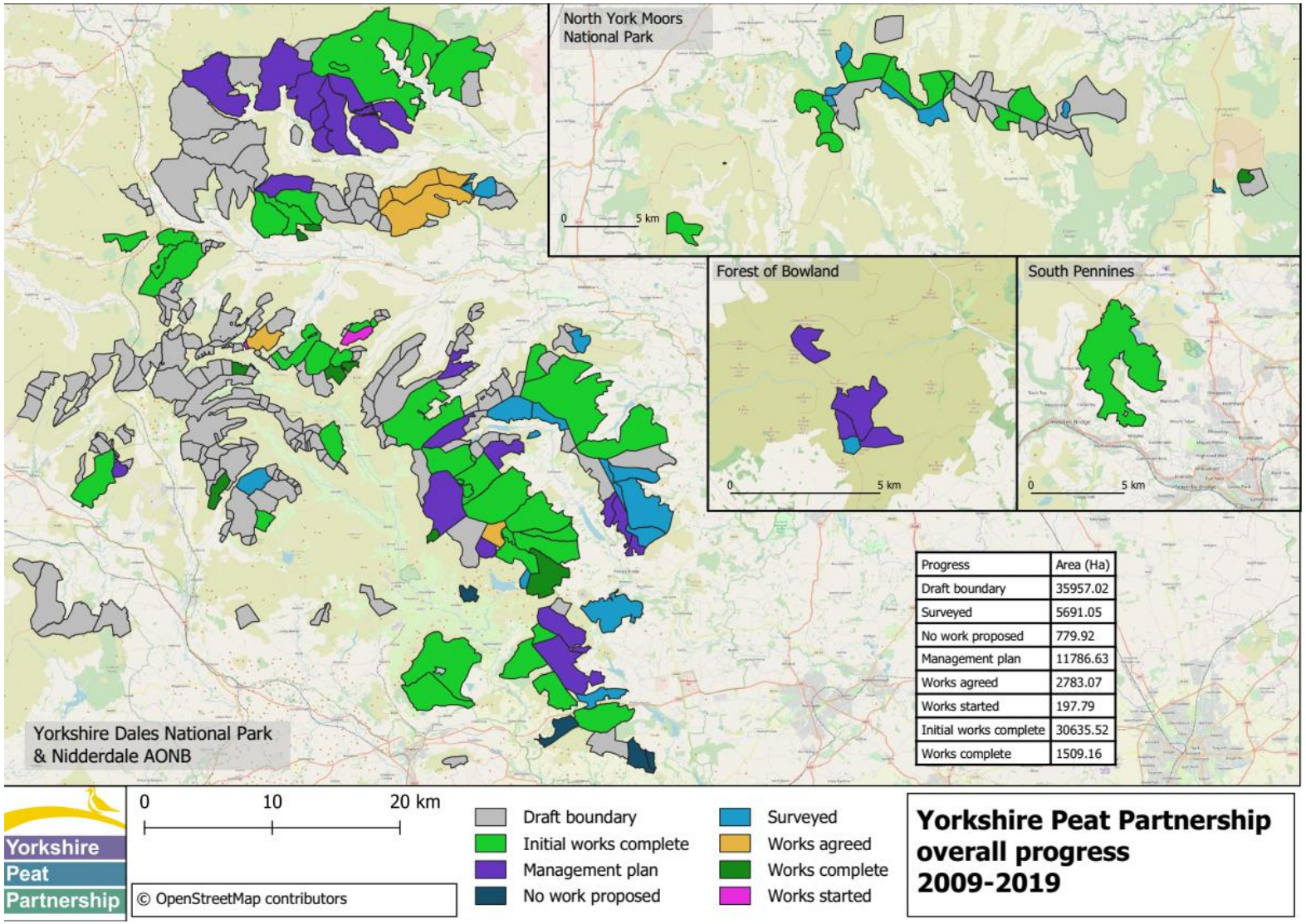
4.3 Restoring bogs

Timber sediment trap, Cray Moss

The majority of the capital restoration works have been carried out by private contractors working under the supervision of YPP staff (or RRT or NT). These contractors are a vital component of the effective delivery of peatland restoration across Yorkshire. The contractors used are specialists in peatland restoration and provide YPP and its partners with innovation and skills that would be very expensive for YPP to employ directly.

So far YPP has:

Begun restoring hydrological integrity by blocking 1608km of eroding grips and begun blocking of 164km of eroding gullies
Prevented further erosion by: • ***Re-profiling and re-vegetating 1638km of grips and 1497km of gully edges and hags.*** • ***Re-vegetating 105ha of bare peat & micro-erosion.*** • ***Commenced restoration in 68ha of dendritic gullying.***
Begun restoring functioning blanket bog on badly eroded areas of bare peat by: • ***Sowing heather seed across 124ha of bare peat, hags, dendritic areas and micro-erosion.*** • ***Planting 124,775 cotton grass plugs*** • ***Inoculating 404ha with 93,850 harvested Sphagnum clumps, 332ha of harvested Sphagnum fragments, 7ha of BeadaMoss beads® and 25ha of BeadaGel™***
Begun re-establishing Sphagnum in 58ha of degraded blanket bog vegetation by: • ***Spreading 20ha of BeadaMoss beads® and planting 50,018 BeadaHumok™ plugs.***


North York Moors National Park
0
5 km
Forest of Bowland
0
5 km
South Pennines
0
5 km
Yorkshire Dales National Park & Nidderdale AONB
Progress | Area (Ha)
Draft boundary | 35957.02
Surveyed | 5691.05
No work proposed | 779.92
Management plan | 11786.63
Works agreed | 2783.07
Works started | 197.79
Initial works complete | 30635.52
Works complete | 1509.16
Yorkshire Peat Partnership
0
10
20 km
© OpenStreetMap contributors
Draft boundary
Initial works complete
Management plan
No work proposed
Surveyed
Works agreed
Works complete
Works started
Yorkshire Peat Partnership overall progress 2009-2019

Restoring hydrological integrity

YPP has:
Blocked 1,579km of grip and 81km of gully with peat dams which at an average spacing of about 8m is over 207,500 peat dams.

Installed over 2400 timber sediment traps in 7km of grips and 16km of gullies.

Installed heather bale dams in 21km of grip and have installed over 8000 bales in 66km of gullies.

Blocked 1.6km of larger grips with nearly 200 stone traps.

Restoration, YPP style

Landscape-scale Action

YPP completed a remarkable 32,343ha of blanket bog restoration work by the end of March 2019 which is 37% of the estimated total area of peatland in the YPP area.

5. Monitoring Restoration works

In 2017 YPP completed a works monitoring assessment where a series of transects were set up across the areas of each site that had undergone different types of restoration intervention. A number of different measurements were recorded using GPS units at 30-40 sample points along the transect to assess the status of the specific type of restoration intervention.

Grip blocking

- ***Overall results very positive***
- ***Grip blocking with peat dams had been particularly successful with the majority of dams remaining intact (94%) with a high average percentage vegetation cover (72%).***
- ***Grips with reprofiled edges appeared to be more successful than non-reprofiled, with less erosion around the dam and a higher percentage of vegetation cover (82% versus 65%).***

Reprofiling hags and gullies

- ***The success of reprofiling hags and gullies and revegetating using turves or seed and brash was less apparent***
- ***Revegetation was relatively low (55%) in both techniques and 73% of the slopes monitored showed signs of erosion was high on slopes revegetated with turves.***
- ***Slopes facing in a south-westerly direction were notably poorly revegetated. This could be due to a number of factors including aspect, exposure, slope angle and quantity of brash and seed used.***

Bare peat

- ***The story on bare peat areas revegetated with brash and seed is very variable with success ranging from 0% to 100% cover.***

However, many of the sites that were monitored had been completed prior to current improvements in techniques. Applications of brash, dwarf seed and 'nurse' grasses have been increased and less suitable lowland grass species have been replaced by upland varieties better adapted to local conditions. Cotton grass plugs were also introduced last winter, targeting wetter areas. Although it is not possible to predict the success of the revegetation from recent work using these updated techniques, the first signs are promising with, for example, Cragdale after just a year post-restoration showing one of the highest average percentages of revegetation (56%).

Analysis of longer term data shows encouraging changes in cover of key species. Common Heather *Calluna vulgaris* appears to be decreasing along with Hare's Tail Cotton Grass *Eriophorum vaginatum* increasing and more base tolerant species such as *S. palustre* and *S. fallax* decreasing. Conversely, on the increase are more acid tolerant *Sphagnum* species. The positive indicators are that on these sites water is being retained by the grip blocking, creating conditions better suited to blanket bog community species.

6. Research

Wherever possible and subject to funding being available YPP has tried to support relevant peat-based research. The vagaries of funding has meant that this has had to be a reactive approach but YPP have managed to support some key research.

At the beginning of the programme YPP supported research through Moors for the Future's Small Research Project Fund and then began to work with other partners and commission its own research projects. All of the research projects are summarized below with more detail available from specific websites or the quoted references.

6.1 Small Research Projects Fund

In 2010 YPP provided £16,645 into the Moors for the Future Small Research Projects Fund and supported the following seven projects. Full reports are available from the Moors for the Future website (http://www.moorsforthefuture.org.uk/moorland-research-fund):

6.2 Peat Cores

In 2011 YPP and the University of Gloucestershire supported a PhD student (Julia McCarroll) to extract peat cores from Mossdale, West Arkengarthdale and Oxenhope Moors to determine historic changes in vegetation and how this might inform conservation today. The results of this work have been written up in Julia's thesis and several published journals as follows:

McCarroll, J. (2014) *Application of Palaecological Techniques to Inform Blanket Mire Conservation in Yorkshire, UK.* PhD thesis University of Gloucestershire, England.

J. Mccarroll, J., Chambers, F.M., Webb, J.C. & Thom, T. J. (2016) Informing innovative peatland conservation in light of palaeoecological evidence for the demise of *Sphagnum imbricatum*: the case of Oxenhope Moor, Yorkshire UK. *Mires & Peat* **18(8)** pp. 1-24.

Mccarroll, J., Chambers, F.M., Webb, J.C. & Thom, T.J. (2016) Using palaeoecology to advise peatland conservation: An example from West Arkengarthdale, Yorkshire, UK. *Journal for Nature Conservation* **30** pp. 90-102.

Mccarroll, J., Chambers, F.M., Webb, J.C. & Thom, T.J. (2017) Application of palaeoecology for peatland conservation at Mossdale Moor, UK. *Quarternary International* **432** pp. 39-47.

6.3 DEFRA burning versus cutting

YPP also provided support to Andreas Heinemeyer and his team at the Stockholm Environment Institute, University of York in a 5 year long research project funded by DEFRA to investigate differences between cutting and burning on blanket bogs on a range of ecosystem services including greenhouse gas emissions and water quality (predominantly dissolved organic carbon). The report of this study is imminent but details of the project can be found at http://peatland-es-uk.york.ac.uk.

7. Conclusions & Next steps

7.1 How did we do?

The following table sets out our original objectives against the outcomes we actually achieved. It is clear that the Yorkshire Peat Partnership has been a hugely successful project getting very close to its original very challenging targets during a period of global austerity.

Original Objectives	Outcome
To restore 50% (35,000ha) of Yorkshire's blanket bog by March 2017, including: Restore 21,262ha of degraded peatland using existing HLS. Secure funding and implement a works programme to restore at least an additional 13,738ha to bring the total restored to 50%.	✓ **32,343ha peat units worked on (37% but the total area of peatland units was revised upwards after this target was set. If we use the original total of 70,000ha this would be 46%). No capital works were proposed 781ha (1% of total area).** X **Could not secure landowner support or funding for works on a further 11,420ha (13% of new estimated total or 16% of the original)**
Complete a programme of desk based surveys of 45 individual peatland sites to provide restoration plans	✓✓ **Surveyed and produced restoration plans for 101 Yorkshire peatland sites plus an additional 6 plans in the Forest of Bowland.**
Establish long-term research & monitoring at a minimum of 2 sites	✓ **Working with the Stockholm Environment Institute supported a 5 year study into the relative merits of burning versus cutting. Established a long-term Sphagnum and ecosystem services study Funded by Yorkshire Water in partnership with University of Manchester.**
Complete a research programme to model the benefits of grip blocking in reducing the flood hydrograph	✓ **Established a project under the University of Leeds led iCASP programme to develop a hydrological modelling package Digibog-Hydro.**
Produce an estimate of the carbon storage and sequestration potential of the Yorkshire region's upland peat.	✓ **Estimated that our peatlands currently store over 38 million tonnes of carbon but we have not yet worked out the sequestration potential.**
Develop and secure funding for a communications and raising awareness programme to promote the importance of Yorkshire peatlands.	✓✓ **Towards the end of the period directly employed a YPP communications officer leading to a considerable uplift in promotion of peatlands through a revamped website and social media presence. Significant coverage on traditional media culminating in Look North and BBC Radio 4 coverage.**

Seek and secure funding to enable the continuation of the Yorkshire Peat Partnership core team beyond March 2013	✓✓**We kept going and have funds to continue. We also developed innovative approaches to unlock substantial funds and secured funding from a variety of sources enabling peatland restoration projects until March 2022.**
Develop a plan for restoring a significant proportion of the remaining 50% of degraded blanket bog and other peatlands	✓**This will form the basis of a new business plan but will be revised to take account of the new increased estimate of the total area of peatland units in Yorkshire.**

7.2 Next steps

The table on page 12 also shows that there is much left to do and we now need to draw up the plans for the next phase of our work from 2019 onwards.

This will concentrate on several key activities:

Consolidate the restoration work already begun by re-visiting those sites with new restoration techniques where the monitoring has highlighted the need for additional restoration work.
Continue to work on new sites with the ultimate goal of restoring all 70,000ha of Yorkshire's upland peatland where it is needed.
Expand the research and monitoring aspects of our work to try to tackle some of the big questions we have yet to answer (e.g. what is the carbon sequestration potential of Yorkshire's peatlands; what are the impacts of restored peatlands on flood reduction and how far downstream?).
Develop new ways to engage with a wide range of audiences to promote the importance of fully functioning blanket bogs for biodiversity, for carbon storage and sequestration, for flood risk reduction and for high quality drinking water.

8. Acknowledgements

The success of the Yorkshire Peat Partnership is the result of the hard work of by a huge range of partners and could not have happened without them.

Landowners, their agents, gamekeepers, farmers and tenants have helped YPP deliver the restoration work on their land often helping practically but also providing advocacy support and helping to unlock funding.

None of the work could have taken place without our major funders supporting both the capital work but also the hugely important core funds that enable YPP to function. We are hugely grateful to Natural England, the Environment Agency, Yorkshire Water, the Yorkshire Dales National Park Authority, the North York Moors National Park Authority, Peter de Haan Conservation Trust & Yorkshire Wildlife Trust. Huge thanks also go to the Yorkshire Dales National Park Authority and The Wildlife Trusts who provided the bridging loaned to enable us to unlock HLS funds.

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YPP Snow dancing!