

**BBOWT Wild Oxford Project**

**Lye Valley North Fen**

Report on the first year, 2014-2015

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*Lye Valley North Fen SSSI, 20.05.2014*

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## General introduction and aims of the project

The Wild Oxford Project is a collaborative initiative of BBOWT and Oxford City Council, grant-funded by the Heritage Lottery Fund (HLF) and the Trust for Oxfordshire's Environment (TOE2)

### Aims:

- Introduce local people to the wildlife on their doorstep
- Enable local people to take an active role in enhancing and protecting the sites

All photographs in the account which follows are my own.

## Type and importance of the habitat

The Lye Valley still has good examples of an alkaline (rich) fen wetland, which is an **Annex 1 habitat (7230) under the EU Habitats Directive (see JNCC references)** because of the great losses already suffered in Europe. It is a valley-head fen resulting from a series or line of springs at the junction of Jurassic clay and overlying Jurassic limestone of the Corallian series. This rich fen, a peat-forming wetland that receives mineral nutrients from groundwater that is calcareous, issues from a limestone aquifer underlying the higher ground around the valley. The substratum is waterlogged peat, which has a high pH and high mineral content, particularly calcium. The higher mineral levels allow a more diverse plant and animal community to be supported than that found in an acidic bog.

The Oxfordshire group of calcareous species-rich fens is the largest remaining set of such habitats outside East Anglia and North Wales and contains elements of the flora and fauna that are intermediate between those areas. Oxfordshire has 13 fens designated SSSI, with the Cothill complex of fens also designated a SAC (Special Area of Conservation) due to its European importance.

As well as peat, there is so much calcium in the spring water that whitish tufa (lime or calcium carbonate deposits) form. Associated with this high pH and tufa-formation is a range of specific plants and invertebrates, some very rare. These fens can also be called 'brown moss fens' because of the range of specific, scarce, red/brownish moss species that are a feature. The most important type of alkaline fens are those that have been managed (cutting, grazing) to retain the short-turf, floristically diverse, vegetation that has the 'brown mosses' and stonewort algae (charophytes) in pools, plus flowering plants such as marsh helleborine, marsh lousewort, grass of Parnassus, marsh pennywort, parsley water dropwort, bog pimpernel, marsh valerian, cotton grasses, blunt-flowered rush, marsh arrowgrass, yellow sedge, tawny sedge and distant sedge.

Recent assessment of the remaining resource of rich fen habitat by Tratt, et al. (2013) provides data for the **Alkaline Fen Inventory for England**. This shows that there are 40 ha of the NVC (Rodwell, 1991) designated fen types M13 and M13-related vegetation in England. The M13-related vegetation includes vegetation intermediate between M13 and other NVC types, including M10, M22, M9 and M24. It also includes 'recovering' previously damaged M13. Of this total of 40 ha, **vegetation unambiguously referable to M13 covers only 19.1 ha**. The stands of M13 and related vegetation captured in the project are believed to represent most, if not all, known examples in England.

### **The Lye Valley North fen SSSI unit has 1 hectare of the 19.1ha of M13 vegetation in England.**

Recognition of the value of the two remaining areas of high-grade fen came with SSSI designation of them in 1972.

**For further information on the history of these fens, see Appendix 1.**

### Problems facing the Lye Valley SSSI alkaline fens today

The biggest issue for the Lye Valley SSSI alkaline fens today is urban development in the rainwater catchment of the springs. Building over the catchment of a fen blocks rainwater recharge of the limestone aquifer. The effect on the springs is not immediate, because of the time delay from water entering the soil and passing through the aquifer to the springs. Whilst some effect may be seen quickly, there might be a 10-20 year delay between building on the catchment and the full reduction in spring flow becoming evident. Maintaining the pure-water chemistry of the springs (high pH, high calcium, low nitrate, low phosphate) is another absolutely critical factor and some springs show evidence of nutrient enrichment attributable to nearby development.

Road surface drainage was directed into the Lye Brook at the head of the valley from the start of house and road building nearby. There is currently a 600mm diameter Thames Water outfall here delivering road water from a large catchment from as far away as Headington Quarry and the ring road. By the late 1970s the flash flooding occasioned by this road run-off had caused considerable bank erosion, with the Lye Brook stream bed being lowered and gouged out to a deep gully. This lowered the water table in the best parts of the adjacent fen, drying it out and causing community change.

Remedial action of raising the stream bed with quantities of limestone chippings happened in 1985-1988 and this reduced the erosion rate.



*View of the limestone chippings and barriers installed in the brook bed to reduce bank erosion in 1985-88. Photograph 27.03.2015*

However, today flash-flooding continues to increase and the water table near the brook is still too low. The peat adjacent to the Lye Brook is too dry for quality calcareous fen vegetation or any active peat/tufa formation for an average 7 metres into the east (best) side (Webb, 2013). Shallow pools with stoneworts, so important as invertebrate breeding sites, never occur on the peat near to the brook edge and are found only in the centre of the east side.

The calculated rainwater catchments of the SSSI and LWS fen areas and a full discussion of hydrological matters currently affecting the Lye Valley fens can be found in **Lamberth (2007)**.

The fact that a good proportion of the best east-side fen area remains too dry for proper M13 wet fen is mostly responsible for the current Natural England SSSI Condition Assessment of the Lye Valley SSSI fen as '**Unfavourable, Recovering**'. Its recovering status is the result of ongoing better management, but it seems unlikely that progress to 'Favourable' Condition can happen without some reduction in bank erosion and achievement of re-wetting of former fen that is now too dry.

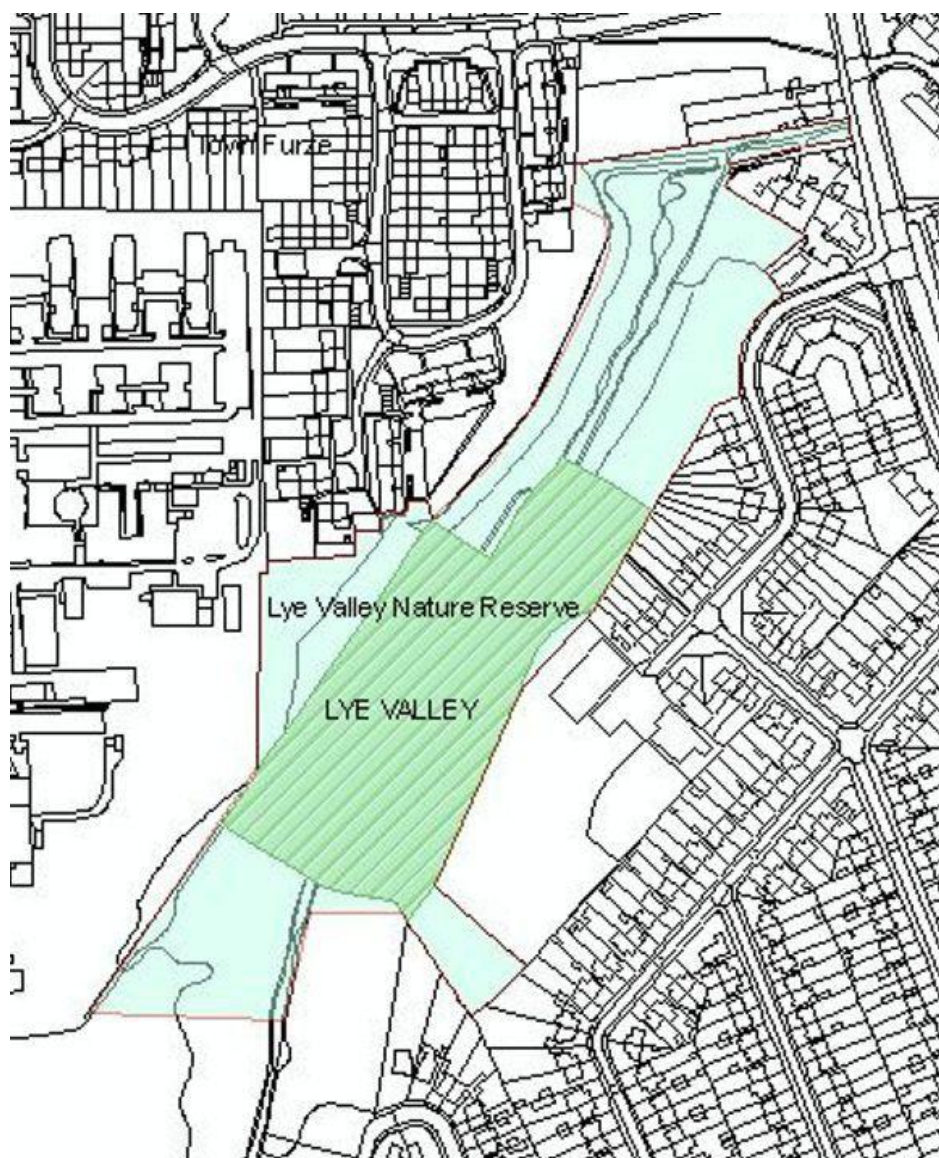
However, the good news is that OCC scrub and reed management of the east side since the mid-1980s has retained and greatly expanded the high-quality short fen habitat.

Two sewers were routed through the valley, including through the most valuable SSSI areas of fen to the east and west sides of the Lye brook.

The whole valley was the target of much fly-tipping in the years to 1978, when it was all cleared and fencing erected between the housing developments and the wildlife site, which has reduced but not eliminated the dumping. This tipping left the site with a problem population of Japanese knotweed on the west side above the actual SSSI area. This patch is now much reduced from the extensive 100m long patch which was once present.

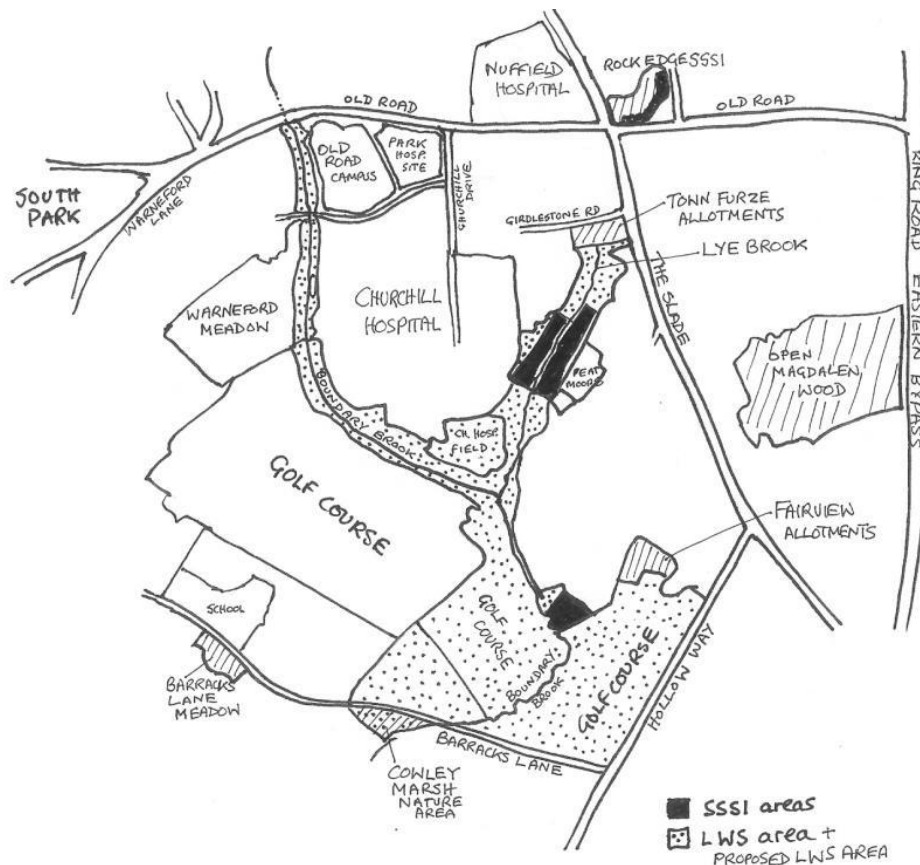
## Introduction and background to the project work area

**Figure 1:** Shading on the map below indicates land owned by Oxford City Council (OCC) all of which is a Local Nature Reserve (LNR) and the site of the BBOWT Wild Oxford Project. The whole of the shaded area and the unshaded area bordering its southern side (except for the two house gardens to the east) is included in the Lye Valley LWS. The darker shading with diagonal lines marks the North Fen unit of the SSSI. Map courtesy of the Countryside Service of OCC



**Lye Valley Local Nature Reserve** (owned by OCC, area 4.5 ha) 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, site centre SP 548057).

The sketch map below shows the inter-relationship between the SSSI units and the interconnecting LWS, which comprises mainly the wet vegetation corridors of both the Lye and Boundary Brooks with a portion of dry sandy and limestone grassland of the Oxford Golf Course.



**Figure 2:** Sketch map to show the relationship between the Lye Valley and Cowley Marsh LWS and the North Fen and South Fen units of the Lye Valley SSSI

Apart from their intrinsic wildlife worth, the LWS areas and other non-designated semi-natural areas of vegetation (for example roughs, fairways and copses on the nearby Oxford Golf course) have great worth in helping to buffer the SSSI separate units and improve the connectivity between these most wildlife-rich areas.

There are no fences or divisions between the SSSI and LWS areas, which contributes to the pleasant wild wetland vistas experienced by a casual walker. Trees screen the site from adjacent housing. Mobile animals move freely between the different areas as the needs of their life cycles dictate. Mobile species such as birds, badgers and most flying insects may be using not just the SSSI, but the whole wider LWS and undesignated green areas for support of their complete life cycles.



*View of the project work area in the LWS/LNR above the SSSI fen, looking north in winter and before any remedial work had started.*

*Note the old railway sleeper and netting board walk through wet peaty areas, 22.01.2008.*

The part of the LWS that comprises the whole of the valley up to the issue point of the Lye Brook above the designated SSSI area used to be termed '**Lye Valley Scrub SLINC**' (Site of Local Importance for Nature Conservation) until it was re-designated and upgraded. It is now included (as the northern part) in the larger '**Lye Valley and Cowley Marsh LWS**'. It is a complex of habitats of lower biodiversity than the SSSI to the south, although a couple of hundred years ago it was probably equal in habitat value as part of the old 'Hogley Bog', when the whole valley had light extensive grazing. However, uncontrolled plant succession in this area, along with the tipping of clay and building rubble to form steep embankments, has resulted in the following habitats present today:

- the stream (with erosion and pollution problems from a road run-off drain entering)
- scrub of blackthorn, hawthorn, willow, ash and bramble,
- shaded calcareous tufa forming springs and relic wet tall herb fen on peat
- secondary woodland on wet peat and on drier slopes. This includes planted trees of poplar and field maple at the valley head.

There is an abundance of nettles on the very steep slopes of the clay and rubble-tipped embankments (made-ground), which are found adjacent to housing developments to the east and west of the valley (Warren Crescent, Heath Close, Peat Moors). Some of the shallower area on a drier slope to the north-east side was historically allotments and this area is now extensively dominated by common nettle just down from the new house at No 167, the Slade.

Access to the site is by footpaths from The Slade, Peat Moors and Warren Crescent.



## Historical and current management

OCC staff from the newly set up Countryside Service started the removal of willow scrub that had colonised the SSSI fen in unrestricted succession around the mid-1980s. Willow trees were winched out leaving the valuable shallow pools. Annual cutting and raking up of reed and rush were confined to the SSSI east side fen, with only a fire-break corridor being cut in the reed-dominated western side sloping fen.

Volunteers from the Local Friends of Lye Valley and the Oxford Conservation Volunteers now assist regularly in the management of the SSSI by reed- and rush-raking and small scale scrub control work twice annually. Risings are raked to piles alongside the brook, where they may be used as refuge by small mammals, amphibians, reptiles and invertebrates.

Outside the SSSI area, management took the form of occasional tree work and path mowing and maintenance in the LWS/LNR areas. Spring-fed areas that were once peat-forming fen had progressed in succession to wet woodland, mostly dominated by grey willow and large crack willows with a restricted relic tall-herb ground flora. The crack willows had been kept pollarded in the past but this had not been done for many years, so shading had increased. Additional plantings of a copse of hybrid poplar, ash and field maple had been made at the head of the valley. Five young small-leaved lime trees have been planted at the top of the tipped embankment on the west side. Other tree introductions include hybrid whitebeam and alder buckthorn. On the east side, natural invasion of blackthorn scrub has allowed a small number of brown hairstreak butterflies to breed here.

The tipped embankment on the west side above the SSSI still has a small problem population of Japanese knotweed, which is treated annually with herbicide injections.



*East side fen SSSI  
looking south*

*Volunteers raking and  
removing reed, 14.10.2012*

Arson attacks happened regularly on the reed adjacent to the footpath on the west side of the SSSI but the firebreaks prevented it all burning at once. Arson attacks (usually in late spring to old, dry reed before new growth) have had the effect of stimulating reed growth on this side, so that with a history of no cutting it is a virtual monoculture except in the firebreak areas. Some previously burnt areas now have reed with an understory of nettle, a species known to be encouraged by nutrient release.



*West side of SSSI fen, ex-arson area adjacent to path, uncut for many years and progressed to reed monoculture - view from boardwalk, 18.02.2008.*

The northern end of the sloping West side of the SSSI has an excellent, strongly flowing, spring with abundant tufa production, so this has now been the target area over the last two years for carrying out reed cutting and raking twice yearly to remediate it to the short fen that would have been here 100 years ago under grazing. So far, six of the rare plants have recurred here, probably from buried seed: distant sedge, long-stalked yellow-sedge, bog pimpernel, marsh lousewort, parsley water-dropwort and marsh valerian. A big flush of commoner desirable species, such as hemp agrimony and yellow flag iris, was also noticeable following this management.



*Remedial cutting and raking to previously reed-dominated sloping west side SSSI fen, 30.06.2013, view from boardwalk*

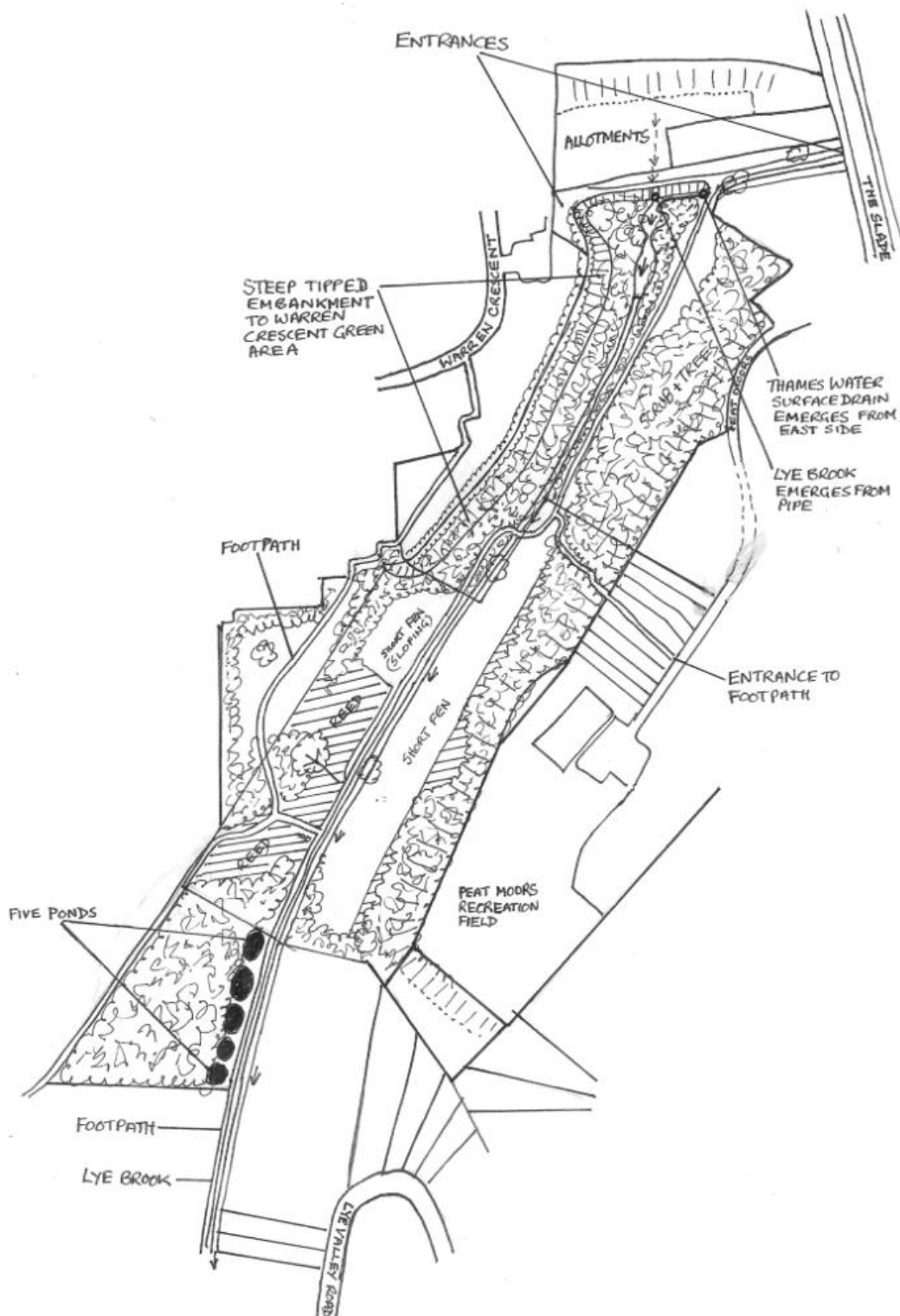
For the SSSI fen areas an early cut and rake of the most reed-dominated areas only happens sometime from the end of June to mid-July. This early removal of green leafy growth deprives the reed's underground rhizome of nutrition, thus resulting in shorter reed the following year and reduction of its shading, so a more biodiverse community of short fen species can thrive.

Sometime in October a cut and rake of the whole of the level east side and the newly short area of the west side is carried out. Cut material is raked by volunteers to habitat piles adjacent to the stream. This second cut removes tall, shading, vegetation, removes nutrients and gets light down to the peat surface to stimulate moss and charophyte growth and seed germination. The poaching from the trampling by the volunteers assists in bringing buried seed to the surface, so it can germinate.

For some years management has had to include constant repairs to the railway sleeper and netting boardwalk lain down through the wet peat area of the North fen adjacent to the brook. As this was set in the peat, it often became very slippery when water flowed over it. However, in 2013 the installation of a new raised recycled-plastic boardwalk through the wettest areas enabled access for walkers and runners to go dry-footed through the whole of the wettest fen section and reduced staff time spent on repairs.

### Habitats and Species at Lye Valley North Fen today

**Figure 3:** Sketch map indicating the juxtaposition and extent of the various habitat types in Lye Valley LNR/SSSI before the start of the Wild Oxford Project



## Alkaline fen

Tufa (lime, calcite, travertine) formation is known to remove and lock up phosphate during the process, so that plant growth is restricted, resulting in a very biodiverse community (rich fen) in which orchids are favored due to their dependence on symbiotic fungi, which thrive only in low phosphate conditions.

This high-quality M13 vegetation on the east side of the North fen SSSI area is still dominated by dense blunt-flowered rush, common reed, various sedges and marsh horsetail, but it also contains a variety of attractive common wetland plants such as ragged robin, purple loosestrife, common spotted orchid, devil's bit scabious, angelica, greater bird's foot trefoil and tufted vetch. As for rarer species, **20 vascular flowering plants here are on the county Rare Plants Register (RPR)** and it contains **14 species on the New Vascular Plant Red List for England** produced by the BSBI in 2014 (see details in the Appendices). The RPR is currently in production by the Ashmolean Natural History Society of Oxfordshire (ANHSO). Noteworthy is the large population (over 1000) of marsh helleborine *Epipactis palustris* orchids and an abundance of the partially parasitic marsh lousewort *Pedicularis palustris*, which reduces the vigour of plants nearby in the same fashion as yellow rattle does in a hay meadow. In the north fen area alone there are 16 species of sedge (*Carex* sp.) of which 7 are on the RPR, along with two species of cotton grass, *Eriophorum* sp. and a spike-rush (all on the RPR). This gives yet another index of the wetland quality.

**Proportionately there are more rare plants in the Lye Valley than in any other city site – at 20 species this is a third of the 61 species on the Rare Plants Register found within all the nature sites in and around Oxford that are managed by OCC.**



*Marsh helleborine orchid, Lye Valley SSSI north fen area, July.*

The Lye Valley SSSI fen areas actually retain one plant species (the small **few-flowered spike-rush** *Eleocharis quinqueflora*), which has been lost due to lack of cutting or grazing from every other Oxfordshire fen where it was historically recorded. They also have the biggest surviving county population of tiny **dioecious sedge** *Carex dioica*, which is reduced to only one other county site. These particular plants, along with grass of Parnassus and marsh lousewort, have northern, montane and even arctic distributions and are likely therefore to have been on site for a very long time - probably thousands of years - and in the category of 'late glacial relict species' today.

Eleven important vascular plant species appear to have been lost from the site since recording began in the seventeenth century (detailed in Appendix 2 and see Druce, 1886, 1927 and Killick et al. 1998, and the Draft Lye Valley Management Plan of 1987-88) including such specialties of M13b fen vegetation as black bog rush *Schoenus nigricans*, butterwort *Pinguicula vulgaris*, sundew *Drosera rotundifolia* and thick-nerved apple moss *Philonotis calcarea*. However, the recent re-discovery of one species that had been thought lost (dioecious sedge *Carex dioica*) gives hope that perhaps some of these apparently lost species could be encouraged back from seed or from un-recognisable non-flowering state.

Particularly important at this site are the waterlogged moss mats forming a layer under the vascular plants and around the pools and runnels. The common spear moss *Calliergonella cuspidata* is most frequent, with, in some wetter areas, a dominance of endive *Pellia endiviifolia*. Scarce species are, for example, tree moss *Climacium dendroides*, pale liverwort *Chiloscyphus pallescens*, marsh thyme moss *Plagiomnium elatum*, maidenhair pocket-moss *Fissidens adianthoides*, marsh bryum *Bryum pseudotriquetrum*, yellow starry feather-moss *Campylium stellatum*, claw-leaved hook-moss *Palustriella falcata*. The rarest and most important are curled hook-moss *Palustriella commutata* and intermediate hook-moss *Scorpidium cossonii* (previous lists and records as *Drepanocladus revolvens*), the latter being nationally rare. Several of these mosses are active tufa-formers and the mossy area is turned crunchy by a surface deposit of lime as they grow.



*Whitish tufa formation amongst mosses and sedges in north fen SSSI, east side May 2014*

Lizards and grass snakes are occasionally found basking in the fen but the whole valley area is very important for reptiles – grass snake & lizards and slow worms are also in adjacent Town Furze allotments. The housing nearby means that the cat population will be an important source of reptile and amphibian predation.

There is an eight-hole badger set in a dry bank just south of the SSSI on the east side and other holes at the top of the west bank SSSI fen. Badger foraging tracks criss-cross the whole site. Foxes hunt in the valley and can occasionally be seen lying on a reed pile in the sun. Muntjac deer are present and cause some destruction of orchid flowers by nibbling.

Common birds are present and even though the central stream is regularly polluted by sewage, grey wagtails have been seen in it. Reed-specific birds such as reed bunting and reed warbler are seen and heard but there has been no evidence of breeding recently. Bats have been noted but no species surveys have been conducted yet.

Water voles used to be present along both the Lye and Boundary brooks, but now the only holes visible in the eroding banks are those of the alien introduced Signal Crayfish.

The Lye Valley was historically one of the best recorded examples of a calcareous valley fen in southern England. The challenge in recent years has been to find out if the previous biodiversity is still present, even with habitat change and a degree of habitat loss.

As for invertebrates, calcareous fens are known to be rich in rare species. The BBONT Draft Management Plan for the Lye Valley of 1987-88 presents a large number of historic records of species, mostly from lists in the Victoria County History, i.e. pre-1938. These species were collected in the valley by eminent entomologists of the past such as A. H. Hamm and J. J. Walker.

Amongst the important invertebrates found, three groups of flies are likely to contain the rarest species, as they have wetland living larvae or depend on other wetland species: the crane-flies, soldierflies and snail-killing flies. The warm, shallow, pools on the fen surface are important breeding sites for darter dragonflies, flies and water beetles. Amongst common snails, the tiny, very local, marsh whorl snail *Vertigo antivertigo* is found around the shallow pools and the frequent common snails feed glow-worms *Lampyris noctiluca*.

A table of the most important invertebrates of conservation interest is presented in **Appendix 4**. Just as an example of the diversity of wetland insects, so far, 16 species of wetland-dependent soldierfly species have been found to be present, some of which are nationally scarce. See Porter (1992) for distribution of soldierflies in Oxon.



*Female banded general soldierfly Stratiomys potamida, on marsh lousewort in north fen 29.06.2014*

Some insects recorded on old lists have not yet been found. The loss of an invertebrate species from a site is quite difficult to be sure of, as a species may decline to levels that are un-recordable but still be present (pers. com. Darren Mann). The Victoria County history pre -1938 records (among others) a number of now very scarce to rare invertebrates, examples are: great green bush-cricket *Tettigonia viridissima*, silky snail *Ashfordia granulata*, variable damselfly *Coenagrion pulchellum*, marsh fritillary butterfly *Euphydryas aurinia*, snail-killing flies *Pteromicra glabricula* and *Pherbellia griseola*, the soldierflies *Odontomyia argentata* (silver colonel), *Oxycera pardalina* (hill soldierfly) and *Stratiomys chameleon* (clubbed general soldierfly) and psilid fly *Chyliza extenuatum*.

As for the bush cricket and the marsh fritillary butterfly, they are such obvious insects to spot, one can be fairly sure they are no longer present (not enough devil's bit scabious now for the marsh fritillary). However others that are very small or cryptic may yet be found because only sweep netting and limited suction sampling has been carried out on site in the last 12 years.

It has not been possible to run a malaise trap (which catches a large variety of flying insects) because of the risk of vandalism. Some may only be found by rearing to adulthood larvae retrieved from wetland moss or peat or from tufa material from springs. This activity is ongoing and such rearing has the advantage of providing evidence of exactly which wetland areas (which springs) are being used by a particular species with a mobile winged adult stage.

Fuller discussion of the importance of the various plant and invertebrate species discovered recently in the Lye Valley SSSI fens are to be found in my various reports to Oxford City Council (**Webb, 2007, 2008, 2009**).

### **Relic alkaline fen area, Northwest side of Lye Brook, below tipped embankment to Warren Crescent**

The area of the LWS/LNR north of the SSSI (grid ref SP 5484 0600) was dominated by large crack willows, some collapsed grey willow, bramble and young ash. A substantial zone of wet peat (indicating past fen) runs all along the base of the tipped embankment on the north-west side of the stream. Good, strong, calcareous tufa-forming springs were clearly visible and these have two remaining calcareous indicator bryophytes, which happen to be tolerant of a degree of shading – endive *Pellia Pellia endiviifolia* and fern-leaved hook moss *Cratoneuron filicinum*. In the spring, over these bryophyte areas, clumps of hemp agrimony *Eupatorium cannabinum*, wild angelica *Angelica sylvestris* and ragged robin *Silene flos cuculi* were indicators of a lost more valuable fen spring flora. There was much invasion by bramble scrub in the lighter areas.



*Grey willow scrub collapsed and rooting in wet spring-fed relic fen peat before start of project work, west side LWS/LNR area below bank to Warren Crescent, 14.03.2014*





*Relic fen area below Warren Crescent bank with crack willow, hemp agrimony and lesser pond sedge in tufa spring area, 18.09.2014*

### **Scrub and Secondary Woodland**

Before the start of the work, this area of the LWS/LNR was mostly impenetrable scrub (hawthorn, ash, crack willow, grey willow, bramble and blackthorn) and some mature trees. Much flowering ivy climbing up and over old hawthorns was a valuable pollen and nectar source later in the year. Wet peaty areas with some degree of tufa formation were completely overgrown and retained no relic wetland flora.

The valley is an important area for brown hairstreak butterfly *Thecla betulae* because of the blackthorn scrub. This species is monitored by egg searches every year on the blackthorn scrub and is the one species of conservation importance that is increasing on site. The scrub provides cover for muntjac deer, foxes and badgers and forage and nest sites for common birds.



*View of the south east side of LWS/LNR before work, showing impenetrable scrub including blackthorn (white in flower, used by brown hairstreaks) willow and ash trees, ivy, bramble and tall herb vegetation over peaty spring areas, 17.04.2010.*



*Flies such as these hoverflies (*Chrysogaster solstitialis*) which breed in the wet fen peat and pools of the SSSI depend on nectar and pollen from flowers such as this ground elder in the adjacent LWS scrubby areas, 27.05.2011.*



*East bank of the SSSI above the fen spring line dense reed and scrub of bramble, buddleia and trees 19.10.2012*

### **Ponds on Western side below SSSI**

Five ponds which had been dug in a peaty area on the west side in the LWS area had become almost totally choked with a growth of common reed. These ponds were cleaned out by a project funded by Freshwater Habitats Trust (FHT, formerly Pond Conservation) in spring 2014. This has resulted in more open water, with a very diverse aquatic submerged plant flora of stoneworts, water cress, water starwort and curled pond weed. There is now greater use as breeding sites by common frogs. Greater invertebrate biodiversity is visible, but there have as yet been no surveys to confirm this.



*Pond newly cleaned out by FHT, 13.11.2013*

Without some further marginal vegetation control (particularly of reed and overshadowing willows) the likelihood is that these open ponds will again be quickly colonised and shaded by reed.



*Reed hemming in and encroaching on recently cleared out pond 14.08.2014*

**Further background information, and records, can be found in the Appendices:**

**Appendix 1: Site history and biological heritage**

**Appendix 2: Plants in the Lye Valley North Fen SSSI area that are on the new England Vascular Plant Red list**

*The following are combined in a separate document:*

**Appendix 3: The most important wetland plants & fungi in the Lye Valley LWS/SSSI fens (old Hogley Bog)**

**Appendix 4: Some of the most important invertebrates in the Lye Valley SSSI & LWS areas including mostly fens (old Hogley Bog)**

A list of the most important invertebrates discovered so far in the Lye Valley North Fen LWS and SSSI areas, showing their conservation statuses.

**Appendix 5: All species in Lye Valley Scrub Area SP 548060 2007-2014**

A table of records of all species – flowering plants, mosses and liverworts, fungi, diptera, crustacea, hemiptera, orthoptera, lepidoptera, hymenoptera, mollusca, amphibians and reptiles, birds and mammals – found in the Wild Oxford project area at Lye Valley North Fen LWS/LNR, previously known as Lye Valley Scrub.

## **BBOWT Wild Oxford Project**

**At Lye Valley North Fen area the potential for the following possible habitat enhancements by the project work was identified as follows:**

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

The LWS section at the head of the valley, previously Lye Valley Scrub SLINC, has been recognised as having numerous calcareous spring-fed peat and tufa-forming areas on the valley sides, but their interest had declined, since, without grazing, succession had progressed from short fen to shady secondary wet woodland. Limited Oxford City Council staff time had been focused on management in the SSSI fen area. With the national resource of alkaline calcareous tufa-forming fen habitat known to have steeply declined, starting remedial management was considered a priority to see if these areas could be brought back to more biodiverse herbaceous fen vegetation by tree and scrub removal. If sufficient biodiversity could be restored, a target might be an application for extension of the current SSSI limits to cover these areas. Even if restoration to high grade short fen is 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 in the Headington area in general. The target for a more biodiverse wetland community resulting after the project work might be a tall herb community of 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 total area. Other SSSI fen areas were not in 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'). Shading of valuable fen vegetation by marginal willow scrub on the east side was also a problem that had not been sufficiently addressed. Cutting the reed whilst in full green growth in mid-summer prevents build-up of food store in the rhizome and thus reduces its vigour and competitive ability the next year. After the early cut it regrows to a reduced height allowing mosses and smaller plants to thrive and warmer conditions in the wet peat to facilitate invertebrate life cycles. A second cut when it is dead in the autumn does not reduce the subsequent vigour of the reed, but it does remove nutrients from the site in the risings removed to piles. It also enables light to reach the peat surface for all the winter and spring months, stimulating the growth of bryophyte mats upon which certain rare invertebrates depend. Trampling of volunteers in the soft peat layers mimics the effect of stock trampling in bringing buried seed to the surface which then may be stimulated to germinate in the higher light levels operating the next spring.

### **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, north fen and Churchill Hospital field). All of these reptile species benefit from undisturbed sunny areas for essential basking. This is particularly important for female common lizards when they are heavily gravid with eggs in June and July.

Lizards are much attracted to the boardwalk through the north fen for sunning, but here they are constantly disturbed by walkers, runners and dogs.

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 result in more successful breeding. Lizards in particular are reluctant to cross cold, deeply-shaded, areas to different habitats, so some degree of scrub and tree reduction on the banks to the fen would enable the lizard habitat in the allotments to be joined up by open sunny grassland to the north fen area habitat and from this to the rank tussocky grassland of the Churchill Hospital field. Evening sun falls upon the dry steep bank above the fen spring line on the eastern side of the SSSI (a tipped embankment below Peat Moors recreation field), so this is an ideal place to start.

The importance of more nectar-rich flowers in the area cannot be over stated. Whilst the fen wet peat and shallow pools provides good breeding area for important insects with aquatic larvae such as some hoverflies, soldierflies, craneflies 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 fen breeding insects need the nectar and pollen sources in dryland areas adjacent, for example an extensive bed of ground elder adjacent to the SSSI has flowers covered in insects of all sorts when in flower.

Brown hairstreak butterfly reproduction will also be enhanced by some cutting of old blackthorn to encourage the young sucker growth that is preferred for egg-laying

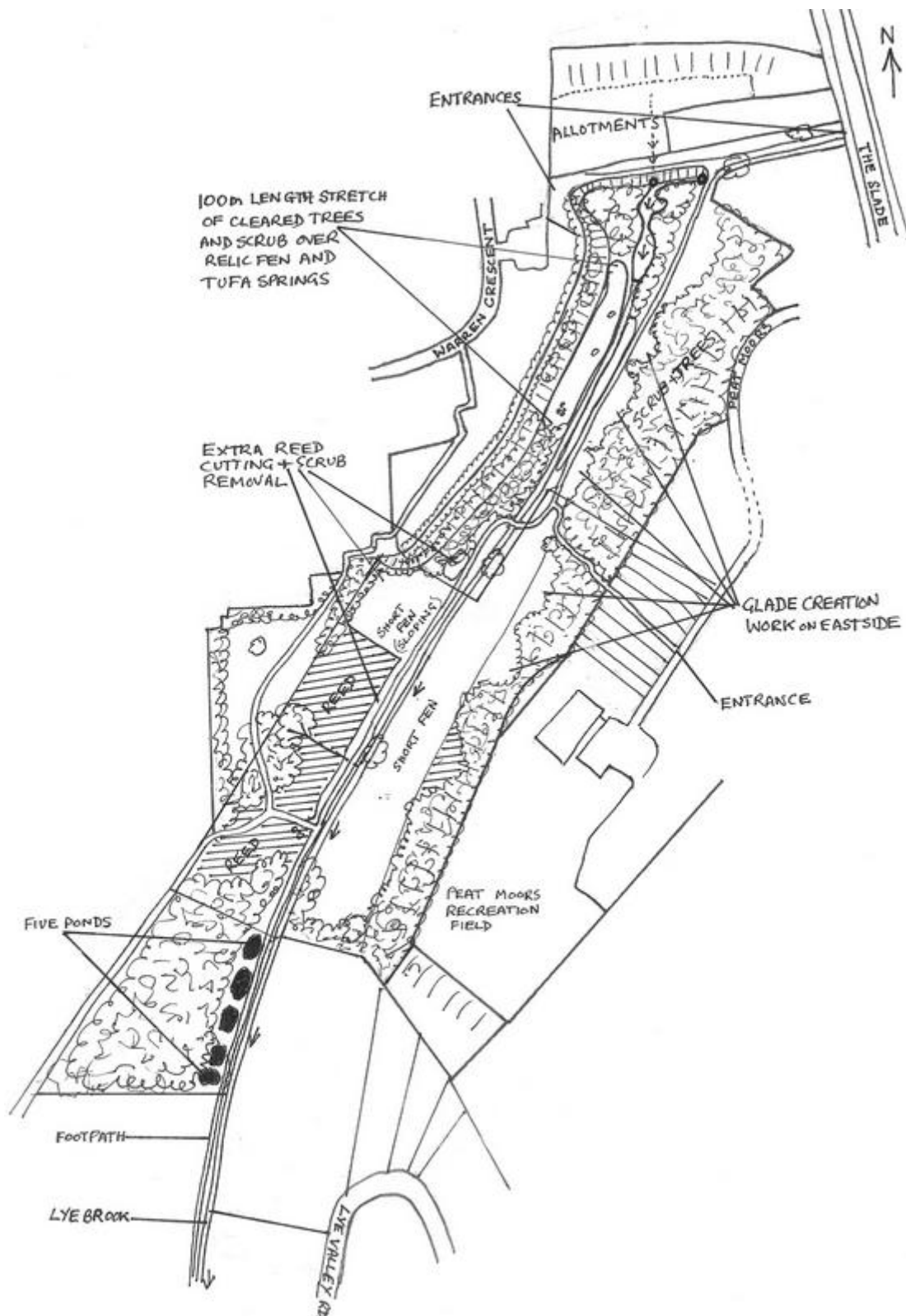
#### **D. Pond enhancement in LWS south western area**

Five previously excavated ponds on the south-west side which are breeding sites for common frogs 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 is threatened by increasing shade from trees and reed re-invasion. Some removal of crack willow trees and scrub, along with cutting back marginal reed, is identified as beneficial to pond water plant diversity and thus to aquatic invertebrate diversity. Whilst a couple of ponds could remain semi-shaded to ensure a different habitat, three of the ponds could have shading trees and marginal vegetation reduced to promote the aquatic vegetation growth.

If some of the ponds remain unshaded and thus warmer, there is a very good chance they will be colonised by some of the rarer insects, such as water beetles and soldierflies, breeding in the shallow fen pools on the other side of the brook. Thus their populations will be more secure.

## Wild Oxford Project Results for the first year Spring 2014-Spring 2015

**Figure 4:** Sketch map indicating the extent of the various habitat types in the valley after first year of Wild Oxford Project work.



## Time and volunteer input to the project

Volunteers under the leadership of Andy Gunn contributed to remedial work on the SSSI North Fen west side and on the relic fen area in the LWS/LNR spring zone adjacent to the bank to Warren Crescent. A good start has been made on clearing vegetation over tufa-forming springs and glade creation on the on the east side of the SSSI and LWS/LNR area. Pond marginal work on reed and shading willows has not yet started.

A total of 8 days' work at the Lye Valley was undertaken between March 2014 and March 2015, with an average of 12 volunteers at each session. As each session lasted for 5 hours, about 480 volunteer hours were put in (pers. comm. Andy Gunn). Monitoring of progress happened either during the sessions or by separate visits after work sessions.

Additional help with large crack willow tree felling and removal was contributed by Oxford City Council Countryside Service workers. Some Thursday work sessions by the City Council Countryside Volunteers team assisted with scrub removal and fen raking.

## Fen Work in the SSSI

On the west bank of the SSSI volunteers further opened up the dense monoculture reed area by at least 10m to the west and north by willow scrub removal and reed scything.



*Using slasher to achieve an early cut of dense reed on west bank of SSSI fen. Early cutting reduces reed vigour the next year and increases biodiversity, 16.08.2014.*





*The autumn second cut, scything reed on the sloping west bank of SSSI fen up near the spring line. This late cut allows light to the peat surface all winter and spring, encouraging moss growth and germination from the seed bank, 26.11.2014.*

It was considered important to cut back the dense reed and remove dead material near the new plastic boardwalk to minimise risk of arson to the dry reed and consequent damage to the boardwalk. Thus a 1-2m swathe was cut back all along the boardwalk edge on the western side and raked off to piles.

### **Work on the relic fen in the LWS/LNR area**

Most volunteer time was spent in this area during 2014–2015. Some of the crack willows were re-pollarded, some were coppiced and the brash staked in piles off the wet fen and at the foot of the steep dry bank to the Warren Crescent green area. A length of 100m, and an area of approximately 776m<sup>2</sup> (0.08 hectares), of wet peat and tufa spring was cleared of the majority of the willow trees and scrub and the logs and brash removed from the surface of the peat and piled at the base of the bank. Only two very large crack willows remain growing out of the wetland in this area, to be targeted in autumn 2015. With the removal of so much woody growth, the peat is noticeably wetter, due to reduction in transpiration losses enabling the spring flow to wet up the peat. The assistance of Oxford City Council staff in the work on some of the largest trees was appreciated.



*West side of the LWS/LNR below bank to Warren Crescent - volunteer students from St Clare's College removing willow scrub and getting stuck in the wet peat and tufa spring revealed, 20.09.2014*



*Re-pollarding of large outgrown willows and scrub clearance on the west side relic fen areas of LWS/LNR below bank to Warren Crescent. Note new plastic boardwalk now extends further to the north over cleared springs 29.01.2015*



*West side of the LWS/LNR below bank to Warren Crescent at end of clearance of at least 100m stretch of relic fen, only two willows remaining 29.01.2015*

An extra section of the plastic boardwalk was installed in the LWS/LNR spring areas in winter, 2014 enabling easier access to the whole site.

### **Bank work, glade creation by scrub removal**

The cutting-back of bramble, young willow, buddleia and hawthorn proceeded well. Three or four small glade areas of varying sizes and shapes from 5-10m diameter were cut into the dense vegetation on the east side level and steep bank areas.



*St Clare's students work in the rain on scrub removal.  
Note old slippery sleeper boardwalk still in place, 08.11.2014*



*Scrub work in the LWS/LNR on the east side near new boardwalk 12.06.2014*



*East bank above the spring line to the SSSI fen. Using slashers to remove reed, bramble and willow scrub upslope to create sunny glades for reptiles, 26.11.2014*



*East bank above SSSI fen, clearing buddleia and bramble scrub to create glade, 26.11.2014.*

## Summary and Conclusions

The BBOWT Wild Oxford Project has made a spectacular difference to the habitats in Lye Valley North Fen area in just the first full year, with an average of 480 volunteer hours worked and three out of the four target areas showing positive change. Fen work on scrub and willows growing out of wet peat and tufa forming LWS/LNR springs, reed cutting in the SSSI and glade creation in scrub (targets A, B and C) occupied most of the volunteer time so the vegetation reduction around the ponds (target D) has not yet started. The response of the vegetation in the cleared areas will not begin to be apparent until the end of 2015, however, and further measures of any success will have to wait for surveys then.

### Achievements are:

- West site of LWS/LNR down the tipped embankment from Warren Crescent – relic spring-fed, wet, peaty, tufa-forming fen cleared over an area of approximately 776m<sup>2</sup> (a stretch of 100m alongside the brook)
- Reduction in reed-dominated fen on the west bank of the SSSI through reed scything and willow scrub removal. A further extension of the short fen by 10m to the north and west edges.
- At least four glades created in scrub on level ground or bank on the east side of the LWS/LNR

## Glossary

### Information on status categories of insects of conservation importance found on site

Status categories from Falk (1991) Falk and Chandler (2005) Hyman and Parsons (1992) Foster (2010).

#### Red Data Book Category 1. RDB1-ENDANGERED

Taxa in danger of extinction if causal factors continue unabated. Includes species occurring as a single colony or only in habitats which are much reduced and highly threatened or which have shown a rapid and continuous decline.

#### Red Data Book Category 2. RDB2-VULNERABLE

Taxa believed likely to move into the endangered category in the near future if the causal factors continue operating. Includes species of which most or all populations are decreasing and those which are confined to vulnerable habitats.

#### Red Data Book Category 3. RDB3 - RARE

Taxa with small populations that are not at present endangered or vulnerable, but are at risk; usually localised within restricted geographical areas or habitats or are thinly scattered over a wider range. Includes species estimated to exist in only fifteen or less post 1970 10km squares or, if more, then in vulnerable habitat.

#### Nationally Scarce Category a (Previously Notable a) NSa or Na

Taxa which do not fall within the RDB categories but which are uncommon in Great Britain and are known to occur in 30 or fewer 10km squares or, in less well recorded groups, within 7 or fewer Vice Counties.

#### Nationally Scarce Category b (Previously Notable b) NSb or Nb

Taxa which do not fall within the RDB categories but which are uncommon in Great Britain and are known to occur in between 31 and 100 10km squares or, in less well recorded groups, between eight and twenty vice counties.

#### Lower Risk (Near Threatened) LR (NT)

A newer category in more recent publications. Taxa which are close to qualifying for Rare, RDB3

#### Local

Taxa which are uncommon enough to be of local importance in the county, but common enough on a national level to have no national conservation status. These are often species that used to have Notable/Nationally Scarce designation, but which have been found more widely in recent years due to increased recording effort.

## 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 and access to documents on the site held in the BBOWT archives. Marilyn Cox gave invaluable editorial help with this report.



Andy Gunn at work in the North Fen 16.08.2014

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## Appendix 1:

### Site history and biological heritage

When Fojt (1991) surveyed the rich calcareous fens in Oxfordshire, she found the Lye Valley SSSI included small areas of vegetation comparable in quality to the Cothill Fen SAC (Special Area of Conservation, a complex of Cothill NNR, Parsonage Moor and Lashford Lane fen). A full discussion of the important features of the Oxfordshire fens ecosystems can be found in The Ashmolean Natural History Society of Oxfordshire (ANHSO) publication *Fritillary*, Vol 3.

Rodwell (1991) classified wetlands (mires) in the National Vegetation Classification (NVC). Botanically, the two small North and South units of the Lye Valley SSSI (total area 2.5 Ha) contain portions with the nationally rare NVC M13 Black Bog-rush (*Schoenus nigricans*)-Blunt-flowered Rush (*Juncus subnodulosus*) mire community, with some parts closer to M22 Blunt-flowered Rush (*Juncus subnodulosus*)-Marsh Thistle (*Cirsium palustre*) community and some areas of species-poor Common Reed (*Phragmites australis*) or Lesser Pond-sedge (*Carex acutiformis*) dominated communities. The M13 and M22 communities are the reason for SSSI designation in 1972.

The north and south sections of the Lye Valley Fen SSSI are now within the bounds of Oxford City, not far from Headington, separated by some 600m of former fen which is now wet woodland, which forms a corridor to the Boundary and Lye Brooks. This historically much larger tract of wild, peaty, wetland was rough-grazed common land, known in the 17<sup>th</sup> and 18<sup>th</sup> centuries as Hockley-in-ye-hole, Hogley bog, Ogley Bog, Headington bog, Bogs under Bullingdon Green and most recently, in the 19<sup>th</sup> century, as Bullingdon Bog.

The whole site has a long history of botanical recording (since the 1600s) by botanists from nearby Oxford University Botany Department, which used to be on the site of what now is the Oxford Botanic Garden, which is only a short walk away. It is thus regularly mentioned in the early manuscripts and Floras of the County, e.g. by Morison (1699), Sibthorp (1794) and Druce (1886, 1927).

Many specimens collected from the site in the 18<sup>th</sup> and 19<sup>th</sup> century are held in the herbarium of the current Oxford University Plant Sciences Department. Most of these species still survive on the site, which is thus important in a historical botanical context and has been the source of a good few of the first County records. For instance according to Druce (1927) the first county record for butterwort *Pinguicula vulgaris* was found here by Parkinson in 1640 ('*in a common about a mile from Oxford neere a village called Herington (Headington)*'). Whilst butterwort has not yet recurred, all the following species are still growing on site: flea sedge *Carex pulicaris*, for which the first County record was by Merrett from this site (as 'Hockley of the Hole') in 1667; Bottle Sedge *Carex rostrata* - first County record by Bobart from this site (as 'Hockley') in 1699 and for Parsley Water-dropwort *Oenanthe pimpinelloides* by Dillenius (as 'Hockley in ye Hole') in 1746.

Even earlier, before the first Oxford University botanists, the Belgian botanist Matthias de L'Obel visited Oxford in 1569 and saw grass of Parnassus *Parnassia palustris* in 'Angliae ad Oxoniam' ('England, around Oxford'). The resulting record in his book of 1570 is the first published national British record of this species. Of all the sites 'around Oxford' that he could have observed with grass of Parnassus, the Lye Valley is the best candidate and the only one where grass of Parnassus still survives today.

Photographs produced by Henry Taunt from the early 1900s from the Lye Valley enable some reconstruction of the vegetational history since then. At this time the valley was rough grazed (presumed light, extensive, grazing and a horse is shown in one photograph around 1910).

Following the cessation of such grazing in the early 1900s the margins of the fen site became colonised by dense reed or scrub.

Photographs by Mrs E. Pickvance from the 1930s show this successional process happening (photographs from archives of Oxfordshire City Council Countryside Service (OCC) and from the BBONT Draft Management Plan for the Lye Valley 1987-88).

After the area ceased to be common land, eventually the North fen area came into the ownership of OCC, but the South fen unit is still in private ownership.

BBONT, as the Wildlife Trust was known in those days, managed the highest grade section of the SSSI fen for a brief period from the early 1970s under lease from OCC. At the North Fen just over 1m of peat and tufa exists under the current vegetation on the east side. It is presumed that this represents the early post-glacial deposits only, subsequent peat accumulation having been removed for fuel (historical evidence of a Roman pottery site nearby and the north fen area being designated 'the Poor' for peat removal in previous centuries is indicative – research quoted in the BBONT Draft Lye Valley Management Plan of 1987-88).

Recognition of the value of the two remaining areas of high-grade fen came with SSSI designation of them in 1972.

By the early 1980s, in the North Fen area, a short, biodiverse, fen community had become restricted to only a small central area of approximately 20m in length on the east side (pers. comm. OCC Ex-ranger Anthony Roberts). In this short central area sundew *Drosera rotundifolia* was last seen in about 1964 and butterwort *Pinguicula vulgaris* in 1994. Despite these losses, it is remarkable that the rest of this valuable community was able to survive in the absence of grazing for approximately 90-100 years. The low nutrient status of spring water would have helped retard growth of dominant species.

Whilst allotments remained at the very head of the valley, housing development started on the higher land around either side of the valley slopes from the 1930s. The valley sides were steepened from their natural shallow slopes by the pushing of material from the level ground of the housing areas into the valley, resulting in very steep clay and rubble slopes (tipped embankments) above the spring lines on each side at the top end of the valley.

## Appendix 2:

### Plants in the Lye Valley North Fen SSSI area that are on the new England Vascular Plant Red list

KEY
LC - Least concern
NT - Near Threatened
VU - Vulnerable

		Old status	New status
<i>Briza media</i>	Quaking grass	LC	NT
<i>Carex pulicaris</i>	Fea sedge	LC	NT
<i>Epipactis palustris</i>	Marsh helleborine	LC	NT
<i>Eriophorum angustifolium</i>	Common cotton grass	LC	<b>VU</b>
<i>Hydrocotyle vulgaris</i>	Marsh pennywort	LC	NT
<i>P</i>	Ragged robin	LC	NT
<i>Oenanthe lachenalii</i>	Parsley water-dropwort	LC	NT
<i>Parnassia palustris</i>	Grass-of-Parnassus	LC	<b>VU</b>
<i>Pedicularis palustris</i>	Marsh lousewort	LC	<b>VU</b>
<i>Potentilla erecta</i>	Tormentil	LC	NT
<i>Ranunculus flammula</i>	Lesser spearwort	LC	<b>VU</b>
<i>Succisa pratensis</i>	Devil's bit scabious	LC	NT
<i>Triglochin palustre</i>	Marsh arrowgrass	LC	NT
<i>Valeriana dioica</i>	Marsh valerian	LC	NT
<b>Totals - 4 Vulnerable, 10 Near Threatened</b>			