

# **BBOWT Wild Oxford Project Lye Valley North Fen**

**Report on the third year 2016-2017**

Dr Judith A Webb  
Ecological Consultant  
2 Dorchester Court  
Blenheim Road  
Kidlington  
Oxon OX5 2JT

Website: <http://judithwebb.weebly.com/>

February 2018



*View down Lye Valley fen after tree removal  
Photo taken on 16 February 2018 © Tony Gillie*

# CONTENTS

	Page
<b>GENERAL INTRODUCTION AND AIMS OF THE WILD OXFORD PROJECT</b> .....	1
<b>Figure 1:</b> <i>Lye Valley Local Nature Reserve</i> indicating the extent of the reserve and the boundary of the North Fen section (Unit 1) of the Lye Valley SSSI .....	1
<b>BBOWT WILD OXFORD PROJECT – LYE VALLEY HABITAT ENHANCEMENT AREAS</b>	
<b>A.</b> Alkaline fen restoration in LWS/LNR areas outside the SSSI .....	2
<b>B.</b> Assistance with restoration of a greater area of short fen in the SSSI area.....	2
<b>C.</b> Glades and sunny open flower-rich areas on drier slopes and banks.....	2
<b>D.</b> Pond enhancement in LWS south-western area .....	2
<b>E.</b> Brook bank defence and restoration, fen re-wetting .....	2
<b>WILD OXFORD PROJECT RESULTS FOR THE THIRD YEAR, 2016 – 2017</b>	
<b>Figure 2:</b> <i>Sketch map indicating Wild Oxford work areas in the Lye Valley</i> .....	3
Volunteer input to the project in 2017 .....	4
General comments on species recorded in the valley during 2016-17.....	5-6
<b>Details of work carried out on specific areas:</b>	
<b>A.</b> Relic fen in the LWS/LNR area north of the SSSI .....	7-8
<b>B.</b> SSSI fen, west side .....	9-18
<b>Figure 3:</b> <i>Sketch map of location of plant-monitoring squares on the western side sloping fen</i> .....	14
<b>Table 1:</b> <i>Results of sampling of plant species on restored west bank fen in 2017</i> .....	15-16
<b>C.</b> Glades and sunny, open, flower-rich, areas on drier slopes and banks.....	19-20
<b>D.</b> LWS south-western area - pond enhancement.....	21-23
<b>E.</b> Brook bank defence and restoration, fen re-wetting .....	21
<b>Water quality issues in the fen springs on the western side</b> .....	23
<b>Friends of Lye Valley Fen first Open Day on 25<sup>th</sup> June 2017 - public engagement</b> .....	23-25
<b>RECOMMENDATIONS FOR FUTURE CONSERVATION MANAGEMENT AND PUBLIC ENGAGEMENT</b> within the Wild Oxford Project at Lye Valley .....	26
<b>SUMMARY AND CONCLUSIONS</b> .....	26
<b>Achievements</b> .....	27
<b>ACKNOWLEDGEMENTS</b> .....	27
<b>APPENDIX 1: Data not previously submitted up to 2017 for all areas within the LNR/SSSI</b> (separate document)	

This report details work carried out throughout 2017 and gives an assessment of the habitat change that has resulted from this conservation work in the various target areas.

*All photographs in the account that follows are my own unless otherwise indicated*

*Full size versions of the photos can be seen at*  
<https://photos.app.goo.gl/rIpBXpAVaiozcn5o2>

*On page 12 there is a snip taken from a Bing aerial view of the Lye Valley*

## GENERAL INTRODUCTION AND AIMS OF THE PROJECT

The **Wild Oxford Project** is a collaborative initiative of BBOWT and Oxford City Council (OCC), grant-funded by a local charitable trust.

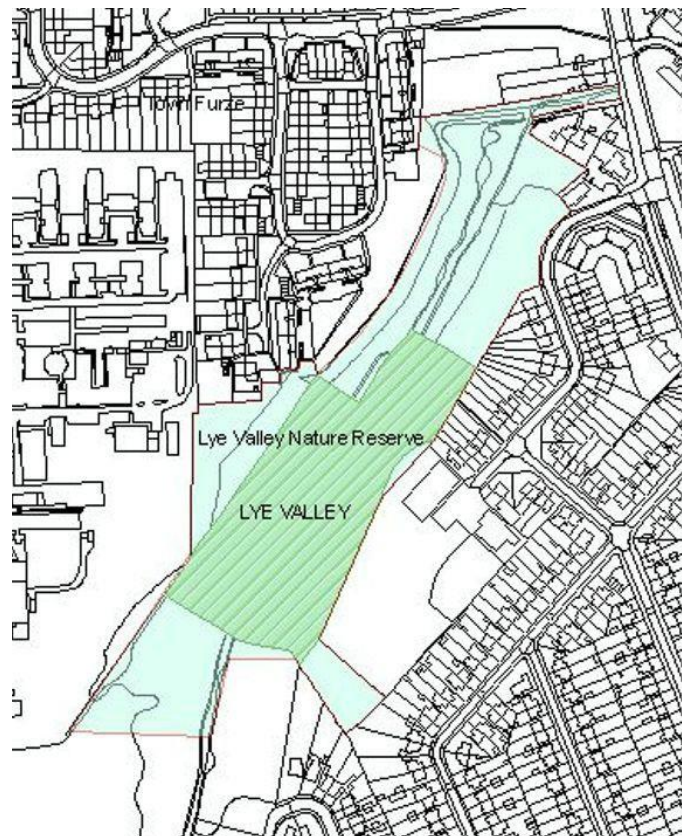
### Its aims are to:

- Introduce local people to the wildlife on their doorstep
- Enable local people to take an active role in enhancing and protecting the sites
- Deliver improvements to the fen and other key habitats.

### Introduction to Year 3 of the Wild Oxford Project in the Lye Valley

The background to this project, i.e. the type and importance of the Lye Valley alkaline fen habitat and the problems facing it in its now partially-urban location, was explained in my report on the first year (2014-2015). That report also covered the historical and current management of the fen, as well as the habitats and local and national species of importance found within it. The appendices to the report provided information on the biological heritage of the site and extensive species lists. Please see my first report (May 2015) for all such detail.

The map below is included again to provide a clear picture of the Local Nature Reserve (LNR) / Local Wildlife Site (LWS) /Site of Special Scientific Importance (SSSI) limits and Wild Oxford target work areas in the Lye Valley North Fen.



**Figure 1:** *Lye Valley Local Nature Reserve*

All the shaded area (total 4.5 ha), including the section marked with parallel lines, is owned by Oxford City Council and is part of a much larger Local Wildlife Site known as '**Lye Valley and Cowley Marsh LWS**'. Within these boundaries is the **North Fen section (Unit 1)** of the **Lye Valley SSSI** (1.8 ha), indicated by the parallel lines. Site centre of SSSI: SP 548057

## **BBOWT WILD OXFORD PROJECT HABITAT ENHANCEMENT AREAS**

**The potential for habitat enhancement in the Lye Valley North Fen area by the project work was identified in 2014 as follows:**

### **A. Alkaline fen restoration in LWS/LNR areas outside the SSSI**

Numerous calcareous, spring-fed, peat and tufa-forming areas on the valley sides are recognised features of the LWS section at the head of the valley, previously Lye Valley Scrub SLINC. However, their interest had declined because, without grazing, succession had progressed from short fen to shady secondary wet woodland. Even if restoration to high-grade short fen were not possible in the short term, restoration to floristically-diverse tall-herb fen, with abundant nectar and pollen-producing flowers (e.g. angelica, marsh woundwort, ragged robin, purple loosestrife) would be of great benefit to insects of all kinds in the valley and to all pollinators within reach of it in the Headington area in general. The target for the project work – a more biodiverse wetland community – might be met by establishing a tall-herb community with unshaded conditions, such as NVC M27 (*Filipendula vulgaris* – *Angelica sylvestris*) mire.

### **B. Assistance with restoration of a greater area of short fen in the SSSI area**

Whilst the high-grade short fen on the east side of the SSSI fen has been well managed by cutting and raking for more than 20 years by OCC staff and volunteers, it is a small area in total. Other SSSI fen areas were not in an ideal condition due to lack of OCC staff time. For example, at the start of this project little progress had been made in restoring the large area of dense common-reed-dominated, spring-fed, peat and tufa areas on the slope on the west side of the SSSI ('hanging-fen').

### **C. Glades and sunny, open, flower-rich areas on drier slopes and banks**

Common lizards, slow worms and grass snakes are present in the Lye Valley in several areas (Town Furze allotments, the North Fen and Churchill Hospital field). All of these reptile species benefit from undisturbed sunny areas for essential basking. Provision of open, sunny, glades with refuges and hibernacula for all these reptile species on currently wooded or scrubbed-up secluded banks to the fen wetland would enable the reptiles to bask undisturbed and would result in more successful breeding. Additionally, the importance of more nectar-rich flowers in the area cannot be over stated. Whilst the fen wet peat and shallow fen pools provide good breeding areas for important insects, with aquatic larvae such as some hoverflies, soldier flies, crane flies and beetles, the fen vegetation can be dominated by rushes, sedges and reed at certain times of the year and be completely lacking in flowers that are good nectar and pollen sources. Many insects that breed in fens need the nectar and pollen sources in adjacent dry-land areas to complete their life cycles. Brown hairstreak butterfly reproduction will also be enhanced by some cutting of old blackthorn to encourage the young sucker growth preferred for egg-laying.

### **D. Pond enhancement in LWS south-western area**

Five previously-excavated ponds on the south-west side, which are breeding sites for the common frog, had become filled in with sediment and reed vegetation, but fortunately these had been re-excavated by work for a Freshwater Habitats Trust project in spring 2014. Since then a good diversity of submerged aquatic vegetation has recurred, but this regeneration was threatened by increasing shade from trees and reed re-invasion. Some removal of crack willow trees and scrub, along with cutting back of marginal reed, was identified as beneficial to pond-water plant diversity and thus to aquatic invertebrate diversity. Unshaded ponds are warmer and can therefore be colonised by some of the rarer insects, such as water beetles and soldier flies breeding in the shallow fen pools on the other side of the brook. Thus their populations will be more secure.

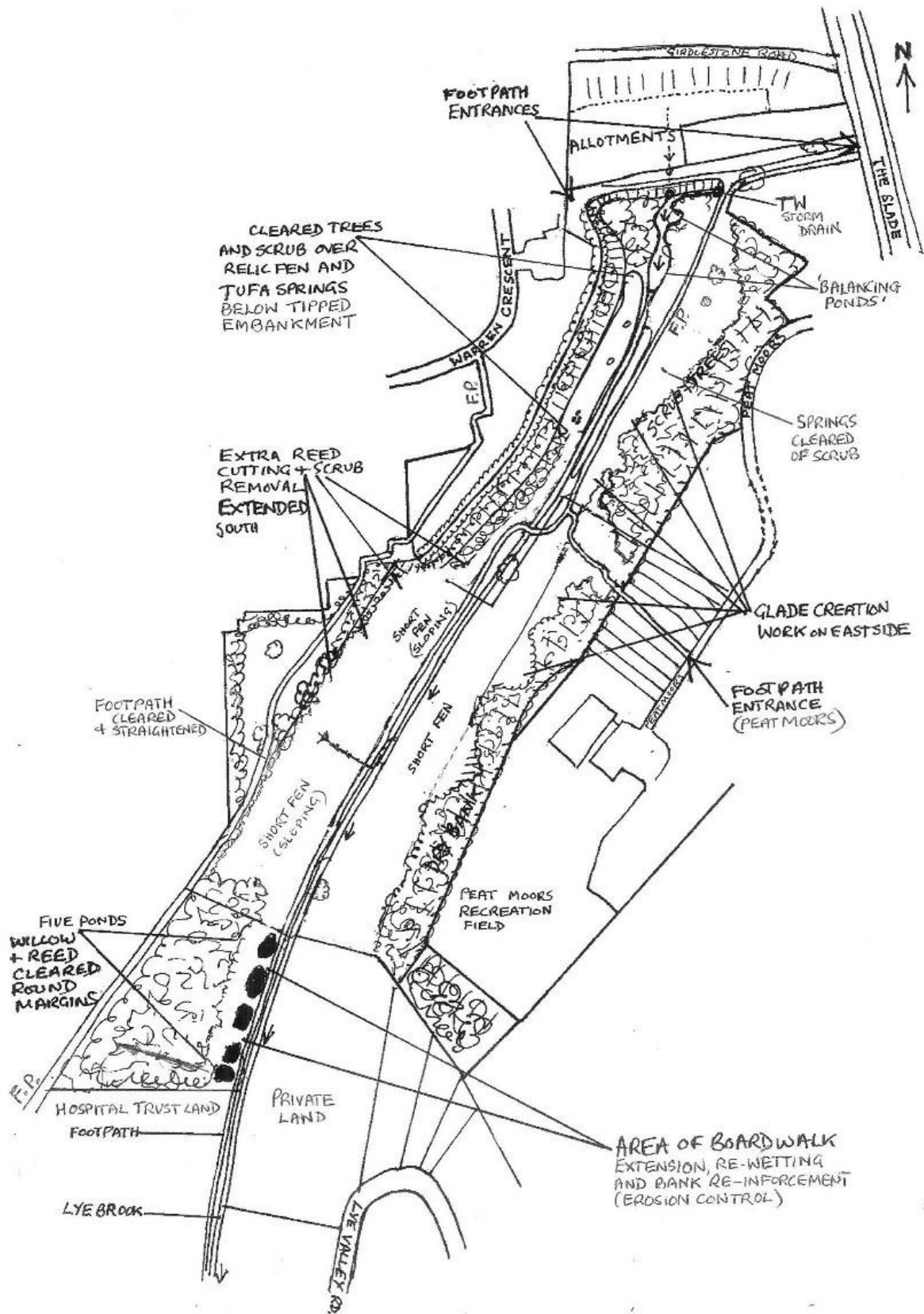
### **E: Brook bank defence and restoration, fen rewetting**

The high storm flows in the Lye Brook from road surface drains continue to erode valuable old fen peat as it travels through the fen areas. Fen habitat adjacent to the brook is too dry for up to 5m. Simple defence structures of natural materials like stakes and woven branches can be used to protect the exposed peat in the banks and prevent further loss. Behind such defence structures, logs and small peat ridges on the fen surface can retain spring flow and re-wet dry peat, restoring wet fen.



**WILD OXFORD PROJECT RESULTS FOR THE THIRD YEAR, 2016 – 2017**

**Figure 2:** Sketch map indicating Wild Oxford work areas in the Lye Valley in 2017



### **Volunteer input to the project in 2017:**

Volunteers under the leadership of Andy Gunn contributed to remedial work on the SSSI North Fen west side and on the relic fen areas in the LWS/LNR to the north and south of the SSSI. Further progress has been made with clearing vegetation over tufa-forming springs and glade creation on the east side of the SSSI and LWS/LNR area. Pond marginal clearance work continued, scything back reed and removing shading willows, plus raking out excessive growth of pond vegetation to maintain open water. Progress has been made in scrub removal on drier marginal areas.

Wild Oxford Project volunteer work in the Lye Valley was supplemented by additional occasional work sessions contributed by the BBOWT midweek team under the leadership of Andy Gunn, who also assisted with willow tree felling in separate sessions.

Oxford City Council Countryside Service workers gave help with felling the very large crack willow trees in the valley bottom. The City Council's Countryside Volunteers team led by Carl Whitehead devoted some of their Thursday work sessions to scrub removal and fen-raking, as well as clearing and re-establishing the route of the footpath along the top of the west bank at the margin of the Churchill Hospital site. Oxford Conservation Volunteers (OCV) helped with scything, raking and scrub work on two Sundays; their work is funded by Oxford City Council.

An additional work session involving 8 volunteers from the Oxford University Environmental Sustainability Department took place on 19.09.2017.

Friends of Lye Valley (FoLV) held separate volunteer sessions every Wednesday morning throughout the year in the north fen area, targeting scything reed, removing scrub and fen re-wetting combined with brook bank restoration and defence using handmade hazel wickerwork structures.

As regards habitat change, progress at this site has been particularly fast due to the involvement throughout the year of several different volunteer groups working at different times (Wild Oxford, BBOWT Midweek team, OCC Thursday group, OCV, Friends of Lye Valley). Volunteers are not necessarily dedicated to only one group. Many join in with the work sessions of two or three groups.

Monitoring of work progress in terms of vegetation response or species recorded took place either during the sessions or on separate visits after work sessions.



**FoLV held the first Open Day in the valley on 25th June 2017** from 11 am to 4pm to show the public all the improvements made to the site. This involved FoLV and BBOWT volunteers.

Activities on the Open Day included guided walks, reed-scything demonstrations, minibeast hunts, a pond-life display and a geological specimen display.

*Photo by Marilyn Cox*

## General Comments on Species Recorded in the Valley during 2016-2017

Since the opening up of the margins of stream and ponds, grey wagtail and kingfisher are seen much more frequently in the valley. **A mammal survey** by Longworth Trapping under the guidance of Alison Leaf of Oxfordshire Mammal Group confirmed the presence of small mammals such as common shrew, bank vole and wood mouse. Harvest mouse nests were found by volunteers during reed cutting and raking on the west bank fen in the SSSI. A well-worn badger path through the fen testifies to frequent use of the site by this mammal and there is a single-hole set on the SSSI margin. Muntjac deer and even roe deer are regularly seen. The west bank fen receives the sun in the morning and observations of reptiles such as slow worm and common lizard there show how important returning this area to short fen is to these animals, which need opportunities to bask and warm up before hunting. Frog spawn numbers have greatly increased in the ponds, now they are open and sunnier.

**The first bat survey** was carried out by Keith Cohen and Dani Linton of Oxfordshire Bat Group, who visited and used hand-held and static detectors in July 2017. Their initial results are as follows ('files' = audio records):

1. **Common pipistrelle, *Pipistrellus pipistrellus*** (>70% files, including social calls and mother-infant contact calls from foraging pairs).
2. **Noctule, *Nyctalus noctula*** (~10% files)
3. **Myotis spp.** (~10 - 15% files, most are probably **Natterer's, *M. nattereri***).
4. **Soprano pipistrelle, *P. pygmaeus*** (~5% files), surprisingly few given the damp habitat but maybe not enough open water.

**Invertebrate records** continue to accumulate for all areas. Important records are the first silver-washed fritillary and the first flecked general soldierfly. As to important plants found, a good number were on the Oxfordshire Rare Plants Register<sup>1</sup> and the England Red List<sup>2</sup>, including the attractive marsh helleborine orchids and common spotted orchids, and there was a marked increase in the flowering of the common cotton grass, broad-leaved cotton grass and marsh lousewort.



*Flecked General soldierfly, Stratiomys singularior*

---

<sup>1</sup> Erskine, S.E., Killick, H.J., Lambrick C.R. and Lee, E.M., *Oxfordshire's Threatened Plants*, ISBN: 978-1-874357-84-1, [publication announced for Spring 2018](#)

<sup>2</sup> **Botanical Society of Britain and Ireland**, *A Vascular Plant Red List for England* (updated 18.11 2014). Available from: <https://bsbi.org/england>



There were big increases in parsley water dropwort and bog pimpernel on the west side of the SSSI.

Most plant recording in 2017, however, focused on detailed recording of marked squares in the west-side fen, as discussed below. Full details are in the tables in the appendix.



*Broad-leaved cotton grass,  
Eriophorum latifolium*



*Parsley water dropwort, Oenanthe lachenalii*



*Parsley water dropwort, Oenanthe lachenalii, and blunt-flowered rush, Juncus subnodulosus*  
9 July 2017



## Results - details of work carried out on specific areas

### A. Work on the relic fen in the LWS/LNR area north of the SSSI

With the removal of so much woody growth and the reduction in shade, abundant flowering in a variety of wetland herbs (especially hemp agrimony, meadowsweet, tufted vetch and greater bird's foot trefoil) was visible. This benefitted many insects especially bees and butterflies. A much more attractive and interesting view down the valley has resulted. Walkers enjoying a walk along the valley bottom no longer feel 'hemmed in' by dense bramble and scrub as they did before.

Retention of spring water flow by small bunds has resulted in much wetter fen conditions and the old greater tussock sedges are now thriving in small pools



*Above: Greater bird's foot trefoil flowers, Lotus pedunculatus, with common carder bee, Bombus pascuorum*



*Right: Greater tussock sedge, Carex paniculata, in new pool*

An area needing attention in the LWS was the footpath leading from the fen in the valley bottom up a steep slope to Peat Moors road. This had really become so overgrown that it resembled a steep tunnel through dense scrub.

The previously-installed steps were very difficult for some people to negotiate. The target was therefore the preparatory removal of scrub, small trees and bramble either side of the current straight footpath up to Peat Moors road.

This work has cleared the way for a re-design of this access path. A safer and easier route will involve a more winding path that has a less steep slope and therefore occupies a wider area of the bank.

Around this path, flowery short turf will be encouraged by spreading seed from other biodiverse areas.





*Pathway to Peat Moors before work started*



*Peat Moors path clearance as at 6 December 2017*



## **B. Fen Work in the SSSI, West side**

Work has focused on restoring the sloping fen on the west side. Previously this area was mostly densely reed-dominated. In March 2017 a large multi-trunked collapsed crack willow in the centre of the west side was felled by OCC staff. This tree had been growing from a very strong spring and shading a considerable area of fen with its collapsed branches. The willow logs from this felling were gathered together and remain as a habitat pile in the middle of the slope. Water previously lost through transpiration from the willow leaves now remains in the soil and flows from the spring. This stronger spring flow has been held up and directed downslope to the south to effectively re-wet previously dry peat areas. Additionally, the spring flow has been held up by small log and peat barriers to create a sequence of three shallow pools on the slope.



*Before removal of big crack willow – 9 April 2016*



*After removal of crack willow, 15 March 2017*





*Dammed pools created in spring flow after removal of willow*

Restoration scything and raking has now extended south to include the whole of the area on the west side of the SSSI that was previously dominated by reed. The most difficult cutting and raking session took place in early spring when the reed was cut for the very first time and so was all dead, tough, stalks, with a thick layer of dead thatch. This initial cut and clear was followed by 3 sessions of cutting and raking during the growth period of the reed, when it was softer and green (in April-May, late June to early July and September-October). Cutting and raking became noticeably easier with each session, as the reed re-growth weakened. This has very effectively reduced the vegetation's overall height and promoted the return of greater biodiversity of smaller plants. Some of these have sprung up from the buried seed bank in the peat and others have arrived via wind-blown seed from nearby species-rich areas.



*Richard Queralt scything old reed 18 January 2017*





*Oxford Conservation Volunteer scything, July 2017*



*Friends of Lye Valley volunteers raking, July 2017*

All cut vegetation material from this west bank has been raked downslope and positioned on the brook banks, where it performs a useful function in rebuilding the eroded bank behind the wickerwork bank defence structures (see pages **21** and **22**).

This cut material will eventually rot down to produce new peat, going some way to replace that lost to flash-flooding erosion.

Path improvements on the top west bank by the OCC Thursday volunteer group have provided better public access along the edge of the Churchill Hospital site from Warren Crescent to the Churchill Hospital field. Consequently more of the west SSSI fen can now be re-wetted with spring water.

### Detailed vegetation monitoring

As soon the tall, old, reed on the western fen slopes had been cut and raked off a couple of times in 2017, it was thought useful to set up a more detailed monitoring system for herbaceous vegetation to obtain more accurate records and to enable repeat recording of a defined area to chart fen restoration progress over future years. This 2017 study will provide a baseline of the vegetation composition immediately after return of the area from dense reed to short turf fen to compare with future similar assessments. Hopefully over time, lost species will be able to re-colonise once the area is regularly shorter.

In order to obtain a frequency value for each plant species, two 20m x 20m square sections of the cleared west fen slope within the SSSI were marked out and vegetation within each square was assessed by recording the presence or absence of species in 40 random 28cm diameter quadrats (actually circular 'roundrats'). This vegetation recording method has recently proved useful in Cothill Fen SAC (Snowdon 2017). The two 20 x20m squares can be re-located fairly accurately in the future for re-recording using the same method. The two squares are separated by a strong spring which flows down this western slope.

The southern square 1 is in a very damaged area on this bank. It had been subject to repeated arson incidents when it had been tall unmanaged reed.



*Snip taken from Bing aerial view of Lye Valley*

<https://binged.it/2BPd5qG>

*Date of photography is unknown*

The last burns of this area I witnessed were in 2006 and 2014 (see *photos below*) but I am informed that there have been regular previous burns (pers. comm. Countryside Rangers) necessitating the OCC staff to attempt to control fire spread by cutting a fire break through the middle of the reed on this western slope annually.



*Burnt area on 01 June 2014*

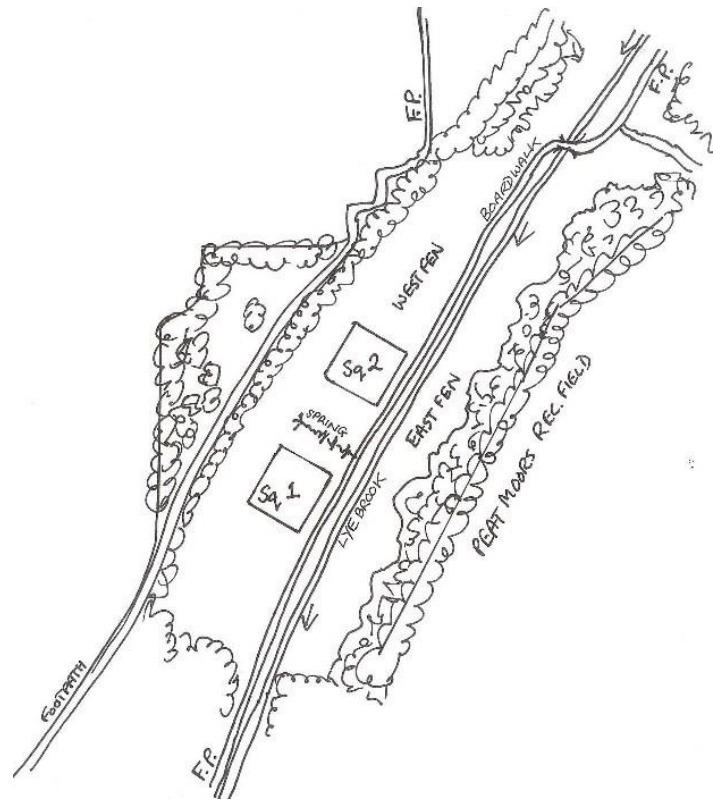


The northern monitoring square is in the fen section immediately north of the sewer hatch on that side and had not been subject to previous arson incidents in 2006 and 2014. Both squares had previously been mainly tall unmanaged reed up until the end of 2016.

Plant Species diversity here had been very low with only four species: reed, nettle, great bindweed and hemp agrimony. See sketch map, **Figure 3**, (*next page*) for square locations.



**Figure 3:** Sketch map of location of plant-monitoring squares on the western side sloping fen



*The area of quadrat vegetation monitoring in square 1, on 22.10.2017.*

*Two corners of the square are indicated by the stake with the red ribbon and the red arrow.*

*The piles of hay from the east side are ready for spreading.*

**Table 1:** Percentage frequency of plant species in 40 random quadrat samples in each of two separate 20 x 20m squares of the restored west bank fen in 2017

For each square, the presence/absence of species is scored for each random quadrat, and the total for each species is expressed as % frequency, i.e. total number of presences/40x100.

**Ex-arson square 1** centre SP54705 05783, date sampled: 18.10.2017

**North of sewer hatch, square 2,** SP54738 05827, date sampled: 30.08.2017

Frequency in 40 random quadrats in 20 x 20m squares in west side sloping fen		Ex arson square 1	North of sewer hatch, square 2
Scientific name	Common name	% Freq	% Freq
<i>Ajuga reptans</i>	Bugle		10
<i>Angelica sylvestris</i>	Wild angelica	2.5	
<i>Brachythecium rutabulum</i>	Rough-stalked feather-moss	32.5	
<i>Buddleja sp</i>	Buddleia	7.5	
<i>Calystegia sp</i>	Greater bindweed		5
<i>Cardamine flexuosa</i>	Wavy bittercress	65	12.5
<i>Carex pendula</i>	Pendulous sedge	2.5	2.5
<i>Cirsium arvense</i>	Creeping thistle	15	
<i>Cirsium palustre</i>	Marsh thistle	2.5	7.5
<i>Cirsium vulgare</i>	Spear thistle	2.5	
<i>Conyza sp</i>	A Canadian fleabane	7.5	
<i>Cratoneuron filicinum</i>	Fern leaved hook moss		22.5
<i>Epilobium hirsutum</i>	Great willow herb		2.5
<i>Epilobium sp</i>	Willow herbs	27.5	
<i>Eupatorium cannabinum</i>	Hemp agrimony	10	20
<i>Funaria hygrometrica</i>	Bonfire moss	7.5	
<i>Galium aparine</i>	Cleavers	10	2.5
<i>Hypericum tetrapterum</i>	Square stalked St John's wort		7.5
<i>Juncus articulatus</i>	Jointed rush		5
<i>Juncus inflexus</i>	Hard rush	2.5	
<i>Juncus subnodulosus</i>	Blunt-flowered rush		5
<i>Lythrum salicaria</i>	Purple loosestrife		10
<i>Marchantia polymorpha s.l.</i>	Umbrella liverwort	5	
<i>Nasturtium officinale</i>	Watercress	2.5	
<i>Pedicularis palustris</i>	Marsh lousewort		2.5
<i>Pellia sp.</i>	Pellia liverwort		2.5
<i>Phragmites australis</i>	Common reed	95	100
<i>Picris echioides</i>	Bristly ox-tongue		2.5
<i>Plagiomnium sp</i>	A thyme moss		2.5
<i>Poa annua</i>	Annual meadow grass	2.5	
<i>Poa trivialis</i>	Rough-stalked meadow-grass	22.5	5
<i>Ranunculus repens</i>	Creeping buttercup		2.5
<i>Rubus fruticosus</i>	Bramble	2.5	5
<i>Rumex obtusifolius</i>	Broad leaved dock	2.5	
<i>Scrophularia auriculata</i>	Water figwort	5	27.5
<i>Senecio jacobaea</i>	Common ragwort	5	2.5
<i>Senecio vulgaris</i>	Groundsel	2.5	



Frequency in 40 random quadrats in 20 x 20m squares in west side sloping fen		Ex arson square 1	North of sewer hatch, square 2
<i>Silene flos cuculi</i>	Ragged robin		5
<i>Solanum dulcamara</i>	Bittersweet	2.5	10
<i>Sonchus arvensis</i>	Perennial sow thistle	2.2	10
<i>Sonchus asper</i>	Prickly sow thistle	2	
<i>Sonchus oleraceus</i>	Common sow thistle	10	15
<i>Stellaria media</i>	Chickweed	5	
<i>Taraxacum sp</i>	Dandelion	10	2.5
<i>Trichodon cylindricus</i>	Cylindric Ditrichum	7.5	
<i>Urtica dioica</i>	Common nettle	32.5	
<i>Veronica beccabunga</i>	Brooklime		2.5
<b>Number of wetland species</b>		<b>9</b>	<b>17</b>
<b>Number of non-wetland species</b>		<b>23</b>	<b>12</b>
<b>Total number of species</b>		<b>32</b>	<b>29</b>

### Interpretation of vegetation data in squares

From these results it can be seen that cutting and raking of Square 2 for one year has resulted in 17 wetland species being now present, including the return of very desirable ones such as: blunt flowered rush, purple loosestrife, bugle, hemp agrimony, marsh lousewort, ragged robin, square-stalked St John's wort, marsh thistle, brooklime, water figwort, and especially the fern-leaved hook moss. It had fewer non-wetland species (12) with only small representation of common weedy species like: ragwort, cleavers, sow thistles bristly ox-tongue and great bindweed. Whilst reed still occurs in every sample, what is not shown in this data is that it is actually only a quarter of the height and biomass it was in the previous year, meaning its suppressant effect on other species is much less.

In contrast, the cutting and raking of square 1 for a year has produced different results. It should be remembered that this area had been subject previously to repeated arson, meaning the seed bank might have been reduced by heat and the ash from burning would have meant a flush of phosphate and nitrate, enriching the peat and stimulating the re-growth of reed and other species with a high nutrient requirement. It had only 9 wetland species with the most frequent being the wavy bittercress, a common species with long lived seed, which has arisen from the seed bank. The most desirable wetland species found were only small amounts of angelica, hemp agrimony and common fleabane. Water cress and nettle are typical of enriched soils. The vast majority of the species found were non-wetland ones (23 species) with a big component of common weedy species such as: willow herbs, creeping thistle, ragwort, groundsel, sow thistles, a Canadian fleabane, buddleia, dandelion, chickweed and cleavers. The rough-stalked feather-moss is a common species very typical of nutrient-enriched sites and the bonfire moss is always one of the first to colonise burnt areas. Again reed occurred in almost every sample but was only a quarter of its previous height and biomass.

It will take a couple of years for the vegetation response to the new regime of cutting and raking to be visible. Species may need to recur from the seed bank and then grow for a couple of years before getting big enough to flower and be identifiable. This applies particularly to difficult plant groups like sedges and rushes.

However, given the very poor response of wetland species recovery in the arson-damaged square 1 (due probably to lack of seed bank) it was decided to target this square with spreading of seed-rich hay and hand collected seed from the more biodiverse areas of the site such as the east side fen. This is an experiment to see if a valuable fen flora can be restored quickly even in areas that have suffered such repeated arson damage combined with no previous cutting and raking management. Getting the 'more desirable' wetland species in early by seed may prevent less desirable weedy common species becoming dominant. Even so, hand weeding out of unwanted species such as: buddleia, cleavers, ragwort and hard rush may be necessary to give the desirable wetland species more chance of thriving.

Both squares 1 and 2 will have the same cutting and raking regime in future years.

## Fen Restoration by re-introduction of seed

Experience, and consultation of literature, have shown there to be a number of fen plant species that cannot be restored to a wetland site that has lost them simply by instituting a regime of cutting and raking (or grazing). These are species with very short-lived seed; therefore there will be no store of dormant seed left in the peat to germinate following vegetation reduction and peat disturbance (because it could be up to 100 years since these plants last grew and seeded on site under the previous historic light extensive grazing). Conditions may now be suitable, with shorter, wet turf, but the only way to get these species back on site is by re-introduction.



One such example of a historic, valuable, fen species with very short-lived seed is the devil's-bit scabious *Succisa pratensis* (now on the New England Red List<sup>3</sup> as 'Near Threatened'). This species exists on the east side of Lye Valley fen but has very poor seed dispersal, so is extremely unlikely to be able to colonise the west side restoration areas without some assistance. In the past, under light extensive grazing, such species would have moved around to new areas in mud on the feet of grazing stock. Without stock movement such species are 'locked into' the area they currently occupy and have no means of spread.

*Devil's bit scabious, Succisa pratensis, in Lye Valley Fen*

The east side fen has been used as a source of seed. This is available from cut hay raked up in normal October fen management and from specific harvesting of selected species from the east side fen. This hay was cut and bagged up in October and then spread evenly over western side marked square 1. It will contain only a limited range of plant species seed (many species would have shed seed at least a month earlier, so seed may not be present in the hay).



To overcome this limitation a small amount of separately hand-collected seed of the following species from the Lye Valley east side fen was also scattered over the southern square 1: marsh lousewort *Pedicularis palustris*, greater bird's foot trefoil *Lotus pedunculatus*, wild angelica *Angelica sylvestris*, meadowsweet *Filipendula ulmaria*, purple loosestrife *Lythrum salicaria*, tufted vetch *Vicia cracca*, yellow loosestrife *Lysimachia vulgaris*, parsley water-dropwort *Oenanthe lachenalii*, blunt-flowered rush *Juncus subnodulosus* and devil's-bit Scabious *Succisa pratensis*. Hay and seed spreading was carried out at the end of October 2017. No hay or seed was spread on the northern square 2. This square will thus act as a control, and detailed recording of it will demonstrate what plants will return without any additional help from hay or seed enhancement from the east-side fen.

Above: Volunteer spreading hay from the east side on cut-over area in square 1 of west-side fen

<sup>3</sup> Botanical Society of Britain and Ireland, *A Vascular Plant Red List for England* (updated 18.11 2014). Available from: <https://bsbi.org/england>





The inclusion of marsh lousewort in the spread seed is expected to help speed fen restoration, as it is a hemiparasite. This means its roots join with those of surrounding grasses, rushes and sedges, siphoning off water, sugars and other nutrients. This activity weakens surrounding species, reducing their height and shading ability, allowing other small plants to thrive.

*Marsh lousewort, Pedicularis palustris, in Lye Valley Fen*

As marsh lousewort is a biennial, when it dies, it leaves a patch of bare peat which is ideal for seed germination and seedling survival of other small plants with little competitive ability. In this way marsh lousewort is a key plant which acts as an 'ecosystem engineer' (Decleer, Bonte & Van Diggelen, 2013). Its presence is likely to achieve a more biodiverse plant assemblage, as is clearly seen in the Lye Valley fen.

Marsh lousewort flowers are also much enjoyed as a nectar and pollen source by bees of all types.

*Bog pimpernel spreading under dead marsh lousewort*





### C. Glades and sunny, open, flower-rich areas on drier slopes and banks



Good progress has been made in scrub removal and nettle-pulling on drier margins – insects that breed in fens need the nectar and pollen sources in adjacent dry-land areas to complete their life cycles. This is also helping common butterflies, such as ringlet, orange tip, meadow brown, gatekeeper, various whites and marbled whites; increased numbers of all these are now seen. On the east bank, the patch of ground elder, now regularly in full sun, has flowers covered with insects in early spring.

This good resource is now augmented by a greater amount of the annual garlic mustard, the food source of the orange tip butterfly.

*Left and below: garlic mustard, Alliaria petiolata, in flower*



Blackthorn re-growth in more sunny conditions has shown the first eggs of the brown hairstreak butterfly and a silver-washed fritillary was seen flying through the top end of the valley.

Not all bramble is being removed; selected patches are being left, as the flowers are a good nectar source in summer, berries are important for birds and badgers, and many types of moth have caterpillars that depend on the leaves.

Patches of dense scrub will also be important for bird nesting. Most of the scrub-cutting arisings are being used in the nearby brook-bank restoration, but some log and brash piles are being left as habitat piles in areas above the spring line.

*Eggs of brown hairstreak butterfly, Thecla betulae, on blackthorn*



The drier top of the west bank of the SSSI has an area of young English Elm suckers that have reached the age and trunk diameter to be affected by the specific bark beetle and are thus dying from Dutch Elm disease.



Before these elms die completely and elm as a species is lost to the valley, work has begun on restoring a small elm copse here thanks to a donation of one disease-resistant elm from the charity [Butterfly Conservation](#).

The aim is to support the needs of all elm-dependent invertebrates. As rare white-letter hairstreak butterflies exist in the Headington area, hopefully some may find the young disease-resistant elms as these grow to trees.

*Peter Cuss, member of the Upper Thames branch of Butterfly Conservation, and Judy Webb ready to plant an elm of a variety that is resistant to Dutch Elm disease – *Ulmus minor Ademuz**

*Photo by Tony Gillie  
November 2017*



*Planting more disease-resistant Elms - February 2018*

*Photo by Tony Gillie*

#### **D. Pond enhancement in the LWS south-western area**



Pond marginal work has continued - removing young willow and scything-back reed regularly throughout the year.

Gradually shade is being reduced, although tall willows on higher ground to the west and private land to the east still shade the ponds for a good proportion of each day.

The ponds are small, so rampant growth of reed sweet grass and water cress, which threatened to completely fill one pond, has been reduced to maintain open water to favour dragonflies and damselflies.

*Removing excess pond vegetation to maintain open water - 8 June 2016*

#### **E. Brook bank defence and restoration, fen re-wetting**

Scrub removal has provided ample material (particularly hazel stakes and wands) for producing wattle/hurdle like structures to protect the eroding brook banks as it runs through the fen in an over deep channel.

The small area behind the woven structure is filled with vegetation cuttings and brash stamped down. This stops the peat banks being further destroyed in storm water flash flooding and the vegetation and brash will be added to each year.

With compression and water-logging it will eventually turn to new peat held in place by the woven hazel structure.

There are plans to eventually slow the water flow and raise the water level in the brook to achieve further re-wetting.

Large fallen rotting willow trunks have been usefully repositioned along the edges of the bank to impede water flow off the fen from the springs and re-wet the dry peat on brook margins.





*Hazel wattle structure and cut material used in bank restoration*



*Group of volunteers re-positioning rotting willow trunk along bank to retain spring water.*





*New small pools produced by re-wetting activities*

Rewetting the dry peat margins to the brook benefits more than wildlife. Drying peat oxidises under the action of aerobic bacteria, liberating carbon dioxide. Thus, the drying areas of the fen in the valley are significant carbon emitters. Re-wetting that peat and restoring anaerobic conditions prevents this. With enough re-wetting, fen vegetation is stimulated to grow, removing carbon dioxide from the air in photosynthesis. When leaves die, they lie in waterlogged anaerobic conditions where they do not decay, but gradually become new peat, storing (sequestering) carbon removed from the air. The main point is that re-wetting the Lye Valley fen enables more carbon dioxide removal from the air, a target of wider importance to the city

### **Water quality issues in the fen springs on the western side**

Contamination by excess nitrate has been identified in the water issuing from the west side springs in the SSSI and LWS. Given that the source of this nitrate could be either leaking water mains or sewers in the developments to the west of the reserve, identifying the source and rectifying the pollution will prove difficult. In the meantime, regular vegetation cutting with raking-off will remove nitrogen in plant material and go some way towards reducing the negative effect of this pollution; which is to stimulate rampant thug species like reed, to the detriment of smaller plant species and with the consequent loss of open, sunny, short vegetation.

### **Friends of Lye Valley Fen first Open Day on 25<sup>th</sup> June 2017 - public engagement**

This event was designed to show off the positive changes in the valley with on-going fen restoration of the past few years and to provide some interesting wildlife experiences for young and old.

Overall attendance was estimated at 100, including children. Two guided tours of the valley were very popular, attracting 20+ each time. As part of the tour, volunteers Richard Queralt and Jim Ballantyne demonstrated fen management by reed scything and gave short talks describing the use of Austrian Scythes.



*Richard Queralt explaining how Austrian Scythes are used to control and reduce reed in the fen restoration area  
Photo by Christopher Hoskin*



*Jim Ballantyne demonstrating how a scythe is sharpened - photo by Marilyn Cox*





*One of the guided walks through the valley – photo by Christopher Hoskin*



*Identifying insects children had knocked from shrubs onto a Bignall beating tray  
Photo by Marilyn Cox*

Refreshments (and access to toilets) were provided by the team (Hogley Bogstars) at Bullingdon Community Centre off Peat Moors road adjacent to the valley. Sophie Clegg attended for BBOWT and supervised model dragon-fly making for the children. There was a popular display of pond creatures in tanks. Children were helped/supervised in sweep netting and beating bushes for minibeasts. Owen Green of Oxford Geology Trust showed off the rich fossil heritage of the Lye Valley.

The only thing that could be improved for future Open Days in the valley is the footpath - making the steep footpath up from the board walk to Peat Moors road easier to traverse for those wanting to access the Bullingdon Centre for toilets and refreshments.

## **RECOMMENDATIONS FOR FUTURE CONSERVATION MANAGEMENT AND PUBLIC ENGAGEMENT within the Wild Oxford Project at Lye Valley**

- **Prioritise work on the footpath down to the valley from Peat Moors Road.** Public access needs to be made easier and safer on this steep slope. This will enable further Open Day events to operate with less risk of slips or trips.
- If the **transfer of species-rich hay and hand-collected seed** from the east side fen to one of the monitoring squares on the west side fen has resulted in desirable wetland species appearing, repeat the process for a second year.
- **Another 20m of recycled plastic boardwalk** would complete the southern extension to the very edge of OCC owned land and would beneficially provide access over a very wet muddy area.
- **For reptiles and amphibians, refuge piles need to be constructed** in appropriate sunny positions and **monitoring mats or sheets placed adjacent for some time before surveys** so that animals can find and use them.
- **Further planting of a greater range of species of useful scrub and tree species on the drier banks** will add to the biodiversity. This should include a few more Dutch-elm-disease-resistant elms, spindle and some UK sourced small-leaved lime.

## **SUMMARY AND CONCLUSIONS**

The BBOWT Wild Oxford Project continues to make a big difference to the habitats in the Lye Valley North Fen area in conjunction with work carried out by other conservation groups. All target areas continue to show positive change.

Volunteers' time has been spent on work on removing scrub and willows growing out of wet peat and tufa-forming springs, reed cutting in the SSSI and pond marginal work, with the biggest degree of change visible all along the western side of the site.

Scrub on dry banks either side of the access footpath to Peat Moors has been cleared in preparation for footpath improvements here.

Four out of the six ponds are now open, less shaded and surrounded by shorter vegetation, which means the wildlife is more visible and much enjoyed by all visitors.

A lot of bank defence and repair using logs and hazel wickerwork has reduced bank erosion from flash flooding in the Lye Brook.

Low peat ridge bunds on the fen surface have retained more spring water, re-wetting dry peat and creating a complex network of shallow warm pools which will favour the breeding of many invertebrates.

A repeatable detailed assessment of vegetation response to the reed cutting and raking on the western slope of the SSSI has been set up.

Fen remediation is being accelerated by the first trial of species enhancement by spreading seed-rich hay and seed of specific key plant species from the very biodiverse east-side fen to the restoration area on the west-side fen. The success of this will be monitored next year and will provide valuable evidence on this method for future additional fen restoration.



### **Achievements are:**

- Further reduction in reed-dominated fen on the west bank of the SSSI through reed scything and willow scrub removal. Further extension of the short-turf fen all the way to the southern limit of the SSSI. Reed has been weakened, resulting in greater plant and invertebrate biodiversity returning to this west side.
- The reduction of reed in the whole of the west-side sloping fen of the SSSI has ensured there will be no possibility of future arson damage to the biodiversity of this area or arson damage to the recycled plastic boardwalk (assuming, of course, that the reed can be kept under control in future by annual cutting and raking).
- Bank defence structures using staked woven hazel wattle structures are reducing peat loss due to flash flooding erosion in the fen and assisting in the re-wetting of dry peat margins to the brook.
- Previously dry peat areas have been significantly re-wetted on the west side of the SSSI and LWS by removal of drainage pipes from under the boardwalk and construction of low water-retaining bunds. Peat is thus prevented from oxidising and a new complex of small, warm, shallow pools favours breeding of invertebrates, such as specific flies and beetles.
- LWS areas in the northern section of the site have shown an increase in sunny, warm, conditions as a result of further scrub work and vegetation cutting and raking. A reduction in scrub and bramble enabled abundant flowering of tall herbs, which attracted a greater diversity of insects, including more bees and butterflies.
- Four of the six ponds have had their water level raised and marginal scrub and reed reduced, producing open, sunny, warm conditions, which have resulted in greater aquatic plant diversity, increased use of the ponds by frogs and a diverse range of aquatic invertebrates, as well as attracting spectacular damselflies and dragonflies.
- A very successful first Friends of Lye Valley Open Day on 25 June 2017 achieved a great deal of useful public engagement and education.
- Re-wetting is ensuring previously dry peat areas in the valley are slowly being changed from carbon emitters to carbon storage areas (carbon sequestration).

### **ACKNOWLEDGEMENTS**

I am grateful to Carl Whitehead of OCC for discussions and for access to documents held on the site in OCC archives and to Andy Gunn of BBOWT for discussions as the work progressed. Thanks are due to Alison Leaf of the Oxfordshire Mammal Group for assistance with small mammal trapping and to Keith Cohen and Dani Linton of the Oxfordshire Bat Group for their voluntary bat surveying. Marilyn Cox gave invaluable editorial help with this report.

### **REFERENCES**

**Botanical Society of Britain and Ireland, A Vascular Plant Red List for England** (updated 18.11 2014). Available from: <https://bsbi.org/england>

**Decleer, K., Bonte, D., and Van Diggelen, R. (2013)** The hemiparasite *Pedicularis palustris*: 'Ecosystem engineer' for fen-meadow restoration. *Journal for Nature Conservation* 21, 65-71.

**Erskine, S.E., Killick, H.J., Lambrick C.R. and Lee, E.M., Oxfordshire's Threatened Plants**, ISBN:978-1-874357-84-1, publication imminent at date of this report.

**Snowdon, H-L (2017)** A Vegetation and Hydrological Study of Parsonage Moor, Cothill Fen, Oxfordshire. MSc presentation, Oxford Brookes University.

**APPENDIX 1 Data not previously submitted up to 2017 for all areas within the LNR/SSSI**  
(please see separate document)