

BBOWT Wild Oxford Project Rivermead Nature Park

Report on the third year 2016 – 2017

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Rivermead fen, scythers preparing tools for work, 22 May 2017

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All photographs in the report that follows are my own, except where indicated.

Larger sizes of the photos are available in Google photos at

<https://photos.app.goo.gl/NYrVBA15u3MEr0is1>

Aims of the Wild Oxford 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 Rivermead Nature Park

Rivermead Nature Park, Rose Hill, Iffley, is owned by the University of Oxford and has been leased and managed by Oxford City Council (OCC) since 1st December 1990.

It is a mosaic of lowland, mixed deciduous, woodland with elements of calcareous alkaline fen, wet woodland, a stream, drains, rough grassland, scrub and a pond, all on a gentle slope down to the eastern margin of the Thames. A housing estate is on higher ground to the east and the ring road passes close by on the south-west side.

The original area managed by OCC was 8 ha. It included an area of Thames-side wet woodland, springs and flushes to the north of the current southern management area known as Rivermead Nature Park (only 3.3 ha)

These two areas combined have been designated a SLINC (Site of Local Importance for Nature Conservation) by Thames Valley Environmental Records Centre (TVERC).

The current Rivermead Nature Park is compartment 2 on the 1996-2001 management plan (supplied by C. Whitehead of OCC). This southern portion (Site centre grid ref. SP526032) is thus the only part of the SLINC to benefit from the Wild Oxford Project work.

This whole SLINC was assessed for potential upgrading to Local Wildlife Site status in 2013 but was rejected for this designation in early 2014.

The higher ground to the east of the Rose Hill estate is the rainwater catchment for the stream/canalised drain that runs through the site to the river. The estate is also the catchment for the springs that emerge at the base of a bank within the park.

The river Thames forms the western boundary of the site and the level ground adjacent to the river is within the Thames floodplain.

The stream emerges from an outflow pipe at the east side of the site and now runs in a deeply eroded channel westwards to the Thames. It is presumed that this stream has a large input of road-surface run-off from urban development (the estate to the east) and that the erosion is the result of flash-flooding.

The Council covenanted to keep the land as a nature reserve and to manage it in accordance with the objectives specified in a draft management plan. These objectives were as follows:

1. To increase the educational use of the site**2. To investigate enhancing the nature conservation value of the communities present on site.**

(Source: Rivermead Management Plan document 1996-2001, Oxford City Council)

The BBOWT Wild Oxford Project is currently of great assistance to the City Council in the fulfilment of these aims.

- **For full further background information** on the site, including its history, habitats (present and past) and current management, please see my report, with species lists in appendices, on the first year of the project, 2014-2015, and the second year of the project 2015-2016.
- **A full table of records of the species** found at Rivermead Nature Park during surveying from 2016-2017 is in the Appendix (*separate document*).

BBOWT Wild Oxford Project at Rivermead Nature Park

At Rivermead the potential for the following possible habitat enhancements by the project work was identified as follows:

A. Alkaline fen restoration

In view of the importance of the alkaline tufa-springs and peat area it was felt that biodiversity would benefit, if the large crack willows currently shading the area could be reduced by pollarding or coppicing to let more light in and allow the suppressed wetland ground flora to recover. This would also allow warmth to the peat, which would be beneficial to the life cycles of any rare invertebrates still present, such as larvae of soldierflies.

Tufa encrustation on twigs in a spring area

Cutting and raking-off invading bramble, dewberry and common reed in the areas without willow would be desirable for the same reasons. This would not eliminate all the shaded, peaty, wet woodland habitat in this SLINC, as there is an abundance of this in the northern section of the site, outside the City Council's current management area.



Main fen area covered by fallen willow trunks, 25.10.2014

B. Pond restoration and access improvement



A reduction in the shade created by tall willows around the pond, as well as the removal of willows that have actually fallen in, would benefit aquatic plant diversity and consequently aquatic invertebrate diversity and toad-breeding success.

Educational pond dipping for children would be facilitated by a safe platform.

The pond is an important breeding site for a sizeable population of common toads *Bufo bufo* in the spring. It is thus a BAP priority habitat.

C. Glade creation and path widening - woodland and scrub biodiversity enhancement



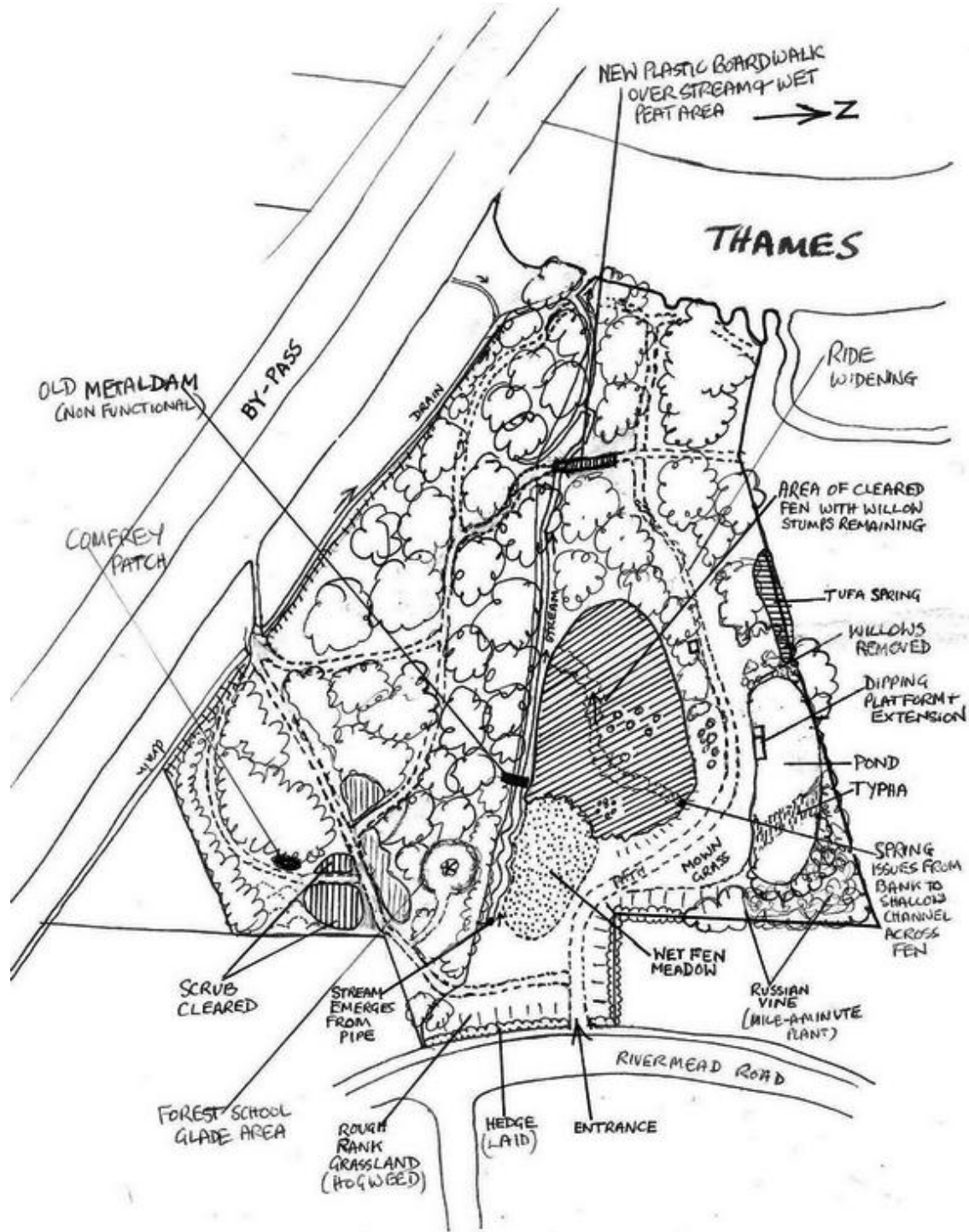
Before any work was done, the only areas with light-loving ground flora, like celandines, ground ivy and violets, were on the narrow edges of mown paths. Thus there was a limited resource for nectar and pollen-feeding insects, such as bees, butterflies and flies.

Glade creation and path widening in the drier secondary woodland and scrub areas on site would enable the spread (or germination from buried seed) of a more diverse flora of greater benefit to insects and make the whole site a more pleasant walk.

Ride before widening, no flowers beside path, 10.04.2015

Figure 1:

Sketch map of Rivermead Nature Park habitats showing areas of Wild Oxford Project work

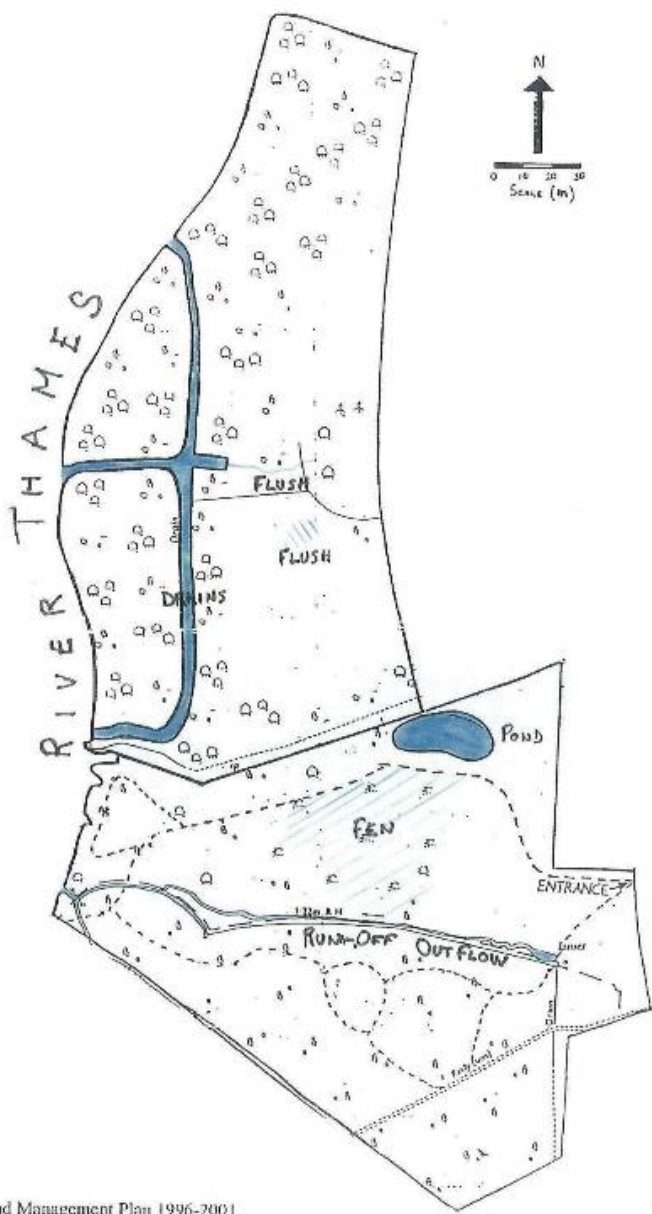


Rivermead reserve connectivity and habitat linkages via river corridor

Not shown in the sketch map (Figure 1) above is the northern section of the wet woodland habitat that abuts the reserve. This northern wet-woodland section gives important support to the Nature Reserve, in that it provides an adjacent, greater, area of similar habitats, which serves as a wildlife corridor facilitating species movements to and from the reserve. In fact, it links Rivermead to the whole eastern-bank wetland corridor habitat along the Thames to the north.

The current Rivermead Nature Reserve is very small at 3.3ha and already enclosed/isolated on two sides by housing and a busy road. If it were isolated from the northern wetland river margin habitats, the actual reserve would be far less rich in species.

Figure 2: Sketch map from the Rivermead Management Plan document 1996-2001 showing the northern wet woodland section of Rivermead SLINC included in the past management plan



This unbroken link to a much bigger area of natural riverine marginal habitat is vital for this small reserve. It is the reason why this tiny reserve is so rich in species. This little area does not stand alone; it is part of a much bigger ecological network.

As regards flying insects, mammals and birds, anything found on site may also be dependent not only on the eastern river corridor but on the rich swamp/floodplain meadows on the opposite, western, side of the river Thames as well.

It is worth noting that this northern section of the SLINC outside the nature park contains valuable tufa-forming alkaline springs, but they are currently deeply shaded and the water quality is unknown

Results of third year of BBOWT Wild Oxford Project work, 2016-2017

Time and volunteer input to the project

Volunteers under the leadership of Andy Gunn contributed to remedial work on the relic fen, the secondary woodland and the pond.

A total of four group work days at Rivermead was undertaken in 2017. As each session lasted for 5 hours, about 20 group volunteer hours were put in.

Oxford City Council's Countryside Service staff provided valuable additional help with large crack willow tree felling and removal. Some Thursday work sessions by the OCC Countryside Service Volunteers team have assisted with scrub and tree removal and pond vegetation raking.

Monitoring of progress happened either during the sessions or by separate visits after work sessions.

General comment on species recording to 2017

Surveys reveal a steadily increasing number of records for fungi and invertebrates for the whole site. New species to the lists are regularly found. This is normal for these two groups; biodiversity will be vast and that found already will be only the tip of the iceberg. Just one example is the finding of this reddish gall on a great willowherb stem. It is caused by a tiny micromoth in the genus *Mompha*. It is new to the site and, if it proves to be *Mompha bradleyi* as suspected, **new to the county** (pers. comm. moth expert Martin Corley). This record needs confirmation by collecting further galls, rearing out the micromoth and asking an expert in micromoths to examine the insect.



Photo above: red stem gall on great willow herb caused by a micromoth (*Mompha* sp. cf. *Mompha bradleyi*) 24.10.2015

Recording so far has focused on plants, fungi, invertebrates, amphibians and reptiles. However, it would be good to have better knowledge of birds, bats and night-flying moths. The finding of a 'Thrush's anvil' with smashed snail shells indicates that this could be a good area for the declining song thrush *Turdus philomelos*, but none have been seen whilst working or surveying so far. Dedicated bird surveys would be useful.



Thrush's anvil with smashed snail shells

Details of work carried out on specific areas, 2016-2017

Alkaline Fen work

Fen restoration at this site was started in 2012 by OCC Countryside Service Volunteers supervised by Ranger Carl Whitehead. The fen habitat had almost disappeared and was really at the stage of being a 'ghost fen' before the Wild Oxford project work started in 2014. Relic herbaceous flora was present but deeply shaded by tall crack willow trees and extensive growth of dewberry, a species related to bramble.



*Rivermead Fen **before Wild Oxford project work**, view of centre vegetation deeply shaded and dominated by dewberry and willow trees, September 2013*



Rivermead fen vegetation sunny and short in May 2017

Further BBOWT Wild Oxford volunteer work was carried out in the fen during 2016-2017. Cutting (scything) and raking of the tall fen vegetation happened twice in 2017. The first was in the peak growing season of reed in May (with maximum effect in reducing its dominance), when careful scything avoided clumps of valuable flowers like hemp agrimony but targeted rank areas. Scything at the end of the year removed all standing dead vegetation and let the light down to the peat in order to facilitate seed germination in spring. Cuttings were piled up nearby to enable life-cycle completion of any invertebrates in the seed heads etc.



This sequence of 2 cuts is very effectively reducing the height and vigour of taller plants, allowing smaller ones, like brooklime *Veronica beccabunga*, space to flower. The May cut avoided the very flower-rich areas dominated by buttercups on the drier margin to allow for insects feeding specifically on them, such as early bees, flies and butterflies.

Patches of hemp agrimony were avoided in May for the same reason. Hemp agrimony is an extremely valuable pollen and nectar source perennial plant, but it can be eliminated by early cutting or grazing. The clumps were therefore not finally cut back until late autumn, which will ensure the survival of the plants. The piles of brash and cuttings will provide increasingly useful refuge areas for amphibians, reptiles and small mammals.



Photo left and above:

Scything and raking the fen vegetation

22.05.2017



Scything and raking the fen vegetation, 30.10.2016

Now, at the end of the third year, the small fen area of 0.25 hectares is completely free of trees and has been returned to tall herbaceous vegetation. Dewberry is mostly gone and reed is very much reduced. The small fen area is, however, still shaded at the beginning and end of each day by tall crack willows and ash trees on adjacent, drier, land to either side. These should therefore be the target of future work to increase light levels in the fen.



Flower of common valerian, *Valeriana officinalis*

Tall herb vegetation predominates, with just a small amount of common reed *Phragmites australis* and hemp agrimony *Eupatorium cannabinum* prominent, mixed with great willow herb *Epilobium hirsutum* and abundant water figwort *Scrophularia auriculata* and creeping buttercup *Ranunculus repens*, with some wild angelica *Angelica sylvestris* and small amounts of soft rush *Juncus effusus*.

Common valerian *Valeriana officinalis* and meadowsweet *Filipendula ulmaria* used to be rare but have now increased. Common valerian is a species now on the England Red list¹ and there is a sizeable and important population at Rivermead.

¹ Botanical Society of Britain and Ireland, *A Vascular Plant Red List for England* (updated 18.11 2014). Available from: <https://bsbi.org/england>

Newly-recorded valuable plant species in the fen that are back from the seed bank are square-stalked St John's wort *Hypericum tetrapterum* and marsh lousewort *Pedicularis palustris*.



Above: Square-stalked St John's-wort,
Hypericum tetrapterum,
(photo taken in the Lye Valley)



Right: flowers of marsh lousewort,
Pedicularis palustris

Now that the fen site is open and free of bramble and trees, access is easier and a more detailed system of monitoring the fen vegetation will be set up in summer 2018. This will take the form of 20m x 20m marked squares, within which 40 random 28cm diameter quadrats are placed, a method used for the other Wild Oxford Project sites. Plant presence or absence will be recorded in each quadrat and the result will be an overall % frequency of each plant species in the square. This has proved useful in vegetation monitoring at Cothill Fen SSSI (Snowdon 2017). Repeating this survey of marked squares annually will enable more accurate charting of the success of fen restoration.

In the future, if fen flora does not recover as much biodiversity as expected, consideration should be given to enhancement by use of seed-rich fen hay or hand-collected seed from a more diverse fen, such as the Lye Valley fen east side (another Wild Oxford Project site).

The benefit of removing a particularly dense patch of scrub of the alien Wilson's honeysuckle *Lonicera nitida* from the bank of the fen continues to be seen in the attractive selection of flowers of drier habitats, including spear thistle, common ragwort and hogweed. These have flowers very popular with insects in the sunny conditions and will provide food for seed-eating birds, but the weedy species may not persist under the new cutting and raking management regime for this area.

Now that the fen is clear of collapsed trees, it can be clearly seen that the peaty areas nearest the stream/drain are drier than they should be, as flash flooding after rainstorms has caused erosion, lowering of the drain bed and consequently lowering of the water table in the peat nearest the stream, drying it out.

Marginal areas of dry fen peat also exist nearest the very large crack willows adjacent to the path. Various remedial actions to re-wet these dry peat areas are possible.



View into fen from bank to footpath, cleared of Wilson's honeysuckle and scrub, now has ragwort thistles and other ruderal species.

Fen invertebrates



Invertebrate records continue to accumulate. One new discovery in the last year was that the now abundant water figwort had numerous figwort weevils *Cionus* sp. feeding on the leaves.

Figwort weevil, Cionus alauda

Photo from the website of [The Watford Coleoptera Group](#) used under a Creative Commons licence

The spectacular scarlet tiger moth was recorded for the first time as a caterpillar. The small patch of comfrey (caterpillar food plant) to the south of the stream/drain could be increased to favour this species. Comfrey rhizomes may be dug up in winter and divided for replanting with great success. Planting rhizome portions in new sunny areas of the fen or pond margins is suggested.



Scarlet tiger moth, Callimorpha dominula, caterpillar and adult moth



Watching bees on comfrey

2017 saw the first records of an important soldierfly species – a female banded general soldierfly *Stratiomys potamida* was found nectaring on hogweed flowers. This is a species that will be breeding in fen mud and used to be nationally scarce, but is now being found much more frequently. Several captures were made of the spectacular giant crane fly *Tipula maxima*, which also breeds in the fen mud.



Giant crane fly, Tipula maxima



*Female banded general soldierfly
Stratiomys potamida (a wasp mimic)*

Fen water quality

With the clearing and raking it was possible to identify features in the fen previously hidden below scrub and trees, one being a small spring that issues from the bank to the path just north-east of the fen. The water from this spring travels in a small channel, which meanders and spreads out over the fen lower down before finally meeting the central stream. It had been thought that damming this runnel at its lower end might allow water to spread out sideways over the fen and achieve beneficial re-wetting of dry peat areas. Although the spring water looked good, a suspicious amount of stimulation of growth of watercress and sweet grass in the small channel from the spring indicated a degree of nutrient enrichment was present.

Water quality testing using the simple colorimetric test kits from the [Freshwater Habitats Trust](#) (FHT), carried out during 2016 and repeated in 2017, revealed that the water as it issues from this spring is indeed enriched with a high nitrate load. Therefore it would have been inadvisable to use it to re-wet dry fen areas, as it would only have encouraged rank growth and would have disadvantaged low-nutrient calcareous fen specialist plants. If this spring flow cannot be cleaned up before it emerges, it may be necessary to divert it away from the fen and direct it to the central drain.



In contrast, use of the FHT test kits on a spring area that is strongly iron-oxide-depositing, more to the west in the fen, indicated an unmeasurably low nitrate level, ideal for re-wetting dry fen areas,

Iron oxide-depositing spring with very low nitrate and phosphate concentration in the water

Marginal fen meadow and rough grassland



*Greater bird's foot trefoil,
Lotus pedunculatus*

The small area sloping down from the road to the spring fen is moist grassland grading to fen meadow and contains species such as common grasses, including cocksfoot, buttercups, amphibious bistort, greater bird's foot trefoil, meadow vetchling, common fleabane and a big population of hogweed. Whilst none of these are rare or scarce, all provide lots of food for insects; the big hogweed population attracts every kind of flying insect, as hogweed is the best of all nectar producers in midsummer.

Meadow vetchling is important for all types of wild bees, from bumble to solitary. The greater bird's foot trefoil favours bees and provides leaves for common blue caterpillars. Regular scything and raking is gradually lowering nutrients and encouraging the expansion of flowers at the expense of rank grass here.



Buttercups in this fen meadow area, avoided during scything in spring



*Hogweed, *Heracleum sphondylium*,
with unusual pink flowers*



*Meadow vetchling,
thyris pratensis, with bumblebee*

Pond work and water quality

The original pond was dug in 1987 on the north-eastern side of the site and it seems likely to have been extended later. It is spring-fed and was probably excavated in a peaty area (possibly previous fen). It had become deeply shaded by tall crack willows, some of which had collapsed into it.



Shaded pond before any work, 24.10.2015

The pond is an important breeding site for a sizeable population of common toads *Bufo bufo* in the spring. It is thus a BAP priority habitat. It has water soldier *Stratiotes aloides* as an introduced submerged plant, as well as flag iris *Iris pseudacorus* around the margins. Greater reedmace *Typha latifolia* dominates a large section of the middle of the pond.

In 2017 a new extension to the previous dipping platform was installed to enable more school children from the local primary school to study the pond life.



Dipping platform extension, 2017

Considerable progress has been made on the removal of tall crack willows that were deeply shading this pond. Lighter conditions now prevail over 2/3 of the pond. Still a few tall crack willows remain at the western end. The alien climber Russian vine (mile-a-minute plant) *Fallopia baldschuanica*, escaping from hedges of adjacent gardens, has ramped away in the light conditions and is now blanketing the banks at the eastern end of the pond. This has needed sessions of reduction work, but it will need more regular, intensive, targeted cutting back to allow this end of the pond to regenerate more attractive and wildlife-friendly pond-marginal and drier-bank flora.



Sunnier pond well vegetated, summer 2017

In 2017 a kingfisher was seen flying over the pond; probably attracted by the more open sunny conditions.

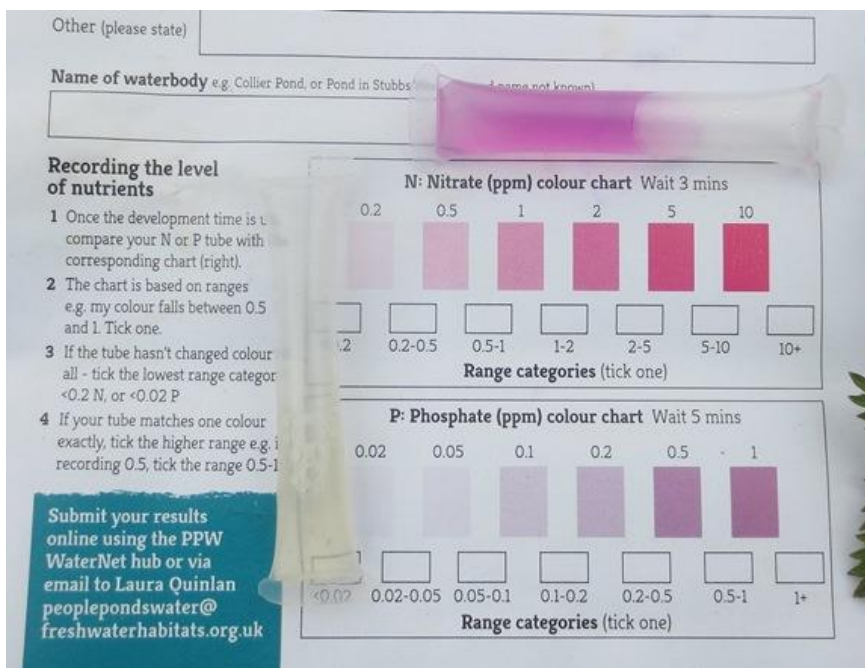


Recent winter crack willow reduction around pond, February 2018

Now that more light is reaching the pond water, a bloom of filamentous algae growth combined with the presence of lesser duckweed *Lemna minor* and least duckweed *Lemna minuta* is indicative of a degree of nutrient enrichment. The stonewort *Chara* algae found in 2012 seems to have disappeared, perhaps due to declining water quality.

Water quality testing using the simple colorimetric test kits from the Freshwater Habitats Trust were carried out during 2016 and repeated in 2017. These revealed that the water was indeed enriched with a high nitrate load: result 2ppm nitrate whereas the desirable level for a clean water pond is almost undetectable nitrate, certainly well below 0.2ppm.

Water testing in summer 2016 indicated the nitrate level of the west end was less than at the east end of the pond. This may indicate the source of nitrate is from upslope of the east end, but it is also possible that the nitrate level was lower at the east end because of increased removal here by tree and vegetation growth.



Results from FHT water-testing kit in March 2017 at east end of the pond

Significant nitrate (2 ppm), with very low phosphate (<0.02 ppm)

The pond supports three amphibian species: smooth newt, common frog and toad. Despite the measured nitrate enrichment, good amounts toad and frog spawn were recorded in 2017, followed by large numbers of tadpoles.

In 2016 it was discovered that the pond also contains three-spined sticklebacks *Gasterosteus aculeatus*. These carnivorous fish limit the aquatic invertebrate diversity. The presence of these carnivorous fish goes some way to explaining the dearth of insect larvae and nymphs in the pond water – they will have been eaten; but the overall lack of invertebrate diversity must be accounted for by the nutrient enrichment, which has stimulated overgrowth of filamentous algae, eliminating other plants, and consequently is unfavourable for many aquatic invertebrate species.

The problem of nitrate enrichment of the fen and pond is most likely a result of leakage from the sewerage system, either from pipework crossing the site or in the housing estate upslope to the east. Nutrient enrichment and the presence of fish in the pond are both problems that will need some remedial action, if a healthy, clean, pond full of a wide range of aquatic invertebrates is to be restored on site.

The pond marginal zone could do with annual cutting and raking to reduce the dominance of great willow herb and promote shorter vegetation; this would allow better views of the whole pond in summer and make room for the introduction of a greater variety of flowering plants to favour insects.

Examples of useful plants that could be introduced are: meadowsweet, purple loosestrife, comfrey, yellow loosestrife, angelica, common valerian. Some of these, such as common valerian, comfrey and angelica, could be transplanted to the pond margins from the good population now in the restored fen areas. This pond might be an appropriate site for the trial of a couple of plants of the rare greater water parsnip *Sium latifolium* currently being propagated by Oxford Botanic Garden. There is an active programme of finding new suitable wetland sites around Oxford for this declining nationally red listed² species - and it has flowers extremely attractive to insects. It is currently under threat of loss at another City Council site.

Scrub, glade and path work



This clearance work has continued adjacent to the paths at the east end of the site, nearest the entrance. Cuttings continue to be raked-off to log and habitat piles.

Sunnier conditions are encouraging more flowering of woodland-edge herbaceous species, such as bush vetch *Vicia sepium*, which favours bumble bees.

Bumble bee on bush vetch, Vicia sepium



Most plants on site have now been identified, but one new addition to the scrub list is cherry plum *Prunus cerasifera*, flowering in March adjacent to the fen. This is beneficial to the early spring bees and flies.

Cherry plum, Prunus cerasifer, flowers

Alien (non-native) plant species in the Reserve

Alien species noticed for the first time in scrub and woodland are single plants of pheasant berry also known as Himalayan honeysuckle *Leycesteria formosa* and climber Virginia creeper *Parthenocissus quinqueflora*. These are both recommended for removal before they increase and give the site problems similar to those already caused by well-established alien species, such as a patch of snowberry *Symphoricarpos* sp. near the river bank and the big patch of Russian vine (mile-a-minute plant) *Fallopia baldschuanica*, which, as already mentioned, is escaping from a nearby garden and threatens the margins of the pond to the east.

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



Himalayan honeysuckle, also known as pheasant berry, Leycesteria formosa

Also recommended for removal are patches of redcurrant *Ribes rubrum* and raspberry *Rubus idaeus* (both allotment/garden escapes with seed spread to the site by birds). The most abundant spring flowers in woodland areas are currently snowdrops, another garden escape, brought to the site by garden rubbish dumping. Whilst not native, these are so much enjoyed by the visiting public that removal or reduction is only recommended if they become extremely widespread and are reducing native flora.



*Mile-a-minute plant ramping over fence and up to pond margin 23.08.2016
(close-up of flowers at bottom left)*



Widening rides and creating glades will favour an increase of native lesser celandine and early dog violets. The flowers would be beneficial to early bees and the latter may even attract butterflies that breed on the leaves.

Dog violet, Viola reichenbachiana

Woodland, deadwood habitat and tree-felling

This is a site with abundant trees of a rather limited species range (mostly willows, ash, hazel poplars). Many were mature and had fallen before the start of the project in 2014, resulting in a lot of rotting trunks and logs lying on the woodland floor.



Honey fungus (*Armillaria* sp.) fruiting bodies are frequently found on such trees and this fungus may have killed them. The abundant fallen wood has provided food for a rich diversity of deadwood-specific fungi and invertebrates. Not many invertebrates can actually feed on dead wood; the majority found associated with dead wood are actually feeding on the fungi which have colonised it. The list of fungi found at Rivermead increases year on year and currently stands at 23 species and all are on dead wood (one of them is the rare aniseed-scented bracket *Trametes suaveolens*). Deadwood-specific (saproxylic) insects are often caught visiting the flowers in the adjacent fen; they must have been breeding in fungi in deadwood piles nearby.

Honey fungus Armillaria sp.

Examples of such saproxylic insects newly found in 2017 are the spotted wing fly *Paraclusia tigrina*, hoverflies *Xylota sylvarum* and *Myathropa florea*, (a harmless wasp mimic), the last of which breeds in water-filled rot holes in tree trunks



Paraclusia tigrina pair
(Male on left)



Myathropa florea hoverfly, wasp mimic



Some flies and beetles can breed in several types of fungi but the nationally scarce fly *Seri obscuripennis* (Platyppezidae), found for the first time in 2017, was bred from larvae occupying its host fungus, the bay polypore *Polyporus durus*, on a rotting log (this fly uses only this particular fungus). The fungus is relatively common but the fly is very scarce.

Bay polypore, Polyporus durus

Listed in my previous reports are other deadwood species discovered – 2 sorts of cardinal beetle, spotted longhorn beetle, wasp beetle, deadwood moth *Nemophora degeerella* and *Ctenophora* sp deadwood crane fly.



Whilst honey fungus is not good news, as it is a tree-killer, several different sorts of flies actually breed in it. Fungi often have specific species of fungus gnats that breed in the fruitbodies, such as the *Mycetophila* sp. shown here.

Fungus gnats, Mycetophila sp
reared from smoky bracket fungus,
Bjerkandera adusta

With fen restoration, even more tall crack willows have been taken down. The consequent log piles will provide a useful resource for deadwood fungi and insects for some years to come, thus supporting the saproxylic fauna on site. However, deadwood for larval stages is insufficient for completion of the life cycle for many deadwood insects. The adult stages may need to feed on nectar and pollen from flowers adjacent to the deadwood, hence enhancement of flower resource on the rides is important.



Ride widened by tree felling



Log pile adjacent to ride



Volunteers moving logs

Collection of hogweed seed in the autumn for distribution around the site is already happening and should continue until a sufficient flowery resource of this plant is present on the widened rides.



*Volunteer collecting seed of Common Hogweed, *Heracleum sphondylium**

Most trees at Rivermead are young and have no rot-holes suitable for hole-nesting birds. The situation seems suitable for the installation of some nest boxes in the trees that will remain, so as to enable better breeding.

Summary and Conclusions

The BBOWT Wild Oxford Project has continued to make a clear difference to the habitats in Rivermead Nature Park in the third year. A total of four Wild Oxford group work days at Rivermead was undertaken in 2017. As each session lasted for 5 hours, about 20 group volunteer hours were put in. Work has progressed with the assistance of the Countryside Service staff and volunteer team for major tree felling and processing. The whole nature park area is emerging slowly from dominance by tall, shading, trees to a more diverse mosaic of sunny and shady areas with attractive views of the open fen and wider rides. In addition to all the positive changes benefitting wildlife, the nature park is a far more pleasant experience for the walker. There is especially good progress in the restoration of a more flowery, diverse, fen area and the pond is well on the way to being fully open and sunny.

Achievements are:

- In the fen, with removal of all the willows in the centre completed, all of the previously-cleared wet peaty area of the relic alkaline tufa-forming fen has had a third year of cutting and raking, resulting in a more diverse herbaceous flora. Reed and dewberry are much reduced and new wetland species to the site list continue to recur from the seed bank in the peat, such as marsh lousewort, square-stalked St John's-wort and blunt-flowered rush. Other valuable wetland species originally present continue to increase in area and in abundance of flowering, such as common valerian, water figwort, wild angelica, brooklime and marsh thistle.
- Further scrub reduction, glade creation and further widening of the path margins to sunny rides have been carried out. Sunny areas adjacent to the paths have increased, favouring flowering of herbaceous plants, and insects. The more open, sunny, paths make this an attractive place to walk.
- Work has progressed on the pond margins to let in more light. A lot of progress has been made in felling and clearing the tall crack willows that previously cast deep shade over the pond

- The dipping platform on the edge of the pond has been extended to make dipping easier and safer.
- A section of recycled-plastic boardwalk has been constructed over the stream and a very wet boggy area to the west of the site, thus improving access for walkers.



New boardwalk over stream and mud

Recommendations for future management actions:

- **Further removal of remaining very large crack willow and ash trees marginal to the fen** and currently still shading it in morning and evening. Without trees removing water, currently dry fen areas will wet-up more readily and higher light levels will encourage better flowering of the fen's tall herb assemblage.
- **In the fen, actions to retard water loss to the deeply-incised drain will aid wetting-up peat to the benefit of all fen flora and invertebrates.** These actions could include small bunds at the edge of the fen adjacent to the stream (it is especially important that these retard loss of clean water from the iron oxide spring). Also, re-wetting could include the insertion of woody debris dams in the stream/drain itself to slow and hold up the water flow. The water quality in this drain is not good, but maintaining a higher water level in the drain will re-wet the fen sideways, taking care not to flood water onto the fen. Such dams need to take account of the flashy peak flow of road run-off this drain receives.
- **Consider cleaning up the water supply entering the fen by diverting the water flow from the strong contaminated spring direct to the central drain;** thus not allowing it to spread over the fen.
- **Remedial action to improve water quality in the pond by reducing nitrate levels to favour more diverse aquatic life.** Within the pond, a trial is suggested of making the most contaminated east end into a 'clean-up swamp', with a permeable barrier to the west end open-water dipping area.

- **Target the following alien (non-native) plant species on site for complete removal**, so as to make more room for more valuable native plant species. This may require some to be dug out, rather than merely cut back, in order to achieve eradication. The species concerned are: Himalayan honeysuckle, Virginia creeper, mile-a-minute plant (Russian vine), snowberry, buddleia, redcurrant, raspberry.
- **Devise a strategy for draining down the pond to get rid of sticklebacks at the time of year (autumn) when it is least likely to be used by amphibians.** Without fish eating larval stages, a greater variety of aquatic invertebrates will be able to exist. Even if the current population of fish is eliminated, past experience has shown that the nearness of this pond to housing inevitably presents a high risk that fish (usually goldfish) will be repeatedly introduced.
- **An annual pond marginal zone cut and rake in autumn** will ensure greater diversity of herbaceous vegetation
- **Once pond marginal vegetation is better managed, try introduction of a greater variety of tall emergent wetland herbaceous plants around the pond**, featuring species with flowers good for insects and ones that are tolerant or actually requiring higher nitrate. This could include a trial of the greater water parsnip *Sium latifolium*.
- **Continue to collect seed from the abundant hogweed population behind the hedge and spread it along the newly-widened rides to enhance nectar sources for insects.**
- **Bat and moth surveys:** it is expected that such a diverse site with mature trees will be important to both groups.
- **Properly constructed and sited reptile refuges with monitoring mats adjacent to them** will be useful for monitoring the grass snakes on site.
- Some **bird boxes suitable for hole-nesting birds** could be placed on the trees that are to remain.
- **Soil investigation by coring (augering)** to detect further areas of peat (relic fen) in the woodland that could be subsequently remediated by re-wetting to fen habitat.

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Appendix: Species records for Rivermead Nature park from 2016-2017