

**BBOWT Wild Oxford Project  
Chilswell Valley**

**Report on the second year 2015 – 2016**

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August 2016



*Chilswell Valley. Limestone grassland in full flower on 25.07.2015.  
A view looking down the valley from the west end*

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*All photographs in the account which follows are my own, except where otherwise indicated.*

## GENERAL INTRODUCTION AND AIMS OF THE WILD OXFORD PROJECT

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

### 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

## BBOWT WILD OXFORD PROJECT AT CHILSWELL VALLEY

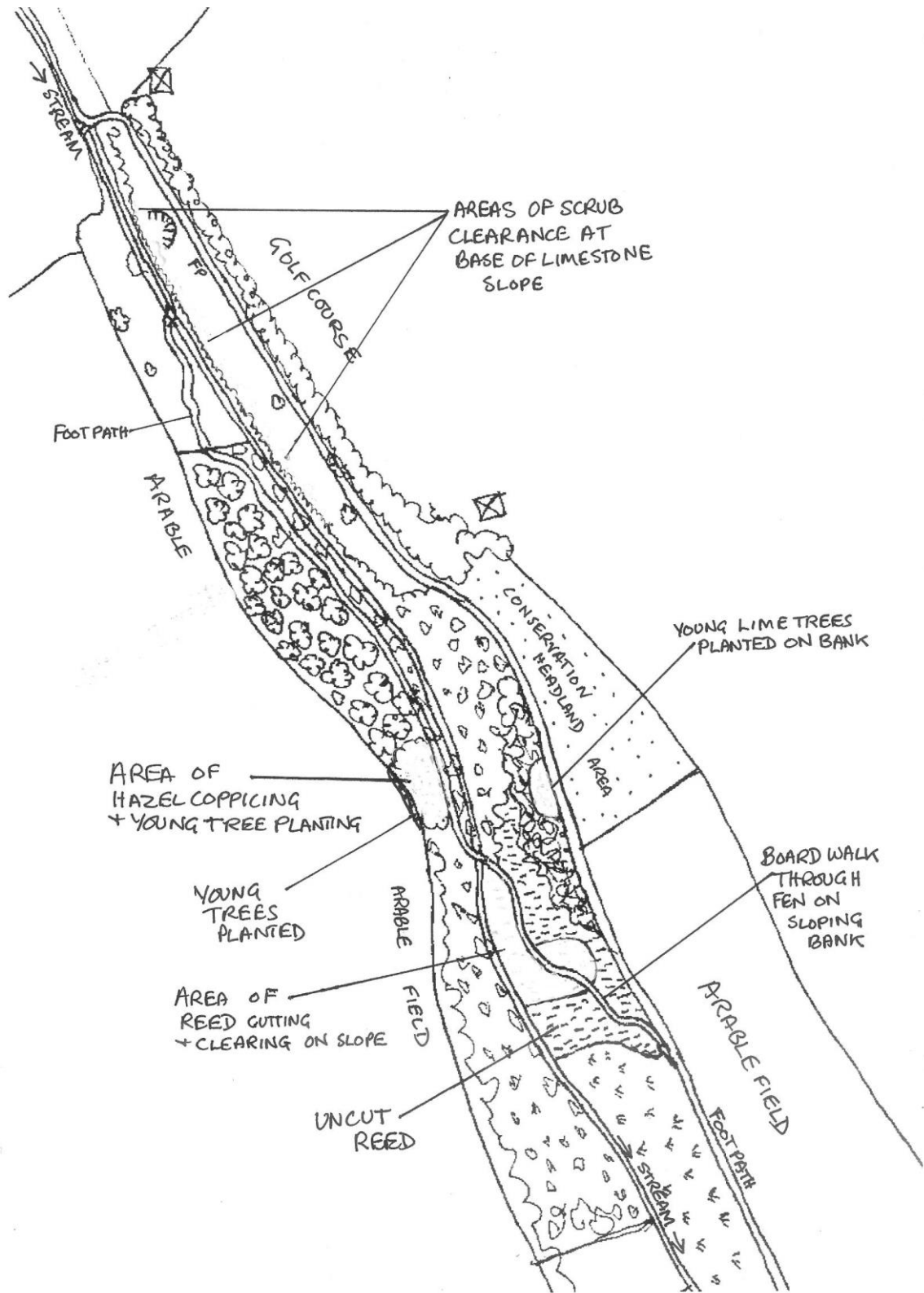
Chilswell valley is well named locally as 'Happy Valley', as for a wildlife enthusiast it has small areas of nearly everything – dry flowery limestone grassland with steep south-facing and north-facing sections, ancient woodland of oak and hazel on steep limestone, rare calcareous, alkaline, tufa-forming fen with reed on peat and a tufa-forming stream.

This valley in South Hinksey Parish was donated to Oxford City Council (OCC) by deed of gift in autumn 1937 by the 'Oxford Trust', which was a forerunner of the current Oxford Preservation Trust. A condition of the deed of gift is that '**The land be dedicated permanently as public open space**'.

Most of the 6.3-hectare section of the valley now so managed by OCC has been designated a Local Wildlife Site, referred to as '**Chilswell Valley and Copse, 50B02**' by Thames Valley Environmental Records Centre (TVERC), in recognition of its county importance for wildlife. The LWS centre's Ordnance Survey grid reference is SP508035.

- A full table of **records of species found at Chilswell Valley from 3 April 2015 to 9 July 2016** is presented in the **Appendix** (separate document).
- For further **background information** on the history of the site, its habitats and management, please see my report on the first year of the project, 2014-2015. Appendices to this previous report include a table of **all species recorded from 16 July 2008 to 10 January 2015** and a list of examples of notable/important wildlife already recorded for the site from previous surveys.

**FIGURE 1:** Sketch map indicating the juxtaposition of the various habitat types in the valley after the first year of the Wild Oxford Project work.



**At Chilswell, at the start of this project, the following potential habitat enhancements were identified:**

#### **A. Alkaline fen restoration**

Chilswell valley contains a relic, rare, valuable, calcareous, alkaline fen, which has been overtaken by common reed due to lack of sufficient management since the cessation of grazing. Natural succession has also resulted in the invasion of patches of scrub comprising willows and guelder rose. Whilst some of this monoculture reed habitat could be left for specific birds and invertebrates, other areas could have scrub removed and regular reed cutting and raking to return it to the vegetation type typical of when it had rough, extensive, grazing. This would increase plant diversity and benefit fen insects that like open, warm, short vegetation. It is possible that eventually some extension of grazing from the grassland area, currently lightly grazed by cattle, to the fen land would be beneficial to these newly-restored short-vegetation areas. In the absence of grazing the fen will need an annual cut and rake.

Adjacent to the boardwalk Oxford City Council Rangers had previously cut and removed vegetation for 1m either side to facilitate access for walkers in the summer. Here could be seen the range of plant species indicating the diversity that could potentially be restored over the whole of the fen with further cutting and reed removal. Species that are proven to have increased with such cutting and removal of reed include attractive wetland species useful to a variety of insects, including: water mint *Mentha aquatica*, meadowsweet *Filipendula ulmaria*, marsh thistle *Cirsium palustre*, common valerian *Valeriana officinalis*, water figwort *Scrophularia auriculata*, comfrey *Symphytum officinale*, great willow-herb *Epilobium hirsutum*, hemp agrimony *Eupatorium cannabinum*, marsh woundwort *Stachys palustris*, wild angelica *Angelica sylvestris*, brooklime *Veronica beccabunga*, water forget-me-not *Myosotis scorpioides* and bugle *Ajuga reptans*. An increase in the population of comfrey produced by such cutting work will benefit the population of scarlet tiger moths on site. Recurrence of scarce seed-bank species typical of calcareous fen that were previously recorded (such as blunt-flowered rush *Juncus subnodulosus*) would be a particularly good outcome of this work.

#### **B. Limestone grassland area extension**

Because of its aspect, the south-east-facing limestone grassland is very important for attractive wildflowers that provide nectar and pollen. In addition, the high temperatures favour the life cycles of many invertebrates, including butterflies, bees, moths, flies, ants, grasshoppers and scarce snails, such as the heath snail *Helicella itala*.

Coppicing of trees, such as hazels, and reduction of dogwood and bramble or dewberry, which are shading or encroaching on the bottom of the hill, would be helpful to extend the valuable area of limestone flora that is exposed to the light and warmth of the sun. The small overgrown quarry at the eastern end of the grassland would particularly benefit from scrub and other vegetation clearance to expose bare limestone rocks. Nationally-rare plants, such as basil thyme, and locally very uncommon ones, such as large thyme and rockrose, are confined just to the edges of this quarry, but with no management they will soon be lost under scrub. This is also a much-loved hot spot for basking butterflies such as the common blues and marbled whites. The limestone rocks currently exposed have interesting lichens and mosses, which are also on the way to being lost due to shading. Clearing vegetation out of the quarry and returning the site to bare rock would benefit all these different wildlife groups and thus enhance the site biodiversity.

### C. Restoration of the ancient woodland on the NE-facing limestone banks

The hazel coppice stools present in this area are becoming mature and creating dense shade, resulting in a reduction in some of the ancient woodland indicator ground flora species, such as greater stitchwort and climbing corydalis. Some re-coppicing and glade creation would enable recovery of ground flora to its original abundance and diversity. It would certainly ensure better flowering of the bluebells, anemones and wood sanicle already present.

Many of the mature oak trees on this steep north-west-facing bank have died and fallen. No natural oak regeneration is happening and the only seed germination is of ash, so without intervention the woodland will change eventually to an ash wood with hazel. Dominance of ash could be reduced by planting with young oak trees and/or small-leaved lime trees in new glades. This would preserve the nature of the woodland and maybe continue the production of deep, persistent, leaf litter layers favoured by the rare Rolph's door snail. Small-leaved lime *Tilia cordata* is suggested as a replacement for some fallen trees, as this species has very beneficial flowers for insects. The flowers produce abundant nectar from June to July, which would provide food for insects from all habitats in the valley, especially fen species. Lime was the historic native tree of the ancient woodlands of the area on limestone, as confirmed by pollen analysis results from peat deposits at Wytham Marley Fen, only a short distance to the north of Chilswell Valley.

## BBOWT WILD OXFORD PROJECT RESULTS FOR THE SECOND YEAR, SPRING 2015 – SUMMER 2016

### Time and volunteer input to the project

Volunteers under the leadership of Andy Gunn contributed to remedial work on the fen, the limestone grassland and the copse woodland. A total of 8 days' work at Chilswell Valley was undertaken between April 2015 and July 2016 with an average of 12 volunteers at each session. As each session lasted for 5 hours, about 480 volunteer hours were put in at Chilswell Valley (pers. comm. Andy Gunn). Monitoring of progress happened either during the sessions or by separate visits after work sessions.

### Explanatory boards



Three explanatory boards were installed.

The one shown on the left is in the middle of the fen.

One of the other boards was installed near the entrance to the boardwalk through the fen and the third (identical to it) at the entrance gate to the limestone grassland – *photo on next page*.

These boards now assist all visitors in understanding the importance of the wildlife on site and the reasons for conservation work.



Information provided near entrance to boardwalk through fen and at entrance to limestone grassland

## Details of work carried out on specific areas:

### A. Alkaline Fen area

A fen area on a valley slope facing south-east (hanging fen) was the target of remedial work. At the start of the Wild Oxford Project work this area was almost a monoculture of dense, tall, impenetrable reed *Phragmites australis* with few other plant species due to lack of cutting or grazing. The first year of work saw the installation of a new, recycled-plastic, raised boardwalk to replace the old sleeper boardwalk and the scything of the reeds over half the area for the first time.

In the second year of work the scything and raking of reed has continued at every opportunity over the initially cleared area of approximately 0.44 ha, which is just over half the originally reed-dominated area. Reed re-growth after the very first cut was shorter and softer, so progress was easier.

Dealing with the considerable quantity of reed arisings was at first difficult. Large piles of dead reed were present at the bottom of the slope next to the stream. However, the introduction of a reed-burning metal cradle to the centre of the fen now allows the arisings to be burnt and the ash removed from site, usefully lowering nutrients.



*Reed scything, 25.07.2015*



*Much cut reed was generated, 25.07.2015*





*Reed-burning cradle in use, 30.01.2016*



*Scything dead reed adjacent to the boardwalk, 30.01.2016*

It was especially important to scythe and remove living or dead reed from a broad swathe either side of the new board walk in order to remove any combustible material from this area of public access. The arson event to the boardwalk in the Lye Valley fen in January 2016 demonstrated that this removal will be vital to protect this new structure, which is very much appreciated by all visitors to the site.

For a few years yet it will be important to carry out annual cutting-back of young reed shoots throughout spring and summer, as they emerge from under the peat, to reduce the starch storage in reed rhizomes and thus reduce the vigour of the plants and give any germinated seeds of other plants the chance of surviving to flowering without too much reed competition (mostly by shading).

Removal of all arisings from the fen surface (to heaps or by burning and ash removal) will lower nutrient levels in the peat and assist in reducing the vigour of the reed re-growth.

It is early days yet to see the response of the fen vegetation in terms of the target of increasing plant biodiversity. Annuals occur immediately, but any perennial species needs to germinate and then spend 1-2 years growing and building up enough reserves to be able to flower and be easily recognisable.

A lot of typical 'first response' annual species were noted in the cut area in 2016. These varied from common ruderal weeds, such as cleavers, annual meadow grass, field forget-me-not and chickweed (seed probably blown in from an arable field nearby), through common wetland annuals like wavy bittercress, to common wetland perennial species recognisable in vegetative form, like hard rush and jointed rush, to more desirable species such as brooklime, marsh thistle, fleabane, comfrey and water figwort. Especially interesting is the arrival of one clump of the tiny bristle club rush *Isolepis setacea*, a species on the county's Rare Plants Register, which will have recurred from the seed bank. Rather unexpected arrivals were red campion *Silene dioica* and herb Robert *Geranium robertianum*. With continued cutting management, the ruderals and non-wetland species will decline, as the true wetland species become established and are spread by seed or vegetatively over the slope.

A wetland plant survey from the site from 2006 is available from TVERC records and, considering only wetland plants, a total of 16 wetland species were found at that time. Surveying the cut-over area from 2015-2016, discounting arable weeds and non-wetland species, reveals a total of **20 wetland species**, so biodiversity is increasing. Even though some of these were few and far between, numbers will build up.

**In summary the following are very positive signs:**

- Hemp agrimony appearing and flowering in areas that were previously monoculture reed
- Common valerian flowering more freely
- Quite a few new clumps of brooklime *Veronica beccabunga* and water figwort *Scrophularia aquatica* (both from the seed bank)
- One clump of the rare, tiny, bristle club rush *Isolepis setacea*.

This area was recorded as 'species poor' as far back as 1989, so it is reasonable to presume that restoring diversity will take some time. Progress so far has been slow but encouraging.

**The more frequently the reed re-growth can be cut every year, the faster the progress will be.** It needs to be targeted as often as possible. In the future, during the remediating phase **three times a year, when it is green, is desirable (exact timing does not matter but reed must be green)**. This will mimic the grazing the site used to have.

Ultimately the re-introduction of stock grazing by cattle would be very desirable, reducing the need for so many volunteer cutting and raking sessions.



*Sparser, weaker, reed regrowth in cut area allows hemp agrimony to increase and flower, 25.07.2015*



*Marsh thistle joins hemp agrimony increase in the previously-cut reed fen area.  
Common valerian leaves also visible, 09.07.2016*

### **Fen invertebrates**

Even if plant biodiversity is slow to return, regular cutting and raking of reed will turn the wet slope from one that is cool at the wet peat surface all year round (under dense tall reed) to one that is warm at the wet peat surface (as sun can now reach the ground). This will make a crucial difference to the invertebrate assemblage that will now be favoured, especially as this wet 'hanging fen' is on a south-east-facing slope and therefore gains valuable insolation both early in the mornings and early in the year.

Some fen invertebrates with larvae in the very wet peat (such as the rarer soldierflies) take up to three years to complete development, even if warm, shallow, wet peat areas are available.

Also, they feed on bacteria and unicellular algae, which are encouraged by bare, well-lit, areas with just a thin, continuous, water-film layer.

Only two soldierflies (delicate soldierfly and four-barred major) have been identified from this site so far, but dense reed is very difficult to survey and there could easily be more. Not only that, Chilswell fen is not all that far from the Cothill fen complex, so invertebrates may be able to spread to the site from these richer SSSI habitats.

Therefore, even if plant biodiversity is slow to return, there will be great benefit to key wetland invertebrates, such as soldierflies, in continuing to keep this hanging fen short. Invertebrates that like cool, shady, wetlands (for example, crane-flies) have plenty of suitable habitat in nearby uncut reed areas or the wet woodland.

The return of fen plant biodiversity to this area will be faster, if certain water-quality issues are solved.

#### **Water quality issues in the fen**

On the basis of the plant assemblage, some areas of the fen were suspected to be nutrient-enriched. A clear botanical indicator was the occurrence of nettles and cleavers. Once the reed was cut short and raked off, the high light levels at the wet peat surface stimulated the clearest botanical indicator – mats of dark-green filamentous algae on the surface.

Water quality testing using the simple colorimetric test kits from the Freshwater Habitats Trust (FHT) was carried out during April 2016. This revealed that the water, as it issues over the slope of the hanging fen from spring areas, was indeed enriched with a high nitrate load, although phosphate was low.

Obviously the enrichment varies over the slope – there are differences in reed vigour and colour in different sections of the reed-bed. Vigorous dark-green foliage indicated the presence of high nitrate stimulation, whereas lighter-green, less vigorous, growth had resulted from low-nutrient inflow from calcareous tufa-forming springs. The formation of tufa locks phosphate away, restricting growth even if high nitrate is present, so areas fed by these springs showed the least stimulation effect.

An arable field occupies the high ground at the top of the valley above the fen to the north. Except for the western end (which is under conservation margin management) this field is intensively cropped. It must therefore be regularly treated with chemical fertilizer and is ploughed and bare for a proportion of each year. Whilst phosphate does not move in alkaline conditions, nitrate is very soluble and will therefore have been moving from the field to the fen in overland water flow or entering the ground and penetrating the limestone aquifer, ultimately emerging in the fen springs.

Simple measures could be put in place at the top of the fen slope to better intercept high-nitrate overland flow, but the ideal approach would be to create a wide buffer margin above the fen (or indeed around the whole Chilswell valley) and establish some form of conservation scheme whereby fertilizer use was discontinued, thus enabling the restoration of low-nutrient conditions throughout. Low-input permanent pasture or no-input conservation margin flower mix would be suitable.

The simple FHT water-quality testing identified some springs to the western edge of the fen, and in the area of wet woodland, that had much lower nitrate levels. These springs are downslope from the conservation margin. A future target might be the removal of scrub and reed from one of these springs to see if more desirable biodiversity resulted.

## B. Limestone grassland area

Work here has continued along the foot of the south-east-facing slope on the north side of the stream with the re-coppicing of large hazel stools, which were casting dense shade on the adjacent grassland, and the slashing of brambles, which were extending up the grassland slope.

Also targeted was a big patch of dogwood, which was choking part of the small quarry and threatening to overwhelm valuable yellow meadow anthills with rockrose on them at the top of the slope.

Stock (cattle) continued the good work of grazing the grassland areas in autumn. Once again their trampling under the trees of the hedge line at the top of the valley stimulated a good growth of goldilocks buttercup from the seed bank.



*Cattle graze the limestone grassland in autumn and shelter under the old coppice trees of the hedge at the top of the slope, 07.11.2015*



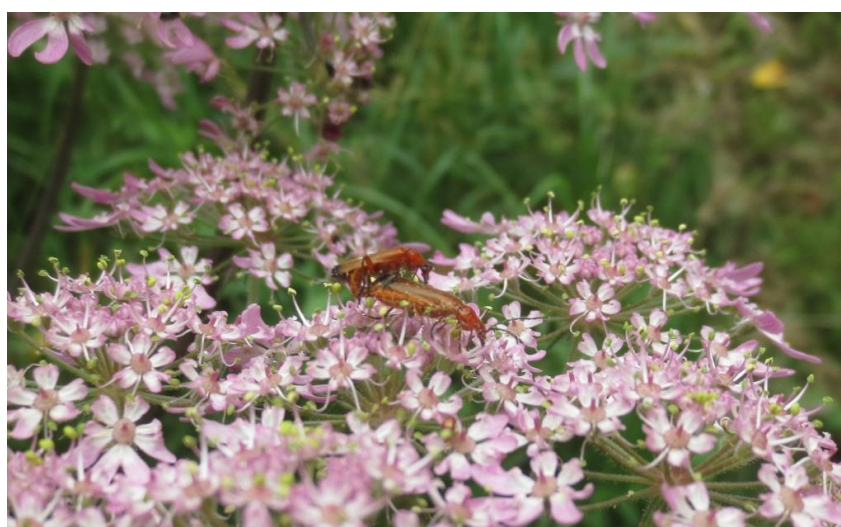
*Scrub work at base of south-east-facing limestone slope, removing hawthorns, 19.12.2015*

Increased flowering success in many plants was noted in 2015 and 2016. In the areas cleared of scrub at the slope bottoms a sea of tall hogweed sprang up and flowered, providing a generous nectar source for many insects. Scrub clearance near the small quarry resulted in a big spring flush of cowslip flowers in the shorter turf. Later, in July, approximately 20 flowering plants of the basil thyme *Clinopodium acinos* were counted in its usual position near the lip of the small quarry area. This is the highest number so far recorded of this annual plant, which is on the county Rare Plants Register and is a UK BAP Priority (Section 41) species. More patches of the large thyme *Thymus pulegioides* (Rare Plants Register) were discovered on anthills at the eastern end of the grassland.

An increase in bare soil areas on the sunny slopes resulted from trampling by grazing cows. This may well have provided good seed germination sites for the increased numbers of the annuals: yellow-wort *Blackstonia perfoliata* and common centaury *Centaureum erythraea*. Increased numbers of flowers of more common perennial species, such as greater knapweed, field scabious, wild carrot and red clover, fed the bees and butterflies later in the year.



*Hogweed flowers abundantly providing a rich summer nectar source in the coppiced and scrub-cleared area at the base of the limestone grassland, 09.07.2016*



*Unusual pink hogweed and orange soldier beetles, 09.07.2016*



*SE-facing limestone slope - abundant red clover, field scabious and agrimony, 09.07.2016*

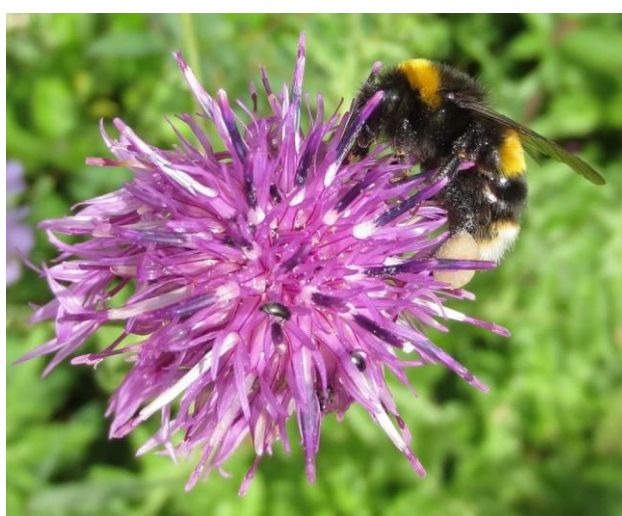


*Looking up from the bottom of the slope - in foreground, previous scrub area now flowers. Small quarry towards top of slope has rockrose, large thyme and basil thyme around margins, 25.07.2015*

Pyramidal orchid *Anacamptis pyramidalis* has made a welcome return to the south-facing slope, although rather greater numbers were found in the previous set-aside, now conservation margin, at the top of the arable field on the northern side of the valley, beyond the LWS limits.



*Rare Basil Thyme, Clinopodium acinos, flowered in greater numbers near the quarry rim, 09.07.2016*



*Small skipper and buff-tailed bumble bee enjoy field scabious and greater knapweed flowers on the south-east-facing limestone grassland, 25.07.2015*

The north-facing limestone slope is cooler and damper, especially in the lower part of the slope. This was the area that saw abundant flowering of meadowsweet *Filipendula ulmaria*, a pollen source much favoured by hoverflies.





*North-facing limestone grassland – abundant flowering of meadowsweet on the lower slopes on damper soil, 09.07.2016*

Wild liquorice *Astragalus glycyphyllos* is an important perennial plant on the south-east-facing limestone slopes. This is a very local species, much declined and now restricted to warm limestone sites. Some interesting invertebrates have been discovered associated with the wild liquorice. Firstly, galls were noticed on some of the flower buds, as in the photos below. Normal flowers are slim and pale yellow-brown. Galled flowers are fatter and pink. From initial research using published sources, this would seem to be an un-described gall on this plant species, although very similar Cecidomyiid fly galls are recorded for bird's foot trefoil flowers. Some of the wild liquorice flower galls have been preserved and the Gall Society needs to be consulted on this finding.



*Wild liquorice with several flowers showing unusual enlarged flower-bud galls, within each of which was a fly larva, 09.07.2016*

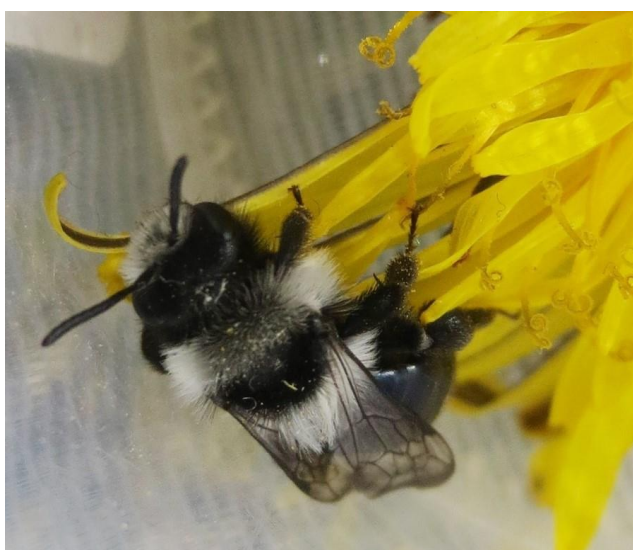
The most interesting wild-liquorice-associated invertebrate identified from this site was actually collected in 2014. This is the tiny Liquorice Piercer moth *Grapholita pallifrontana*, which breeds in the seed pods of wild liquorice.

This is a UKBAP (Section 41) Priority Species. This specimen was found by sweeping Chilswell limestone grassland on 14.05.2014 but not recognised until re-examined in 2016, when its identity was confirmed by micro-moth expert Martin Corley. Wild liquorice has declined over much of the south-east-facing limestone slope with the heavier grazing intensity currently operating (which is good for many other limestone wildflowers). Grazing can actually eliminate wild liquorice, as this plant likes un-grazed, sunny, scrub margins, so the management will need reviewing to see if the grazing might perhaps be zoned to keep lots of healthy flowering wild liquorice to provide an abundant resource for the moth. This will also favour the undescribed fly that is galling the liquorice flower buds.



*The tiny Liquorice Piercer moth, which breeds in the seed pods of wild liquorice, collected 14.05.2014*

Other invertebrates of note recorded from 2015 to 2016 in the limestone grasslands include the six-belted clearwing moth *Bembicia ichneumoniformis*, a very local species, with larvae that breed at the roots of bird's foot trefoil in the grassland. Small solitary mining bees made good use of warm bare soil areas at the top of the limestone grassland for nesting. The most spectacular of these seen in 2016 is the ash-grey mining bee *Andrena cineraria*, a species that seems to be on the increase and becoming common generally.



*Ash-grey mining bee Andrena cineraria, May 2016*

### C. Chilswell Copse woodland and scrub areas

Re-coppicing of hazel stools has proceeded in this area alongside planting of young oak trees on the slope in the new lighter conditions. Coppice stools were protected from deer browsing by circular dead hedges, which appear to have worked well.

Newly recorded in the woodland flora this year is barren strawberry *Potentilla sterilis*, and lady fern *Athyrium filix femina* was discovered in new areas. There was a much increased flowering of violets and bluebells in response to higher light levels in the work areas.

Areas for further work have been identified, particularly patches of redcurrant that could usefully be removed, along with some path diversion to protect populations of wood anemones from being trampled as a result of the increased visitor pressure on the site, (which is an indication of the success of efforts to encourage people to visit and enjoy the wildlife present).

The wet woodland areas are to be the target of increased invertebrate recording over the next year to better assess their value.



*Recently-coppiced hazel stools with protection and young oak tree planted nearby, 12.03.2016*



*Coppice stool re-growth within protection, 09.07.2016*



*Crane fly female, Tipula vittata, from the wet woodland, 23.04.2016*

## BBOWT HAPPY VALLEY PICNIC, MAY 2016

This successful event attracted a good number of visitors on a beautifully sunny day. Bug hunts for children were supplemented by explanatory walks around the site. Thanks are due to Colin Williams for his bird records from the walk that he led.



*The limestone grassland makes an ideal base for bug-hunting in warm sunny weather on the BBOWT Happy Valley picnic day, 08.05.2016*



*Andy Gunn leads visitors on a walk round the site on the Happy Valley picnic day, 08.05.2016*

## SUGGESTIONS FOR THE FUTURE

- Review grazing in the light of finding the liquorice piercer micro moth and special galls on the wild liquorice. This plant is not favoured by grazing and heavy grazing can eliminate it. An area of light grazing could be set up to favour it.
- Consider opening up an additional low-nutrient spring area to the west end of the currently-targeted fen areas, as this may have a better chance of restoration to high biodiversity calcareous fen. However, work should continue on the present area of cut-over fen.
- A small amount of path diversion in the woodland to protect colonies of wood anemone.
- Investigate the feasibility of taking a wide buffer zone of land out of intensive arable cultivation all around the valley in order to lower nutrient input from agrochemicals to all springs on site.
- Bat, moth and glow-worm surveys. (The valley seems a likely site for glow worms and a night walk in midsummer might be a good public event.)

## SUMMARY AND CONCLUSIONS

The BBOWT Wild Oxford Project continues to make a big difference to the habitats in Chilswell Valley in the second year, with an average of 480 volunteer hours worked and all target areas showing positive change. The improvements in habitats and biodiversity have been described here and there will be further improvements in years to come. Certain water quality issues have been identified in the fen and suggestions for remediation made.

### Achievements:

- There has been repeat cutting and raking of the 0.44ha of previously reed-dominated fen. There are early indications of the return of increased plant biodiversity in this area, although it will take a few more years for this to be apparent to the casual visitor. This area will need to be cut short at least twice annually (preferably more often), with arisings removed from now on, to continue the restoration of a more biodiverse tall herb community and favour fen invertebrates.
- Mature hazel coppice and scrub of dogwood and bramble have been cut back for a further 100m of the bottom slopes of the north side of the valley to increase the area of south-east-facing limestone grassland exposed to full sun and to prevent loss of grassland habitat to succession. A resultant great increase in flowering of hogweed and other flowers has fed many insects.
- The copse woodland on the south side of the middle of the valley has had further re-coppicing of mature hazel stools to let more light in to encourage ground flora. Young oaks have been planted in the glade areas. These young trees will go some way towards compensating for the loss of mature oak trees in the copse to fungal disease.
- Species recording has revealed increased flowering of many desirable species and the discovery of additional rare and local species – the bristle club rush in the fen area and the six-belted clearwing moth, liquorice piercer micromoth and unusual flower galls in the limestone grassland area (last two living on wild liquorice).

## **ACKNOWLEDGEMENTS**

I am grateful to Carl Whitehead of Oxford City Council for discussions and for access to documents held on the site in the City Council's archives and to Andy Gunn of BBOWT for discussions as the work progressed. Colin Williams of BBOWT helpfully gave his bird list from the Happy Valley Picnic walk. TVERC supplied historic species lists and Marilyn Cox gave invaluable editorial help with this report.

## **REFERENCE**

**Management plan for Chilswell Valley** (1989) Oxford City Council, from the archive held by the Countryside Service Rangers.

**APPENDIX 1** Full Species record data accumulated by J A Webb in surveys from 2015-2016  
**(please see separate document)**