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Contents	Page
Dr Geoff Oxford FLS, President of the Union 2014-15	161
Wild Tulip in Yorkshire and Sweden Linda Chapman	163
Nothing in the Esk Valley Graham Featherstone	165
Some records of tardigrades in Yorkshire Barry Nattress, Mike Smith and John Ramsbottom	167
The dolichopodid flies of North Cave Wetlands, a former sand and gravel quarry Roy Crossley	172
Field Note: Intra-specific killing in Great Black-backed Gull Roy Crossley	179
One day in June – a snapshot of decline* Nick Morgan	180
Early notes from Spurn Bird Observatory John R. Mather	182
Colonization of sand and gravel quarry ponds by aquatic plants: the example of North Cave Wetlands 2001-2013 R. Goulder	185
Establishment of Meadow Foxtail-Great Burnet meadows (MG4) on former pasture land at South Grange Farm, in the East Riding of Yorkshire Neil Humphries, Jeff Lunn and Paul Benyon	197
Leeds Naturalists' Club 1870 - 2014 Peter Larner	210
Obituary: John Wint 1946-2014	217
Obituary: Leslie Magee B.A., C.Eng., M.I.Mech.E., M.I.E.T. 1918-2013	218
Field Note: Positive news of Floating Water-plantain in the Calder & Hebble Navigation Ray Goulder	220
Field Note: Rough Niger - a first record for the North of England Heather Walker	220
Yorkshire Naturalists' Union Excursions in 2014 Albert Henderson and Adrian Norris	221
YNU Calendar 2015	240

YNU Notices: p239

An asterisk* indicates a peer-reviewed paper

Front cover: Wild Tulips *Tulipa sylvestris* growing at Cattal (see p163). Photo: *Mike Chapman*

Back cover: A Scorpion fly *Panorpa* sp. found at Thorpe Marsh Nature Reserve during the VC63 excursion (see p223). Photo: *Colin Rew*



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Dr Geoff Oxford FLS, President of the Union 2014-15



My earliest forays into natural history focussed on mammals when, as a lad, I used to wander the countryside around Warwick mapping Badger setts and catching mice and voles with a home-made 'Longworth' trap constructed from marine plywood and bits of Meccano. After a BSc in zoology at the University of Wales, Bangor, I moved to the University of Liverpool in 1968 to undertake a PhD. This was in the early days of using molecular markers (allozymes) to study evolutionary processes and I chose to work on the ecological genetics of 'area effects' in the snails *Cepaea nemoralis* and *C. hortensis* on the Marlborough Downs. After a year as a genetics research demonstrator at the University of

Wales, Swansea, I was offered a lectureship in population genetics at the University of York where I remained until my retirement in 2009. This was a fortuitous appointment because in those days (early 1970s) the relatively new Department of Biology was an amazingly integrated unit with everyone knowing pretty well what everyone else was doing. Since I had very general interests across a broad sweep of biology this suited me down to the ground.

At first my research concentrated on enzyme variation in snails but it soon branched into disparate avenues, initially united within the general theme of how genetic variation in populations (balanced polymorphisms) could be maintained. For example, in collaboration with Terry Crawford and various students, we studied the distribution and origins of the radiate/non-radiate capitulum polymorphism in Groundsel *Senecio vulgaris* – a

phenomenon which, around York at least, proved to be curiously short-lived. During my PhD years I had become frustrated with the relatively tedious process of scoring molecular variation in snails (extraction, gel electrophoresis, staining, etc.) and I looked around for a 'hobby' project involving genetic differences that were more obvious. I homed in on the colour-polymorphic candy-stripe spider *Enoplognatha ovata*, thus initiating a three-decade-long study of the genetics and evolutionary implications of this variation, mostly conducted in Nidderdale, and a subsequent fascination with spiders. This eventually led on to research with colleague Rosie Gillespie (initially at the University of Hawaii, then UC Berkeley) on very similar variation in the endemic Hawaiian Happy-face Spider *Theridion grallator*. We showed that the genetics of some morphs of this exuberantly colour-polymorphic species differed between populations on the islands of Maui and Hawaii, suggesting major genetic shifts during founding events. While on sabbatical in Berkeley in 2005 I discovered another highly polymorphic species, *Theridion californicum*, which shares many of the same colour morphs with *T. grallator* and *E. ovata*, thus prompting an investigation into why unrelated species may have convergent colour patterns. In addition to work on polymorphisms I have examined distributions and speciation (including possible reverse speciation) in large house spiders *Tegenaria* spp. and initiated, with my wife, colleagues and students, studies of the ecology and conservation of the beautiful but endangered Tansy Beetle *Chrysolina graminis*.

Aside from research interests, I served on the Council of the Yorkshire Wildlife Trust for six years and on the Trust's education committee for many more. In the 1980s I took on the role of Yorkshire WATCH Organiser, a voluntary post within the YWT with the remit of encouraging the setting up of local WATCH groups across the county (WATCH was a national organisation run by the RSNC for young children interested in natural history). My wife and I ran our own WATCH group in York for almost a decade – a most inspiring and rewarding experience. Since the 1970s I have been a member of the Yorkshire Mammal Group (YMG), acting as chairman (twice) and for a number of years edited the Group's annual publication *Imprint*. For a decade I was involved with other YMG members in the annual monitoring of a re-introduced population of the delightful Hazel Dormouse *Muscardinus avellanarius* near Helmsley until, sadly, it became extinct. Over the last 10 years or so I have become increasingly involved with the British Arachnological Society, acting variously as vice president, president and, currently, honorary secretary. Encouraging a respect of, and fascination with, spiders – not the most endearing of groups – is to my mind extremely important and, to this end, I run one or two local workshops each year teaching adults how to catch, appreciate and begin to identify at least some members of our arachnofauna.

Wild Tulip in Yorkshire and Sweden

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A shorter version of this article appeared in the *Wakefield & North of England Tulip Society Newsletter* 25 (2013).

The Wild Tulip *Tulipa sylvestris* is a bulbous perennial of open woodlands, orchards, hedgerows, riversides, chalk pits, grassy banks and waste ground. Populations can arise from discarded bulbs, deliberate planting in the wild or relics of cultivation. In Western Europe it is commonly found in orchards and vineyards where it thrives on disturbances to the soil. In such situations it is sometimes described as invasive. Wild Tulip also grows in woodland but, although it thrives, spreading rapidly by underground stolons, it rarely flowers well. It may grow in old churchyards, but again flowers little until these grounds are cleared and dug over, disturbance of the ground stimulating flowering. It grows some 35cm tall with bold clear yellow flowers and is tetraploid, having double the normal number of chromosomes, a factor which may account for its vigour.

The Wild Tulip's true origins are far from clear. Pavord (1999) suggests that it probably slipped into England in the reign of Elizabeth I (1558-1602) although, she states, it may have come earlier, possibly arriving with Flemish, Walloon or French refugees from 1540 onwards. It may have been brought over by the Flemish botanist Matthias de L'Obel (generally known as Lobelius) who travelled to London in 1570. Another consideration, noted by Daniel Hall (1929; 1940), is that the plant may even have been introduced by the Romans when bringing their vines to these shores.

According to Perring & Walters (1962), Wild Tulip was in cultivation in Britain by 1596. Formally much cultivated, it was first recorded in the wild in 1790. It appears to have been widely naturalised by the 18th and 19th centuries, but had declined dramatically by the time of the 1962 *Atlas of British Flora* (Preston *et al*, 2002) which shows fifteen recorded sites in Yorkshire, only three of them post-1970.

My own particular interest in this plant began in February 2013 when James Akers forwarded a copy of the *Yorkshire Naturalists' Union Bulletin*, issue 54. An article by Howes *et al*. lists the Yorkshire sites where Wild Tulip had previously been recorded, one of which is near Kirkbymoorside, a town about seven miles from my home. James' intent was that the information would give my recently retired husband the 'opportunity' to avoid rest, relaxation and boredom by getting out there and searching for the plant around Kirkbymoorside to try and add a 2013 record. In 1930 the estimated number of plants was 200-300, in 1979 it was reported that there were fewer tulips, and no plants at all were found in 2009. However, it was noted that as the land was permanent grassland "there is a possibility that the plants are still there". Unfortunately, try as we did, we found no sign of any plants near Kirkbymoorside.

Howes *et al*. (*loc. cit.*) also mentioned Wild Tulip growing at Cattal, a village located between York and Knaresborough. Wild Tulips have been recorded growing here since 1881. We visited

Cattal on 28 April 2013 and parked to the west of the village. Immediately we saw about 20 Tulips growing on the east side of the culvert, then a further 40 further down the west side of the culvert, approximately 10 in a hedge bottom and some individual specimens in the field. All the land where the Tulips were growing was adjacent to the River Nidd and it was apparent, from debris in the field, that the area had recently been flooded.

We took lots of photographs of the Tulips and returned to our car, satisfied with what we had seen (see Plate I, centre pages, and front cover). Malcolm Hainsworth happened to call the next day and, during discussion, realised that we had not visited what is recognised as the main site for the Tulips at Cattal. So, on 30 April, we returned and visited Aubert Ings, a designated SSSI in a loop of the meandering River Nidd to the east of the village. Here, there were no Tulips in the field adjacent to the Nidd. However, as we walked up the levee and looked down the river bank there were Tulips as far as we could see, literally hundreds of them. It was a truly remarkable sight and one that I had the opportunity to relate to our Swedish visitors after the Tulip Society's Annual Show. Talking to Anita Ireholm and Ulf Hannson it was apparent that they also had stories about the Wild Tulip. Ulf described it growing at Uppsala Botanic Gardens and also at Linnaeus' summer house at Hammarby. He also contacted Mariette Manktelow, at Uppsala University Botanical Garden, who told Ulf that Wild Tulip is found wild throughout the garden but that it shows mainly leaves and only the occasional flower. If the plants are from Rudbeck's original stock they can be dated to 1670–1680.

At Uppsala, a small Hortus Academicus was established in 1655 by Olof Rudbeck the Elder, a scientist and professor of medicine. This garden was the first botanic garden in Sweden and was originally called Rudbeck's Garden. His son, Olof the Younger, also became a professor and continued his father's studies. His best known student was Carl von Linné, better known by his latinised name Linnaeus, the man who devised our system of plant and animal nomenclature. Linnaeus would later name a genus of plants 'Rudbeckia' after the father and son (a later descendant of the Rudbeck family is Alfred Nobel, the originator of the Nobel Prizes). Linnaeus described *T. sylvestris* in 1753 in his *Species Plantarum*.

Between 1741 and 1778 the garden was under the directorship of Linnaeus, who was then Professor of Medicine. It became known as Linnaeus' Garden and was expanded considerably from Rudbeck's original design. By the end of the 18th century it had become very crowded and it often flooded. Consequently, a new garden was established and the old one abandoned, though it was restored in the 1920s; this restoration was undertaken to Linnaeus' original 1750s plan.

Linnaeus' summer house at Hammarby is one of the best preserved summer houses in Sweden. It is now a historic monument, museum and a sanctuary for surviving Linnaean plants. Only about 40 of the 900 varieties that Linnaeus may have had in the garden remain today, one of which is Wild Tulip, again mainly leaves but there is the occasional yellow flower in the spring sun. According to Ulf, the Wild Tulips here are almost certainly derived from the Botanical Garden at Uppsala.

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Nothing in the Esk Valley

Graham Featherstone

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Lealholm is a small village nestled in the Esk valley, surrounded by the North York Moors. The River Esk splits the village in half and runs eastwards for another 10 miles before entering the North Sea at Whitby. Just upstream of the village is the once famous Crunkley Ghyll, a steep-sided gorge with one of the few remaining blocks of ancient oak woodland with a typical understory carpet of Bilberry *Vaccinium myrtillus* and brambles.

Lealholm falls within the boundary of the Whitby Naturalists' Club and I have been recording the Lepidoptera of the area for the last 10 years. I regularly run a 40 watt actinic Heath trap in my back garden and the results have been quite spectacular. As this is such a rural garden I immediately saw all the commoner moths coming to the light. In the spring I am usually overwhelmed by the *Orthosias* (e.g. Common Quaker and Hebrew Character), with sometimes over 100 individuals hiding amongst the egg boxes deposited in the bottom of the trap. As the season progressed I discovered that, if I placed the moth trap on the kids' 14ft trampoline, lots of moths attracted to the light would settle on the surrounding safety netting and it was quite simple to walk around the trampoline potting up any interesting moths to photograph or identify next morning. On 29th July 2010 I retained one such moth, a rather bland, brown micro which I could not put a name to. Photographs were taken and emailed to a good friend of mine and within minutes the phone rang and a rather excited fellow 'moth-er' told me that he thought my moth was a migrant Vagrant Piercer *Cydia amplana* and it would be a first for VC62. More photos were sent to 'the experts' and they confirmed its identity.

Living just 8 miles as the crow flies from the east coast, I am always hopeful of seeing a few migrant moths in my garden trap each year and on 27th August 2013 I was amazed to see the unmistakable silhouette of a large hawk-moth on one of my tours of the trampoline. It was out of reach on the inside of the netting, meaning that I had to crawl onto the trampoline as carefully as possible, hoping not to disturb it. With great relief I secured it and saw straight away

in the beam of my headtorch that my prize was a wonderful migrant moth, none other than the scarce Bedstraw Hawk-moth *Hyles galii*. Next day, after photos were taken, the moth was released unharmed, flying strongly westwards into the last glows of the setting sun.

Not surprisingly, quite a few wandering moorland moths find their way into my garden trap. Golden-rod Brindle *Lithomoia solidaginis*, Heath Rustic *Xestia agathina* and the Brown Knot-horn *Pyla fusca* were all welcome additions to my garden list and one morning I saw the unforgettable sight of a female Emperor *Saturnia pavonia* in the light trap. I noticed that she had laid a batch of eggs, so these were carefully scraped into a container and posted off to a fellow enthusiast who managed to rear quite a few splendid adults from the eggs and had great fun using the virgin females to search several sites in Yorkshire for wild males which would assemble to them.

On 19th July I ran a mercury vapour lamp over a white sheet for a couple of hours in a local woodland. It was not a particularly successful evening with only 29 species of moth recorded, but one small Geometrid had me baffled so I retained an individual to identify next day. The moth was very well marked and was obviously a Barred Carpet *Perizoma taeniata*. Sutton and Beaumont's *Butterflies and Moths of Yorkshire* says that this moth was confined to just one site at Dibscar near Grassington. With more digging I was amazed to discover that the moth had actually been taken at the same location as mine in 1980. Later in the month I trapped a worn individual of the same moth in my garden too, possibly a wanderer from the local oak woodland not far from my village.

Nothing in any back garden can be quite fascinating, even addictive, as you just never know quite what is going to be in the moth trap each morning and I would encourage anyone with an inquisitive interest in natural history to either buy or build a moth trap and site it at the end of the garden. You won't be disappointed!

2014 sees me taking over as the Whitby Naturalists' Club's recorder of Lepidoptera and I am looking forward to helping members of the club in recording the butterflies and moths that can be found in this most varied of habitats, from the beaches on the coast to the nearby heather-clad moor tops. I am sure that there are many under-recorded sites with many fascinating moths just waiting to be discovered!

Editors' note: In addition to the YNU book mentioned above we would recommend the excellent website of the Lepidoptera section of the YNU (www.yorkshiremoths.info) for detailed information on all Yorkshire's moths, particularly the distribution maps and charts of seasonal occurrence.

Some records of tardigrades in Yorkshire

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Introduction

Tardigrades, sometimes known as water bears, are microscopic animals 0.1mm-1.5mm long, usually transparent and with four pairs of stumpy legs (See Plate II, centre pages). They are to be found in marine, freshwater and terrestrial environments.

Tardigrades were included in the phylum Arthropoda prior to 1962 but since that date they have been allocated their own phylum – the Tardigrada (Ramazzotti, 1962). The phylum is split into two Classes, the Heterotardigrada and the Eutardigrada. The former is broken down into two Orders, the Arthrotardigrada, which includes all the typical marine species, and the Echiniscoida which, with one exception, are from terrestrial environments. The exception *Echiniscoides sigismundi* is to be found on some species of marine algae and within some barnacles and mussels. This Order also includes *Echiniscus*, a genus whose species are covered with sclerotized plates and distinctive cirri. The Class Eutardigrada comprises typical terrestrial species which lack the sclerotized plates, having an elastic, transparent cuticle.

Terrestrial tardigrades are found in a number of environments - in soil and leaf litter, in moss cushions, liverworts and lichens and also in freshwater. Whilst some marine tardigrades are found in deep water and are outside the scope of this paper, many are found within the intertidal zone, buried in the sand and living interstitially in the spaces between the sand grains.

Tardigrades cannot remain active without water and those that live in soil or moss cushions, etc., depend upon having a film of water around them. In consequence, they have developed the ability to survive extreme conditions in a dehydrated state, a condition known as cryptobiosis. In unfavourable conditions, the animal retracts its head and legs and forms a barrel-shaped tun (Kinchin, 1994; Nelson, 2001). As long as the desiccation is slow the animal will survive and return to active life once water returns.

There would appear to be few Yorkshire records of tardigrades. Morgan & King (1976), in their monograph on British Tardigrades, record just four species in Yorkshire, whilst Morgan (1976) adds but two more.

Methods

Samples of mosses, lichens, etc., were collected and stored with full site details including the national grid reference, in paper bags until ready for processing, usually within 48 hours. Each sample was soaked in water for about 24 hours and then squeezed into a petri dish.

The animals were then picked out individually with a pipette under a stereo-microscope and transferred to slides for examination.

Each leaf litter or soil sample was spread thinly on a sheet of supported single ply tissue in a tray (Greaves, 1989). Water was then added up to the level of the tissue. The sample was then left for a period of about 24 hours. The supported tissue and sample were then carefully removed and the water passed through a 50 micrometre sieve. The sieve was then back-flushed with distilled water into a petri dish. The tardigrades were then extracted as before.

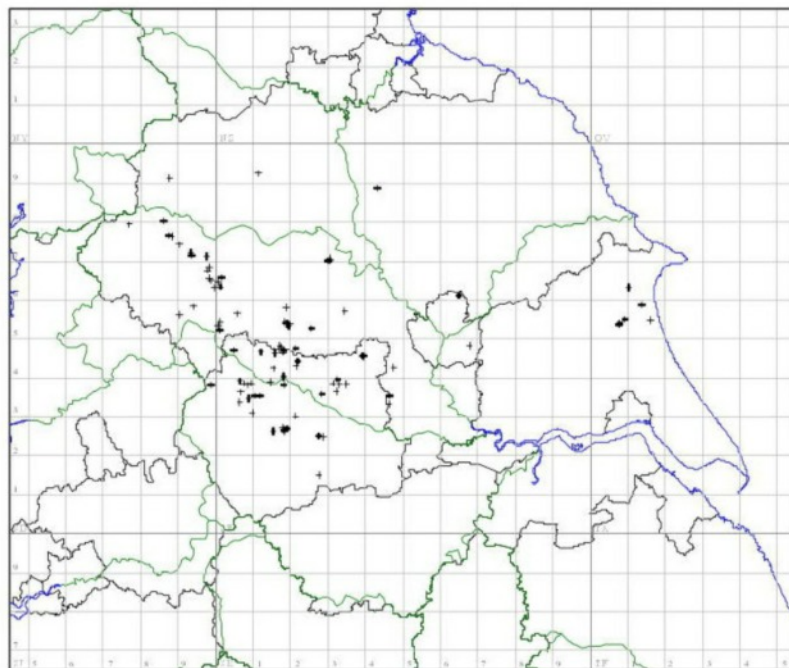
We did find specimens in two unusual places. We found one specimen in a heavy deposit of green algae growing on a tree trunk. Even more unusual, we found that almost 30% of the snail droppings we examined contained tardigrades (following Fox & Garcia-Moll (1962)). It is unclear if they had passed through the gut of the snail or taken up residence at a later stage!

Once the specimens were on microscope slides they were examined with phase contrast at magnifications ranging from x200 to x800. Identification was achieved by using the keys in Morgan and King (1976) and subsequently Ramazzotti & Maucci (1983).

Any permanent slides of tardigrades were mounted in Hoyer's medium.

Figure 1. Positive sampling sites visited

VC61 to 65 Tardigrada Recorded Sites



Samples

210 samples were taken over a five year period commencing October 2008. Of these, 176 were from mosses, 19 from lichens, 1 from green algae removed from tree bark, 8 from soil, 1 from coniferous leaf litter, 2 from deciduous leaf litter, 3 from freshwater and 14 from snail droppings. 67% of these samples held tardigrades. Sampling sites were not evenly distributed around the county but were concentrated in the Leeds/Bradford area of West Yorkshire (Fig 1). Regrettably, none were in South Yorkshire.

Systematic Accounts

Taxonomic Note - some so-called 'species' are most probably groups of near identical species. This is indicated by the "cf" separating generic and specific names, e.g. *Hypsibius cf dujardini*.

† = new county record (recorded at the first named site)

* = new vice-county record (recorded at the first named site)

Family Batillipedidae

Batillipes acaudatus Pollock, 1971

*VC61: Filey Beach (TA1280) (Pollock, 1971).

†VC62: Described from Stoupe Beck Sands (NZ9503) (Pollock, 1971).

Batillipes phreaticus Renaud-Debyser, 1959

†VC61: Stoupe Beck Sands, J.S. Gray, 1971 (Gray & Rieger, 1971).

†VC62: Filey Beach, J.S. Gray, 1971 (Gray & Rieger, 1971).

Batillipes tubernatis Pollock, 1971

*VC61: Filey Beach (Pollock, 1971).

†VC62: Described from Stoupe Beck Sands (Pollock, 1971).

Family Echiniscidae

Echiniscus granulatus (Doyère, 1840)

†VC64: Halton Gill (SD8776), Arncliffe (SD9372), Grass Wood (SD9865).

Echiniscus testudo* var. *trifilis (Doyère, 1840)

*VC61: Skipsea Brough (TA1654), Gransmoor (TA1358).

†VC63: West Ardsley (SE2725), Hunsworth (SE1826).

*VC64: Skipton (SE0152), near Lotherton Hall (SE4635), Moortown (SE3138), Roundhay Park (SE3338), Sherburn in Elmet (SE4633), Tadcaster (SE4742).

Echiniscus testudo* var. *quadrifilis (Doyère, 1840)

†VC61: Gransmoor and Skipsea Brough,

Pseudechiniscus suillus (Eherenberg, 1853)

†VC64: Grass Woods, Arncliffe (SD9372), Coniston (SD9767), Grassington (SE0064), Halton Gill, Litton (SD9074), near Lotherton Hall and Yarnbury (SE0165).

Family Milnesiidae

Milnesium cf tardigradum Doyère, 1840

†VC61: Foston on the Wold (TA0955), Gransmoor.

*VC63: Tong (SE2130). Harden (SE0838).

*VC64: Moortown, Knaresborough (SE3457), Ribbleshead (SD7679).

Family Hypsibiidae

Hypsibius cf dujardini (Doyère, 1840)

*VC63: West Ardsley (specimen removed from a snail dropping!), Queensbury (SE0931).

†VC64: Bradley (SE0048), C.I. Morgan, 1974 (Morgan & King, 1976), Esholt (SE1840).

Isohypsibius prosostomus Thulin, 1928

†VC63: Bradford (SE1633), C.I. Morgan (Morgan, 1976), Allerton (SE1035), Cleckheaton (SE1826), Hunsworth (SE1927), Tong, Queensbury.

*VC64: Arncliffe (SD9371), near Yockenthwaite (SD8682).

Ramazzottius cf oberhaeuseri (Doyère, 1840)

This was the second most common species we recorded.

†VC61: Brigham (TA0753), Burton Agnes (TA1063), Elvington Wood (SE6748), Foston on the Wold, Gransmoor, Hunsworth,

*VC62: Strensall Common (SE6461),

*VC63: Allerton, Bingley, Cliffe Castle (SE0639), West Ardsley, Wyke (SE1526), Queensbury.

*VC64: Burley in Wharfedale (SE1546), Esholt, Fewston Reservoir (SE1853), Grass Woods, Hawksworth (SE1542), Ilkley (SE1245), Moortown, Red Hall (SE3438), Skipton, Tadcaster.

Diphascon (Diphascon) alpinum Murray, 1906

†VC64: Coniston (SD9868), Fewston (SE1854).

Diphascon (Adropirion) prorsirostre (Thulin, 1928)

†VC64: Halton Gill.

Diphascon (Adropirion) scoticum Murray, 1905

†VC63 Stocks Moor Common (SE2715).

*VC64: Coniston.

Family Itaquasconinae

Astatumen trinacriae (Arcidiacono, 1962)

†VC64: Winterburn (SD9458).

Mesocrista spitzbergensis (Richters, 1903)

†VC64: Arncliffe, Grassington, Halton Gill and Litton.

Platicrista angustata (Murray, 1905)

†VC64: Halton Gill,

Family Macrobiotidae

Dactylobiotus dispar (Murray, 1907)

†VC64: Askham Bog (SE5748), J. Murray (as *Macrobiotus dispar*), 1907 (Morgan & King, 1976).

Macrobiotus cf harmsworthi Murray, 1907

†VC63: West Ardsley, Ardsley Reservoir (SE2824), Bingley, Chellow Dene Reservoir (SE1135).

*VC64: Swinsty Reservoir (SE1953).

Macrobiotus cf hufelandi Schulze, 1933

This was the most common species we recorded, found in almost every area we visited.

†VC61: Burton Agnes, Brigham, Gransmoor, Skipsea Brough.

*VC63: Ardsley Reservoir, Cullingworth (SE0636), Tong, West Ardsley.

*VC64: Ilkley (SE1246), Collingham (SE3945), Coniston, Fewston Reservoir, Grass Woods, Halton Gill, near Lotherton Hall, Silsden (SE0447), Sherburn in Elmet, Skipton, Swinsty Reservoir, Tadcaster, Yarnbury.

*VC65: Scotton (SD8791).

Macrobiotus macrocalix Bertolani & Rebecchi, 1993

†VC63: Allerton.

*VC64: Kettlewell (SD9771), Baildon (SE1438), Coniston.

Macrobiotus sandrae Bertolani & Rebecchi, 1993

†VC63: Denholme (SE0633), Hebden (SE0163), Tong.

*VC64: Yarnbury, Askwith (SE1748), Fewston.

Minibiotus intermedius (Plate, 1888)

†VC64: Fewston.

Paramacrobiotus areolatus (Murray, 1907)

†VC64: near Lotherton Hall.

Paramacrobiotus richtersi (Murray, 1911)

†VC61: Brigham,

*VC63: Tong, Cleckheaton, Oakworth (SD9838), Queensbury.

*VC64: Borrowby (SE4388), Askwith, Esholt, Fewston Reservoir, Ilkley, Knaresborough, Moortown, Ribbleshead, Silsden, Skipton, Weston (SE1847).

Richtersius coronifer (Richters, 1903)

†VC64: Coniston, near Yockenthwaite.

Acknowledgments

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Editors' note: We recommend the Wikipedia article on Tardigrades as a good introduction to the detailed aspects of their biology, including their tolerance of extreme environmental conditions. (<http://en.wikipedia.org/wiki/Tardigrade>)

The dolichopodid flies of North Cave Wetlands, a former sand and gravel quarry

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Introduction

Since the Yorkshire Wildlife Trust acquired North Cave Wetlands in 2000 a huge amount of landscaping and habitat creation has been undertaken with the principle objective of attracting birds and making them accessible to the general public as well as the serious bird-watcher. That this work has been hugely successful is readily apparent, with regular breeding birds including Little Grebe *Tachybaptus ruficollis* and Great Crested Grebe *Podiceps cristatus*, Oystercatcher *Haematopus ostralegus*, Avocet *Recurvirostra avosetta*, Little Ringed Plover *Charadrius dubius*, significant numbers of Black-headed Gull *Chroicocephalus ridibundus* and both Sedge Warblers *Acrocephalus schoenobaenus* and Reed Warblers *A. scirpaceus*.

Sand and gravel extraction is still proceeding in the immediate vicinity and is expected to do so until the early 2020s. As these areas become worked out they are taken into conservation management and thus the reserve is regularly being extended. At the end of commercial operations it is expected that North Cave Wetlands (hereafter 'NCW') will be one of the most important and varied nature reserves in the East Riding of Yorkshire. For a full account of its history and development to date see Ashforth & Dayes (2011) and also the comprehensive reserve website (www.northcavewetlands.com).

Quarrying has introduced an entirely new series of habitats to the low-lying plain which was previously under agricultural management, having been farmed for cereals, root-crops such as sugar beet and potatoes and with smaller areas of permanent pasture. Over the past twenty or so years many varied habitats have been created and superseded, and this process is on-going. These offer unique opportunities for naturalists to study the colonization and succession of plants and invertebrates in an ever-changing sequence of environments.

This paper is an account of some of the dolichopodid flies which have been recorded at NCW since my first survey in 2007. Dolichopodidae have recently been the subject of a short paper in *The Naturalist* (Crossley, 2014) and the flies need no further description here. 67 of the 238 Yorkshire dolichopodids (out of a British total of 300) have now been recorded at NCW. It is of interest to note that Askham Bog, which in 1946 was the first reserve to be acquired by the Trust, has a list of 60 species which have been recorded over a period of eighty years, although not all are common to both reserves.

To some extent species diversity reflects recording effort: the more site visits that are made the more likely it is that the species list for any group of organisms will be greater than for an area which has received less attention. Likewise a locality which contains a range of macro and/or micro-habitats is likely to support a wider variety of species than an area of uniform habitat. There are many variables and imponderables but this account of a recently created and dynamic site is offered in the hope that it may encourage others to undertake similar studies.

Notes on the Species List

In the following account nomenclature follows Chandler (1998) (with up-dates) and national statuses follow Falk and Crossley (2005). References to Yorkshire status and occurrences are based on the records of the Yorkshire Naturalists' Union, which stretch back for more than a century. A complete species list is appended.

Many dolichopodids are associated with wetland habitats where the larvae are thought to develop as predators in mud or silt, and it is therefore to be expected that the margins of the lagoons at NCW are the most productive for these flies. Access to the water bodies at NCW is very restricted in the early part of the flight period of many dolichopodids in order to avoid disturbance to nesting birds. However, it is possible to carry out brief collecting activity at a few locations and the extreme south-east of Village Lake near the entrance to the Reserve is available throughout the season in most years, and this area has proved to be very productive. Noteworthy dolichopodids recorded in that area include *Melanostolus melancholicus* with a single female found in July 2008. It was first recorded in Yorkshire in 1996 at Sand Dale on the southern edge of Dalby Forest and also at Forge Valley. The following year several specimens were found at seepages on Sewerby Cliffs north of Bridlington and it has also been recorded from Hatfield Moor (Skidmore, 2006). Although a small fly (c.2.5mm), it is not likely to have been overlooked in the past and prior to 1970 there were only two known British records. Since 1974, when it was found at Earith Gravel Pit (Hunts.), there have been more than ten records nationally and the species is now accorded Lower Risk (Nationally Scarce) status.

In July 2008 a single male *Dolichopus agilis* was found at the Village Lake site. This too is a Lower Risk (Nationally Scarce) species, with only three records on the YNU cards, the first (if correct), from 1886 being one of the earliest Yorkshire dolichopodid records. The locality given is simply 'Bradford', with the attribution 'R.H.Meade', a pioneer Yorkshire dipterist and arachnologist. The next was from Allerthorpe on 2 July 1927, with a note in the hand of C.A.Cheetham 'Given to Collin'. J.E.Collin was a leading British dipterist of international standing in the first half of the 20th century, and it is apparent from the YNU record cards that, from time to time, both Mr Cheetham and Dr Fordham sought his opinion on their identifications. In 2009, at my request, my colleague Adrian Pont kindly examined the specimen, which is in the Verrall-Collin collection

at Oxford University Museum of Natural History. Mr Pont reported (*in litt.*) that it was on a short pin with one of Collins' disc labels with the following data on the underside 'Allerthorpe/2.7.27/Cheetham'. Mr Pont has staged it up on a plastazote mount and turned the data label the right way up so that it can now be read without handling the specimen. Oh that all historic records could be verified so easily! There is a further Yorkshire record from Blacktoft Sands RSPB reserve in July 1980 from material obtained in water traps by Andrew Grieve during an invertebrate survey and identified by the late Dr Peter Skidmore.

Unsurprisingly, *Dolichopus* species are well represented at NCW, with 17 of the 40 Yorkshire members of the genus having been recorded. Apart from *D. agilis*, the remainder are mostly common and widespread across the County, although *D. claviger* and *D. nubilis* have a distinctly southern/eastern bias in their Yorkshire distribution and some others are rather localized. At NCW *D. plumipes* and *D. unguatus* are found widely across the reserve, reflecting their status as being amongst the most common and widespread of dolichopodids generally.

In complete contrast, representatives of the similar genera *Gymnopternus* and *Hercostomus* are largely unrecorded at NCW. Two male *G. silvestris* swept from grassland between Carp Lake and Main Lake on 29 June 2013, and a single female *H. fulvicaudis* in the same general area on 26 July 2008, are the only representatives of these genera noted to date, which is quite astonishing and inexplicable at present. *G. silvestris* was described 25 years ago (Pollet, 1990); it is very similar to the widespread but rather localised *G. assimilis*, with which it may have been confused in the past. It was first reported in Yorkshire from Low Wood, Hornsea, in 1996 and thereafter from a number of lowland sites in the county.

H. fulvicaudis is a Lower Risk (Nationally Scarce) insect which was first reported from Yorkshire in 1978 when two males and two females were found in water traps during survey work at Blacktoft Sands RSPB reserve. I found a single female on the tidal Humber bank at Redcliff near North Ferriby in 2012, and in 2013 Ian Andrews recorded a pair from the edge of a reed-bed near Broomfleet, again on the Humber bank. In late June 2014 I sought it at the edge of reeds bordering the Humber flood bank between East Clough and Welton Waters and found a single female at the former site and singles of both male and female at the latter. The 1978 Blacktoft specimens need to be re-examined as a very similar species, *H. rothi* (Zett.), has recently been found in Britain (Drake *et al*, 2013).

Two species of *Tachytrechus*, *T. insignis* and *T. notatus*, have been recorded at NCW. My first encounter with *T. insignis* was in 1994 when I found numerous specimens on bare sand at Little Paxton Gravel Pits in Cambridgeshire. In August 2001 I found the first to be reported in Yorkshire on bare wet sand at the side of a brackish dyke at Beacon Ponds, Kilnsea, where several examples of both sexes were present. A single female was found at NCW in the south-east corner of Village Lake on 4 September 2007, and four years later it was abundant along the bare, sandy edges of the newly created drainage system at Dryham Ings. In 2014 examples of both sexes were found in a similar habitat in the most recently developed site (Cell A) at Dryham Ings. Indications are that this dolichopodid is an early coloniser and it may become extinct at NCW as its specialised habitat disappears. It is also reported from Hatfield Moors (Skidmore, *loc. cit.*).

Tachytrechus notatus is much more widely distributed in Yorkshire, although very local, with records from ten sites. Habitats include high altitude Pennine moorland and sandy sea-cliffs at Reighton and at Sewerby, where I found it in abundance at the latter site in July 1997 on wet sand and mud at the base of the cliffs. At NCW it has been found on the shore at Village Lake and also on the margin of Island Lake.

Seven of the nine British species of *Hydrophorus* are recorded in Yorkshire and four of these occur at NCW. The three Yorkshire species that have not been recorded here are *H. atriceps*, *H. nebulosus* and *H. oceanus*. *H. atriceps* is mainly found at moorland peat-bogs, with occurrences also at lowland peat sites such as Thorne Moors and Skipwith Common, and *H. nebulosus* has a similar distribution. *H. oceanus*, as its name suggests, is a coastal/salt-marsh dolichopodid with all Yorkshire records confined to sites along the Humber; none of these three are likely to occur at NCW but one never knows! Of the remainder, *H. balticus*, *H. bipunctatus*, *H. litoreus* and *H. praecox* have all been recorded on the south-east shore of Village Lake and all but *H. praecox* have been found at other lake-side sites. Historic Yorkshire records for most *Hydrophorus* species are few, and the paucity probably reflects collector interest rather than any comparatively recent spread. For example, the widespread *H. bipunctatus* was first noted in Yorkshire from Spurn during the YNU Entomological Section survey of that area in the early 1950s. The next report was from Thorne Moors in 1982, since which date it has been recorded in nearly thirty 10km squares across the County. *H. litoreus* is the least reported of the NCW quartet, with the first Yorkshire record from Helwith Moss in 1936 and being recorded again in 1940. It was then reported from Spurn in 1946 and there were no further reports until 1986 when it was found at Denaby Ings. Since then there have been records from about a further fifteen sites in eleven 10km Yorkshire squares.

Three species of *Rhaphium* call for special mention. *R. consobrinum* is primarily associated with coastal salt-marshes and river banks and it is currently recorded from eleven Yorkshire 10km squares, having been first reported in the County in 1975 at Blacktoft Sands RSPB reserve. The first Yorkshire report of *R. laticorne* was from Acaster Malbis in 1985 and it has since been found at a further nine lowland localities, including Hay-a-Park gravel pits at Knaresborough. *R. rivale* is a Lower Risk (Nationally Scarce) insect which was first recorded in Yorkshire in 1983 at Timble Ings near Otley. Further reports have been from river banks, including the River Don at Rotherham, the Calder at Cromwell Bottom near Elland and well-worked riparian sites in lower Wharfedale. It has been recorded to date from a total of seven 10 km squares across the County.

Three species of *Sciapus* have been recorded at NCW. *S. longulus* appears to be restricted to the eastern half of Yorkshire and, although members of the genus usually occur on arboreal vegetation, *S. longulus* can often be found on coastal vegetation such as salt-marsh grasses, the first County record being from Spurn in 1953. *S. platypterus* is widespread and common across Yorkshire in a variety of habitats and its occurrence at NCW is not unexpected. *S. wiedemanni* was swept from tree foliage at the south-east corner of Carp Lake in 2007. Yorkshire records for this dolichopodid go back as far as 1922 (Skipwith) but, apart from Austwick (VC64) in 1931 and Spurn (1953), all records are from sites in a cluster of 10km squares in the western part of VC61 and the Thorne/Hatfield area of VC63. As the majority of post-1990 records are attributed to the author one could speculate that this is a classic case of 'collector bias'!

Campsicnemus marginatus is usually associated with sand and shingle-banks beside fast-flowing upland rivers, the first Yorkshire record being from the River Wharfe at East Keswick Fitts in 1984. Since then it has been found sparsely on a number of river banks in the north and west of the County but with no records yet from VC63, and only NCW in VC61. It is interesting to note that *C. marginatus* has been recorded at Hay-a-Park gravel pits and Nosterfield gravel pit (West Tanfield), but both sites are fairly close to major rivers. At NCW the damp, sandy shore-line of Village Lake is similar to the more usual riparian habitat of this species, but one does wonder how it got there! Most Yorkshire records of *C. picticornis* are from lowland sites in eastern and southern parts of the County and the occurrence of this tiny dolichopodid at NCW is not unexpected, but it is interesting that it was not found until 2013, at the margins of both Village Lake and Island Lake.

Micromorphus albipes is a dull, greyish and minute (c.1.5mm) dolichopodid. It occurs at NCW, sometimes in large numbers, chiefly on dry ground with colonizing short turf, such as on the slopes surrounding Village Lake. It is known that there are several species masquerading under this name and awaiting description, which will be mainly determined on genitalia differences in the male. It is wise to retain a series of specimens for possible future study; in the meantime the present name stands.

Syntormon monile was first discovered on the margin of Village Lake in 2009 and at Island Lake the following year. There are numerous widespread but localized Yorkshire records of this species (then known as '*monilis*'), with the first being from Austwick in 1921. About twenty years ago dipterists were alerted to the presence of two forms of this species in Britain (Hodge, 1993), but it was some years later that a paper describing one of these forms, named *S. silvianum* (Parvu, 1989), came to general attention in this country. As a consequence, examples determined prior to 2001 may be of either species (i.e. *monile* or *silvianum*) and, in the absence of voucher specimens, all earlier records of '*monilis*' should be regarded as suspect. Subsequent to 2001 *S. silvianum* has been found to be more widespread in Yorkshire than *monile*, the latter now being regarded as much more localized. However, the status of these two is still a cause for dispute and the matter may not yet have finally been resolved (Parvu, 2009; Grichanov, 2013).

The publication by the Royal Entomological Society of the key to Dolichopodidae (Assis Fonseca, 1978) gave impetus to the study of the family, and this no doubt accounts for the surge of Yorkshire records since the early 1980s. In that work only two species of *Xanthochlorus* are noted: *X. tenellus* and *X. ornatus*. In 1987 attention was drawn to the presence of a third (probably undescribed) in Britain (Dyte, 1987). However, it was not until much later that the matter was resolved (Chandler & Negrobov, 2008). As a result, four species are now known to occur in Britain. It is likely that many records of *X. tenellus* refer to the new species *X. galbanus*, and, in the absence of voucher specimens, records of *tenellus* prior to 2008 should be ignored. Specimens are usually swept from tree foliage, and this has been the case at NCW.

Chrysotus suavis and *Chrysotimus molliculus* are recent (2014) noteworthy additions to the NCW dolichopodid list. The first Yorkshire record of *C. suavis* was from Nosterfield gravel pit in 1998 and then from Redcliff on the tidal Humber bank near North Ferriby in 2005. The following year it was reported from both Thorne and Hatfield Moors (Skidmore, 2006). In 2013 there was a further record from the Humber bank up-river from the Redcliff site. Assis Fonseca (1978) refers

to *C. suavis* as a 'sea-coast species, scarce and very local', and the Thorne and Hatfield records refer to its occurrence in 'brackish' situations. At NCW specimens were found on the sparsely vegetated sandy margins of shallow drainage channels on the most recently developed areas of Dryham Ings (Cells A and B).

Chrysotimus molliculus is also tiny (c.2mm) and it exhibits sexual dimorphism, the males being entirely bright green and the females having bright yellow abdomens. Specimens are usually found by sweeping the foliage of trees and shrubs. First reported in Yorkshire from Millington in 1936, it was next recorded from Wheldrake Woods in 1998, after which it has been found in a further ten, mostly lowland, localities in the County.

Discussion

Thirty years ago the lagoons, their immediate surrounds and all the other ever-changing habitats that make up the complex of environments at today's North Cave Wetlands, were under agricultural management, mostly as arable farmland. Then came the extractive industry, leaving behind a post-industrial landscape. This is now being actively managed primarily for the benefit of birds, but this study clearly demonstrates that other colonizing animal groups are of conservation interest. As always in these situations the most obvious question is how do the many 'new' species get there? At NCW there are, *inter alia*, flies primarily associated with coastal habitats and at least one which is associated with upland river systems. One possible answer is that they may form part of the aerial plankton caught up and blown along by the wind – those which escape the attention of hunting hirundines and other avian predators might drift down and, finding a suitable habitat, settle for a while and establish a breeding population until the habitat changes over time and they then die out. Others may be purely transitory and their detection due entirely to serendipity!

Acknowledgements

The author is responsible for all the NCW records quoted herein but thanks are due to the many entomologists who, over the years, have contributed to the Yorkshire Naturalists' Union records, and thus helped build up the general fund of knowledge regarding insect distribution in the County. Stephen Martin gave much practical advice on site and facilitated access to sensitive areas, as well as providing much information on the development of the NCW reserve. Officers of the Yorkshire Wildlife Trust have been supportive of this study and Dick Brown provided me with valuable information on land-use prior to the development of the quarries.

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Appendix 1

Systematic list of Dolichopodidae recorded at North Cave Wetlands, 2007-2014.

<i>Argyra argentina</i> (Mg.)	<i>D.latilimbatus</i> Macq.
<i>A.argyria</i> (Mg.)	<i>D.lepidus</i> Staeg.
<i>A.diaphana</i> (Fab.)	<i>D.linearis</i> Mg.
<i>A.perplexa</i> Beck.	<i>D.longicornis</i> Stann.
<i>Chrysotus cilipes</i> Mg.	<i>D.nubilus</i> Mg.
<i>C.femoratus</i> Zett.	<i>D.plumipes</i> (Scop.)
<i>C.gramineus</i> (Fall.)	<i>D.popularis</i> Wied.
<i>C.neglectus</i> (Wied.)	<i>D.simplex</i> Mg.
<i>C.suavis</i> Lw.	<i>D.subpennatus</i> d'Assis-Fonseca
<i>Diaphorus nigricans</i> Mg.	<i>D.trivialis</i> Hal.
<i>Melanostolus melancholicus</i> (Lw.)	<i>D.ungulatus</i> (L.)
<i>Dolichopus agilis</i> Mg.	<i>Gymnopternus silvestris</i> Pollet
<i>D.brevipennis</i> Mg.	<i>Hercostomus fulvicaudis</i> (Hal. in Walker)
<i>D.campestris</i> Mg.	<i>Poecilobothrus nobilitatus</i> (L.)
<i>D.claviger</i> Stann.	<i>Sybistroma obscurellum</i> (Fall.)
<i>D.festivus</i> Hal.	<i>Tachytrechus insignis</i> (Stann.)
<i>D.griseipennis</i> Stann.	<i>T.notatus</i> (Stann.)

Hydrophorus balticus (Mg.)
H.bipunctatus (Lehmann)
H.litoreus Fall.
H.praecox (Lehmann)
Scellus notatus (Fab.)
Medetera jacula (Fall.)
M.truncorum Mg.
Microphor holosericeus (Mg.)
Rhaphium brevicorne Curtis
R.caliginosum Mg.
R.consobrinum Zett.
R.elegantulum (Mg.)
R.laticorne (Fall.)
R.rivale (Lw.)
Sciapus longulus (Fall.)
S.platypterus (Fab.)
S.wiedemanni (Fall.)

Campsicnemus curvipes (Fall.)
C.marginatus Lw.
C.picticornis (Zett.)
C.scambus (Fall.)
Chrysotimus molliculus (Fall.)
Micromorphus albipes (Zett.)
Sympycnus aeneicoxa (Mg.)
S.desoutteri Parent
Syntormon denticulatum (Zett.)
S.monile (Hal. in Walker)
S.pallipes (Fab.)
S.pumilum (Mg.)
Teuchophorus monacanthus Lw.
T.spinigerellus (Zett.)
Xanthochlorus galbanus Chandler & Negrobov
X.ornatus (Hal.)

Field Note: Intra-specific killing in Great Black-backed Gull

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At about 15:10 on the afternoon of 3 December 2013, whilst bird-watching at North Cave Wetlands YWT reserve, my attention was attracted to a commotion on the water at Dryham Ings (Cell A), some distance in front of Crosslands hide. Closer inspection revealed two adult Great Black-backed Gulls *Larus marinus* engaged in a tussle on the water c.100 yards away. The birds were repeatedly stabbing at each other and also holding and pulling heads by placing the upper mandible at the upper part of the nape and the lower mandible at the throat. This was accompanied by much wing flapping as they moved around on the water.

This activity lasted without ceasing for the next twenty minutes or so, by which time one of the two had become dominant and was holding the head of the other tightly and shaking it, interspersed with occasional jabs, and drawing blood. The victim's wing-flapping became increasingly feeble and finally ceased, at which point it gave up the fight and floated on the surface. There it remained, apparently lifeless, and the victor swam away.

The following week I reported my observation at a meeting of the York RSPB Local Group and Barry Bishop told me of an almost identical occurrence which he had witnessed at North Cave Wetlands on 5 August 2013 when gulls were coming in to roost. Two adult Great Black-backs fought on a small island in the deep-water lagoon immediately west of Crosslands hide, one of them eventually being killed.

Subsequently Keith Rotherham told me that he, too, had witnessed a fight between two adult Great Black-backed Gulls on the afternoon of 16 November 2011 at North Cave which had ultimately resulted in the death of one. In this instance the contest took place on the water of Main Lake and lasted for three hours, the loser being eventually drowned. After death the victor dragged the corpse to the bank where it continued to peck at the head of the dead bird, eventually decapitating it, and then it left the scene. At times during the fight one of the birds flew into the air and dropped on to the back of the other. Michael Bayldon has also told me that he witnessed a fight between two adult Great Black-backs at North Cave Wetlands in 2012 which ended in a fatality, but on this occasion the event took place on one of the dry banks. I have also heard of one further report of an attack at North Cave Wetlands within the past year or so, leading to the death of a Great Black-back Gull, but with no details.

There are reported instances of Robins *Erithacus rubecula* killing other Robins, and John Coldwell tells me that he once saw a Magpie *Pica pica* kill another Magpie in his garden feeding area. Similar acts no doubt occur in other birds, but I can find no published reference to this for the Great Black-backed Gull, although it is a well-known predator of other birds and mammals. At least five instances of intra-specific killings at North Cave Wetlands within the past two years lead one to suspect that the same individual may have been implicated in all cases.

I am obliged to those colleagues mentioned who have kindly agreed to their observations being included in this note, and also to Dr John Mather who suggested publication and made helpful comments on the first draft.

One day in June – a snapshot of decline

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Like many naturalists there is a little of Gilbert White in me - a particular passion for the natural history of my home parish, Ainderby Steeple in North Yorkshire (VC65). Whilst searching for any historic bird records for the village I saw reference to a YNU excursion to Ainderby. Thanks to the efficient offices of the YNU Webmaster and the Honorary Librarian copies of both the circular advertising the event and the report of the visit in *The Naturalist* were located. The visit took place on 22 June 1946 and the advice for attendees included a recommendation for rubber thigh boots and the warning that Ainderby Bottoms was home to a “particularly vicious gnat, the full effect of whose attentions are delayed”. Perhaps most surprisingly, it appears that the bus services are more frequent now than in 1946!

However, the overwhelming feeling, particularly for a local birdwatcher, is one of melancholy at the loss of what must have been tremendous habitat and a much richer avifauna. The ornithological list includes no fewer than thirteen species that no longer breed in the village:

Teal *Anas crecca* – Now only recorded as an uncommon winter visitor.

Snipe *Gallinago gallinago* – Although the odd pair has stayed to late spring there have been no confirmed records of breeding for some years.

Redshank *Tringa totanus* – Now reduced to a less than annual passage migrant through the parish.

Black-headed Gull *Chroicocephalus ridibundus* – Draining of part of Ainderby Bottoms meant that the small colony here was already in terminal decline by the time of the YNU visit. Older villagers remember going to collect the gull eggs as a supplement to wartime rations.

Turtle Dove *Streptopelia turtur* – There have been no village records for more than twenty years.

Cuckoo *Cuculus canorus* – Now recorded less than annually with no evidence of breeding in recent years.

Tree Pipit *Anthus trivialis* – I have never seen this in Ainderby in my twenty-five years in the village.

Redstart *Phoenicurus phoenicurus* – Breeding was recorded through to the 1960s but an autumn migrant in my garden is the only modern sighting.

Whinchat *Saxicola rubetra* – A single spring migrant is the only recent record.

Grasshopper Warbler *Locustella naevia* – There have been no modern records other than a bird heard singing for one day in spring 2014.

Sedge Warbler *Acrocephalus schoenobaenus* – Bred up to the late 1990s and seemed to be adapting to habitat loss by nesting in Oil-seed Rape fields but there have been no recent sightings.

Reed Warbler *Acrocephalus scirpaceus* – This must have been a scarce and localised bird even in 1946 and it was largely absent from the Vale of Mowbray until the early years of the current century. Its reappearance was linked to the establishment of reed beds at some of the local nature reserves. A bird briefly holding territory around a village pond in the autumn of 2014 might give hope for future breeding in the village.

Marsh Tit *Poecile palustris* – Occasional sightings up to the early 1990s but no subsequent records.

On the positive side of the balance sheet we have a few rather more meagre pickings with Greylag *Anser anser* and Canada Goose *Branta canadensis*, Collared Dove *Streptopelia decaocto* (which of course had not been recorded in Britain at the time of the excursion) and Nuthatch *Sitta europaea* added to the list of breeding birds.

However, with the continuing destruction of hedgerows, further drainage and a large solar farm planned for some of the last remaining 'unimproved' grassland, I wonder if, in 60 years' time, local birdwatchers will look back on this period with the same sense of nostalgia and loss?

Acknowledgements

Thanks to Chris Young, John Bowers and Colin Howes for locating and forwarding the material to me.

Early notes from Spurn Bird Observatory

John R. Mather

Spurn Bird Observatory first came into being in November 1945 when Ralph Chislett acquired a lease on the Warren Cottage from the Lands Department of Northern Command in York. Before this was actually signed, George Ainsworth had already erected a Heligoland trap in the cottage garden, the first of several such traps built along the peninsula during the ensuing years, establishing Spurn as one of the earliest and most important bird observatories in Britain.

Whilst sorting through the library and papers of John Cudworth, long-term member and Chairman of the Spurn Bird Observatory Committee now living in a retirement home in Wakefield, his friend David Proctor discovered an old foolscap log book entitled SPURN BIRD OBSERVATION STATION – DETAILED OBSERVATIONS. It contains discontinuous entries covering the periods 12 August to 30 December 1946, 21 and 22 April 1947 and 18 February to 8 March 1950. Why there are such long gaps in this seemingly important log book is difficult to understand as it is known from ringing results and published records that the observatory was actively manned during the missing periods. Another, perhaps the main, log book must exist for those intervening and subsequent years.

Thirty-nine observers were involved in the 1946 entries, including some familiar names of the period: G.H. Ainsworth, W.B. Alexander, H.O. Bunce, C.E.A. Burnham, R. & L. Chislett, Miss E. Crackles, R.M. Garnett, Miss E.P. Leach (BTO Ringing Secretary), J. Lord, W.H. Rowntree and C.M. Swaine. It is strange that there were entries for only two days in 1947 when S. Jackson, E. Holmes and their wives “ - - - arrived at 7.30pm, cool to cold very strong SW wind, mostly sunny – no birds at all near trap”. Of the nine contributors for the eleven days covered in February and March 1950, six appeared for the first time: J. Cudworth, P.E. Davies, R.F. Dickens, G.R. Edwards and I. Morley, all of whom are known to have been visiting regularly during 1948 and 1949. The entries are typical of such daily logs, outlining personnel present, weather, general activities including ringing totals and observations by those staying at the infant observatory. There are, however, two entries which are of particular interest and historical importance.

Firstly, the two opening pages of the log book written in Ralph Chislett’s stylish hand, make very interesting reading and are reproduced below *in extenso*:

WHITSUNTIDE 1946

Official meeting of the Yorkshire Naturalists’ Union

The principal value to Yorkshire ornithologists of a visit to Spurn and the Humberside marshes of Welwick (where one day was spent) between June 7 and 11, lay in the opportunity to assess the breeding birds and so help towards their separation from passage migrants of late summer. Starling, Linnet, Reed Bunting, House Sparrow, Meadow Pipit, Whitethroat and Blackbird were abundant; the huts of the W/D (War Department) provided haunts for Starlings and Sparrows and the other species nesting in the low herbage, mainly Marram Grass and Sea Buckthorn; Greenfinches,

Corn Buntings, Song Thrushes and Hedge Sparrows were less numerous. Carrion Crow and Magpie, Chaffinch, Pied Wagtail, Sedge Warbler and Wren were few. Only one pair of Yellow Wagtails (feeding young near Welwick) was noted. A small colony of Reed Warblers near Skeffling had not previously been recorded.

A Swallow, sitting on four eggs, shared its O.P. (Observation Post) habitat with several naturalists during heavy rain. Martins and Swifts were noted. A female Cuckoo, attended by two males, passed the weekend in the vicinity of the ringing trap, in which one had been caught and ringed a week previously. Kestrel, Sparrowhawk, Heron and Turtle Dove were seen occasionally. Ducks on the estuary were several pairs of Shelducks (breeding locally), a pair of Tufted Ducks and a distant flock of black ducks, probably Common Scoters.

Breeding waders included a few Lapwings, whose numbers should have been greater; Ringed Plover (4 nests seen), 3 pairs of Oystercatchers, one of which at least had an egg; and Redshank vociferous over their young in several places. Many nests of the Little Tern were seen, some with only one egg and very few with three. One pair had young. This, the only colony in Yorkshire, has stood up to war conditions remarkably well; much better than it is likely to do due to the disturbances caused by parties that now picnic near to the nesting ground on fine Sundays. If the new road to the Point remains open the Terns will probably have disappeared in a very few years, since they cannot maintain themselves unless they rear sufficient chicks to repair the natural wastage, which they are not likely to do this year. Other local breeders noted were Moorhen and Common and Red-legged Partridges (nest found). The Wheatear, a one-time breeder there, was not noted.

At this date passage migrant species were few and in small numbers, but some of the waders seen would not breed locally. At high tide up to 100 Curlews lined the shore; and upward of 40 Oystercatchers, Dunlins, Golden and Grey Plovers and Sanderlings were fewer but were noted. A few Sandwich and Common (or Arctic) Terns passed. The motley gulls included all 6 species in most stages of plumage. A Kittiwake picked up dead (very recent) was in excellent feather.

Even on June 10, when Swifts should be nesting, parties flew both ways along the promontory. Whether they were passage birds or merely on foraging expeditions could not be stated. During incubation Swifts are little in evidence about their habitat for long periods and their mileage is not compass-governed! A few House Martins were also noted flying south.

R.C.

Secondly, in the YNU Bird Report for 1946, Chislett published the record of a male Little Crake *Porzana pusilla*, seen by G.H. Ainsworth and J.H. Barrett on 28 December, giving brief details of the plumage and behaviour. The bird was seen in the 'Wire Dump', an area halfway along the peninsula at the Chalk Bank, consisting of heaps of rusting rolls of barbed wire discarded after the war amongst an often flooded area of Glasswort *Salicornia europaea*. He included the record, repeating the same brief details, in his *Yorkshire Birds* (Chislett, 1953) and I published it in *The Birds of Yorkshire* (Mather, 1986). The only details available until now have been those

published by Chislett and it is therefore of great interest to find the original entry in the log book written by Barrett on the day of observation:-

“Whilst we were watching a flock of sparrows in the wire, we heard a sudden ‘ZEL’ note rather like a loud Siskin. On going towards the pile of wire, we flushed a bird smaller than a Water Rail. The wing-coverts were chestnut-brown with well defined dark centres to feathers. The flanks, throat, sides of neck and chest were uniform slate grey. The legs appeared to be grey. We decided to return later in the day and J. Barrett had a close view (5 yards). The bird was observed feeding in the brackish water, but on our approach skulked away with body held horizontally and head well out. The beak was greenish but orange-scarlet towards the base and was not nearly as long as that of a Water Rail. The tail was held erect and was dark in the centre and light brown at the sides. There was no barring on the flanks”.

Chislett (1953) concluded by saying; “The absence of white streaking on wing coverts and of barring on the flanks point to this species and against Baillon’s Crake. That two such competent observers were able to obtain such good views places the identification beyond any reasonable doubt”. This was the sixth record of this bird in Yorkshire, the others being in the 19th century as follows:

One was shot on the banks of the Yore (River Ure) near Wensley on 6 May 1807 by Mr John Humphrey: it was alone and suffered itself to be approached very near without betraying any sense of danger. It ran with great rapidity, carrying its tail erect.

Thomas Allis (1844) reported, “H. Reid tells me that a specimen of this rare bird was taken alive at Cantley near Doncaster; it ran into a tuft of grass and was captured by a boy and came into Reid’s possession about 18 years ago (c.1826)”.

One was captured at Scarborough in 1836 and recorded by Professor W.C. Williamson.

One was caught alive on a canal boat on 6 May 1862 on the River Ure at Aldwarke Bridge near York and went to the collection of Mr Johnson of Masham, being later acquired by J.C. Garth of Knaresborough, in whose collection Nelson saw it. At the dispersal of Garth’s effects in December 1904, the specimen was bought by Riley Fortune of Harrogate.

One was taken alive at Green Hammerton on 17 October 1892. The specimen was sent to Lord Lilford who identified it.

The Little Crake has not since been seen in Yorkshire. It breeds from Eastern Germany and Poland eastwards across Central Europe, with isolated populations in the marshes of Iberia, France and the Balkans.

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Colonization of sand and gravel quarry ponds by aquatic plants: the example of North Cave Wetlands 2001-2013

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There are many ponds scattered throughout lowland England that are a legacy of industrial minerals extraction and are often valuable resources for wildlife. In East Yorkshire, for example, ponds that originated through extraction of sand/gravel, clay or spoil for construction of railway embankments have greater species richness of water plants and more species of regional conservation significance than village ponds, ancient moats or ponds of miscellaneous origin (Linton & Goulder, 1997, 2000). The initial colonization by aquatic plants of new ponds formed by the flooding of pits left by minerals extraction can be rapid. For example, clay-pit ponds in Purbeck, Dorset, acquired 5-8 species of aquatic plants within 2-4 years of abandonment (Barnes, 1983). Even more striking is that at least 67 wetland and aquatic plants colonized an experimental pond complex dug in the clay and gravel of the River Thames floodplain within seven years (Williams *et al*, 2008). Rapid colonization is especially well shown by events at North Cave Wetlands, a 39ha site of former sand and gravel workings in East Yorkshire that was acquired as a reserve by the Yorkshire Wildlife Trust in 2000. The lakes on this site (Fig. 1) were primarily excavated between 1983 and 1999. By 2001 they had been colonized by more than twenty aquatic plants (Goulder, 2002). Of the submerged plants Lesser Pondweed¹, Horned Pondweed, Spiked Water-milfoil and Stonewort were widely distributed. Emergents were represented by Celery-leaved Buttercup on muddy strands around all the lakes. Common Reed, Bulrush, Brooklime and Blue Water-speedwell were scattered around some of the lakes.

Talling (1951) suggested a model to describe the colonization of new ponds. His view was: (1) new ponds are rapidly colonized and he cites a description of a new pond at Garstang, Lancashire, that became colonised by a diversity of water plants within only 20 months; (2) once ponds are established their colonization by further plants is reduced, firstly because of competitive exclusion by already established ones and secondly because once plants from the pond's environs have colonized then the pool of species that have not yet colonized is in consequence diminished. The present paper investigates continuing colonization by aquatic plants at North Cave Wetlands from 2001 to 2013 and evaluates Talling's model in that context.

Site description and methods

The history and physical features of the reserve are described by Martin (2011) and an account of terrestrial and aquatic plants and vegetation is given by Boatman & Goulder (2011). The approximate dates when excavation of the lakes (Fig. 1) was completed are: Far Lake 1983; Carp Lake 1987; Main Lake 1990; Village Lake (West) 1994; Village Lake (East) and Island Lake 1995-96, except that Island Lake was extended eastwards with construction of islands between 2001 and 2004; and Reed Bed Lake 1999. In 2001 what later became Reed Bed Lake comprised a several-metres deep quarry with shallow pools at the bottom; this was later back-filled and by 2004 had been flooded and extensively planted with Common Reed.

¹ Scientific names which are included in Table 1 (page 193) are not repeated in the text.

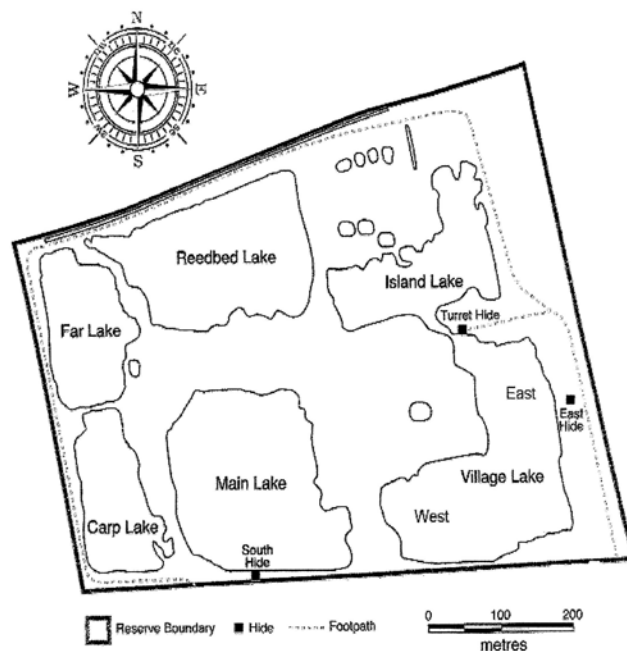


Figure 1. Map of North Cave Wetlands

Far Lake and Carp Lake retain their original profiles and are several metres deep, while shallow areas of Village Lake were conserved and areas of Main Lake and Island lake were partially in-filled between 2001 and 2004 to create shallow (<1m deep) water for the benefit of waterfowl. Thus, for example, counts of over 1500 Greylag Goose *Anser anser* have been recorded on the reserve (Dayes & Griffiths, 2011). By 2013 the margins of Far Lake and Carp Lake and the west side of Main Lake had become extensively tree clad. There is intermittent inflow of spring water at the eastern edge of the reserve and Martin (2011) describes how the lakes are interconnected with gravity-driven water flow from east to west; water from Village Lake can be directed through Main Lake, Carp Lake and Far Lake to discharge into Black Dyke at the north-west corner of the reserve, while water from Island Lake can be directed through Reed Bed Lake also to discharge into Black Dyke. In July 2001 pH and conductivity in the lakes were within the relatively narrow ranges of 6.6-6.8 and $929\text{--}1002\mu\text{S cm}^{-1}$ respectively (Goulder, *loc. cit.*), indicating that the lakes had broadly similar water quality.

Water plants in the lakes and their margins were recorded during June and July in 2001, 2004, 2007, 2010 and 2013. This was done by walking around the circumference of the lakes to record emergent plants growing in shallow water and on littoral mud; submerged plants were retrieved using a grapnel. In 2001 the eastern part of Village Lake and the then un-extended Island Lake were recorded together. From 2004 onwards Village Lake (East), Village Lake (West) and Island lake were recorded as separate lakes. The approximate abundance of each species in each lake was recorded using a truncated three-point DAFOR scale; that is d/a = dominant or abundant, f = frequent, o/r = occasional or rare. Only those that feature on the Palmer & Newbold (1983)

checklist of aquatic plants in England and Wales were recorded, plus Stonewort. Species of batrachian water crowfoot were identified only when flowers were present, except for the distinctive Fan-leaved Water-crowfoot, using Rich & Jermy (1998) and it is acknowledged that, even with flowering material, identifications can be problematical (Lansdown, 2008). Blue Water-speedwell and Pink Water-speedwell were not separated in 2010 and 2013 because of difficulty with identification of seedlings.

Aquatic plants in the lakes

The aquatic plants recorded in the lakes are shown in Table 1, p193; the complete set of results with those found in each lake on each recording occasion and their abundance is available as additional electronic material (Appendix 1 - please see <http://www.ynu.org.uk/node/493>). The numbers of species per lake were very variable, ranging from eight in Far Lake in 2001 to 24 in Village Lake (West) in 2010. The range for submerged and floating-leaved plants was from two in Island Lake in 2013 to ten in Village Lake (East) in 2010; that for emergent plants was from two in Far Lake in 2007 to 17 in Village Lake (West) in 2010. There was not a steady increase in each lake over the study period, nor did the lakes share a common pattern of change. Thus, for example, the number in Far Lake increased from eight in 2001 to 16 in 2004 but fell back to nine in 2010 and 2013; in Carp Lake the number increased from nine in 2001 to 12 in 2007 and remained at that number in 2013; in Village Lake (West) the number of species increased from ten in 2001 to 24 in 2010 but then fell to 16 in 2013 (Appendix 1). It is also clear that there was not a steady increase in the numbers in the lakes as a whole (Table 2, p195). Instead the total number increased from 22 in 2001 to 27 in 2004 and to 33 in 2007 but then remained at that number in 2010 and 2013. Similarly, the number of submerged and floating-leaved plants increased from nine to 12 between 2001 and 2007 but then stabilized at 12-14 between 2007 and 2013, while emergents increased from 13 to 21 between 2001 and 2007 but stabilized at 19-21 between 2007 and 2013 (Table 2).

There were both similarities and differences between lakes (Table 1). Some species were, at one time or another, found in most of the lakes; examples of these amongst submerged plants were Stonewort, Spiked Water-milfoil, Curled Pondweed, Fennel Pondweed, Lesser Pondweed and Horned Pondweed. More-or-less ubiquitous emergent and marginal plants included Soft-rush, Celery-leaved Buttercup, Common Reed, Bulrush and Brooklime. Others, in contrast, were recorded in only three or fewer lakes: the submerged plants, Rigid Hornwort, Nuttall's Waterweed and Fan-leaved Water-crowfoot and emergent plants, Water-plantain, Sea Club-rush, Water Forget-me-not and Common Club-rush.

Between 2001 and 2013 there were substantial changes in both the plants present and their abundance within individual lakes. This is clearly shown by consideration of the plants that were sometime recorded as dominant or abundant (Tables 3 & 4, p195-7). Several themes emerge from consideration of the results for submerged and floating-leaved plants (Table 3).

- Some that had already colonized the reserve by 2001 became dominant or abundant in several of the lakes and persisted as such for several years, for example: Spiked Water-milfoil in Far Lake, Carp Lake and Main Lake from 2001 to 2007 and in Village Lake (East & West) from 2004 to 2013; Lesser Pondweed in Far Lake, Carp Lake and Reed Bed Lake from 2001 to 2007, in Main Lake from 2004 to 2010, in Village Lake (West) from 2001 to 2010 and Village Lake (East) from 2004 to 2013.

- ? Some of the early colonizers were sometimes dominant or abundant for shorter periods, for example Curled Pondweed in Main Lake and Horned Pondweed in Village Lake (West) only in 2001.
- ? Some later arrivals on the reserve became dominant in some of the lakes, for example Nuttall's Waterweed, first recorded in 2007 in Far Lake, was dominant or abundant in that lake from 2007 to 2013 and in Carp Lake in 2013; Rigid Hornwort, first recorded in 2004 in Far Lake, was dominant/abundant in Village Lake (East) in 2013; Fan-leaved Water-crowfoot, first recorded in Village Lake (West) in 2010 was dominant/abundant in Main Lake in 2013.
- ? In some lakes there was an obvious succession of dominant/abundant plants with some replacing others, for example in Far Lake, Spiked Water-milfoil and Lesser Pondweed were both dominant/abundant in 2001 and 2004 and were joined in 2007 by Stonewort, Nuttall's Waterweed, Curled Pondweed and Fennel Pondweed but Nuttall's Waterweed had emerged as the only dominant by 2010 and continuing to 2013. A general trend shown by this succession was the replacement of Spiked Water-milfoil and Lesser Pondweed as dominant/abundant plants by Nuttall's Waterweed, Rigid Hornwort and Fan-leaved Water-crowfoot. Thus, in 2001 and/or 2004 Spiked Water-milfoil was dominant or abundant in six lakes and Lesser Pondweed in all seven lakes while by 2010 and/or 2013 they were dominant/abundant in only two and three lakes respectively. In contrast, Nuttall's Waterweed had become dominant in Far Lake and Carp Lake while Rigid Hornwort was dominant/abundant in Village Lake (East) and Fan-leaved Water-crowfoot in Main Lake by 2013.

The behaviour of emergent plants on the Reserve, as exemplified by those that were at some time recorded as dominant or abundant (Table 4), was somewhat different from that of the submerged plants; essentially more emergents were recorded as dominant or abundant as time progressed. In 2001 there were virtually none that were sufficiently luxuriant to be recorded as dominant or abundant (the exception being Celery-leaved Buttercup in muddy places on the bottom of the not-yet-flooded Reed Bed Lake). In 2004 Celery-leaved Buttercup was dominant/abundant around Main Lake, Island lake and Reed Bed Lake, Soft-rush was dominant/abundant along the south side of Village Lake (West), where it had been introduced in staked-down coir rolls used for bank stabilization work in 2002, and Common Reed was abundant in Reed Bed Lake, in which it had been planted. By 2007-2013, however, more emergents had colonized and spread to the extent that they were recorded as dominant or abundant. These included Bulrush in Carp Lake, Village Lake (East & West) and Island Lake, Common Reed in all but Carp Lake and Lesser Pond-sedge (originally introduced in coir rolls) in Village Lake (West). Some herbs that are characteristic of muddy littoral areas were recorded as dominant/abundant in 2007 but became less conspicuous in later years (e.g. Brookweed around Main Lake and Water-plantain and Brooklime around Reed Bed Lake).

Wetland plants not dealt with above because they are, perhaps arbitrarily, not included on the Palmer & Newbold checklist (*loc. cit.*) were also conspicuous in places around the margins of the lakes. These included Great Willowherb *Epilobium hirsutum*, Field Horsetail *Equisetum arvense*, Gypsywort *Lycopus europaeus*, Purple-loosestrife *Lythrum salicaria* and Water Figwort *Scrophularia auriculata*. The diversity of rushes was interesting. In addition to Soft-rush, which does feature on the checklist, Hard Rush *Juncus inflexus* was found at the margins of all the lakes

while Jointed Rush *Juncus articulatus*, Toad Rush *Juncus bufonius* and Compact Rush *Juncus conglomeratus* were frequently observed. There was also a single clump of Sharp-flowered Rush *Juncus acutiflorus* at the margin of Island Lake in 2010 and 2013. Scattered on the reserve are diverse scrapes, pools, dykes and ditches (Fig.1); these are widely colonized by aquatic plants but the only ones not found in the lakes were some plants in the Dragonfly Ponds (in the north-east corner of the reserve) that were obvious introductions (Middleton, 2009; Boatman & Goulder, *loc. cit.*). Photographs of some of the plants encountered can be found in Plate V, centre pages.

Discussion

The initial increase in the number of aquatic plants recorded in the lakes as a whole, from 22 to 33 species between 2001 and 2007 to a plateau after 2007 (Table 2), agreed closely with Talling's model (*loc. cit.*). The colonization process had clearly begun well before the present study commenced in 2001; by that year 22 plants (Table 1) had become established in the lakes since their excavation in 1983-1999. Lakes can be regarded as islands in a terrestrial sea (Keddy, 1976). Distribution mechanisms by which water plants can reach them include transport of seeds and/or vegetative fragments by wind and in the guts or on feet, feathers and fur of birds and mammals (Barrat-Segretain, 1996; Figuerola & Green, 2002). It is likely that some of the plants that established in the lakes had their origin in long-distance transport by waterfowl. The early-colonizing submerged species, often dominant/abundant in the lakes in 2001 (Stonewort, Spiked Water-milfoil, Lesser Pondweed and Horned Pondweed), are all typical early colonizers of gravel pits and are eaten and dispersed by waterfowl (Moore, 1986; Preston & Croft, 1997). Dispersal may also be over short distances, perhaps less than 1km or so. Indeed, study of plants in ponds and their neighbouring water bodies has suggested that such short-distance dispersal is important in the colonization of ponds in East Yorkshire (Linton & Goulder, 2003). Many of the water plants that colonized the lakes before 2001 are also found at other water and wetland sites in the neighbourhood; 16 of the 22 checklist species recorded in the lakes in 2001 were also found in ponds, streams, dykes and wet pasture within 1km of the Reserve boundary (Goulder, *loc. cit.*). Colonization by short-distance dispersal from nearby water bodies is, therefore, likely to have been important. This process seems to have continued in that seven further plants found within 1km of the reserve in 2001 were recorded as new to the lakes between 2001 and 2007 (Common Duckweed, Water-plantain, Lesser Pond-sedge, Yellow Iris, Water Forget-me-not, Reed Canary-grass and Pink Water-speedwell). Some of these, however, were also direct introductions, at least to Village Lake (West) where they were in the coir rolls used for bank stabilization, notably Lesser Pond-sedge, Yellow Iris, Water Forget-me-not and Reed Canary-grass. After 2007 colonization from the neighbourhood appeared to have largely ceased; only one plant found within 1km of the site in 2001 (Fan-leaved Water-crowfoot) was recorded as new to the lakes between 2007 and 2013. Only seven out of 31 checklist taxa recorded within 1km of the Reserve boundary in 2001 (Goulder, *loc. cit.*) had failed to reach the lakes by 2013. This evidence agrees with Talling's (*loc. cit.*) model in that depletion of the pool of plants that had not yet reached the lakes was probably a reason why the initially rapid colonization largely ceased after 2007. Also in alignment with island biogeography theory applied to lakes (Keddy, *loc. cit.*) is that once stability had been reached a few new ones continued to appear, balanced by the apparent loss of others. Thus between 2007 and 2013 the total number was constant while Small Pondweed and Fan-leaved Water-crowfoot were new records but Fool's Water-cress and Marsh Horsetail were apparent losses.

Some of the plants that were at some time or other recorded in all or most of the lakes (Table 1) were perhaps readily spread from lake to lake by waterfowl; examples of these are Lesser Pondweed and Horned Pondweed. Others, more or less ubiquitous, are likely to have been spread around the reserve by wind dispersal; Common Reed and Bulrush, for example, are spread by wind (Barrat-Segretain, *loc. cit.*). Some that were found in more than one lake may have been carried by the flow of water around the reserve. Thus Fan-leaved Water-crowfoot, first recorded in Main Lake in 2013, may have originated from Village Lake (West) in which it was recorded in 2010. Others, in contrast, were recorded in only one lake; for example Water Forget-me-not in Village Lake (West), Water-plantain in Reed Bed Lake and Sea Club-rush in Island Lake (Table 1). Perhaps few propagules of these plants with limited distribution reached the lakes. Furthermore, some are known introductions while others may be inadvertent introductions; Water-plantain, for example, may have piggy-backed on the Reeds planted in Reed Bed Lake.

In addition to an element of chance governing which plants reached which lakes, there may be between-lake differences in local environment that favoured or constrained particular plants. The shallower lakes are more used by waterfowl and it is well known that their grazing can reduce submerged-plant biomass (e.g. Lauridsen *et al*, 1993; Søndergaard *et al*, 1996; Wood *et al*, 2012). Thus greater grazing pressure probably contributed to Reed Bed Lake and Island Lake becoming largely devoid of submerged plants. Furthermore, the marginal vegetation was grazed down to a short grassy sward in places, for example along the south side of Island Lake. In contrast, there is less potential habitat for emergent plants along the margins of the deeper lakes, for example Far Lake and Carp Lake, because the edges fall steeply to deep water and there is also shading by trees. Differences in species composition between neighbouring gravel-pit ponds elsewhere in East Yorkshire have been related to water quality. The occurrence and dominance of Rigid Hornwort in only one of several ponds along the Brandesburton Gravel Ridge was related to high nitrate-nitrogen concentration, but this was explained by input from a field drain from arable land (Goulder & Boatman, 1971). Fertilization of specific lakes by such point-source inputs has not been identified at North Cave, although enrichment of the shallower lakes by guano is possible and this may have led to observed extensive growth of filamentous green algae (Chlorophyceae). Surface colonization of submerged plants by algae can lead to repression of their growth (Phillips *et al*, 1978).

Whether competition from established species hindered colonization by new ones as suggested by Talling (*loc. cit.*) is not clear but the question of whether there is interspecific competition between established plants can be addressed by consideration of within-lake change in dominance/abundance during the 2001-2013 period of study. Perhaps the best example of interspecific competition amongst submerged plants was provided by Nuttall's Waterweed in Far Lake and Carp Lake (Table 3). This North American plant is an aggressive colonizer that was first recorded in Britain in 1966 (Preston & Croft, *loc. cit.*). It was first recorded in Far Lake in 2007 and in Carp Lake in 2010; by 2013 it formed dense submerged masses in both lakes while submerged plants that had previously been dominant or abundant in these lakes were apparently out-competed. These observations are in agreement with those of Williams *et al*, (*loc. cit.*) who found that the primary colonizers of newly-dug experimental ponds (Blunt-leaved Pondweed *Potamogeton obtusifolius* and Perfoliate Pondweed *Potamogeton perfoliatus*), disappeared when the aliens Nuttall's Waterweed and Curly Waterweed *Lagarosiphon major* invaded.

Some decreases of submerged plants previously dominant/abundant could not, however, be linked to competition (Table 3). For example, Stonewort, Spiked Water-milfoil and Lesser Pondweed were all dominant/abundant in Island Lake in 2004 but none of them were recorded in 2013. Similarly, Stonewort, Lesser Pondweed and Horned Pondweed were dominant/abundant in Reed Bed Lake in 2007 but by 2013 Stonewort was not recorded, Lesser Pondweed was occasional/rare and Horned Pondweed was recorded only as frequent. In neither of these lakes were these decreases paralleled by increases in potential competitors. Perhaps substantial grazing by waterfowl and excessive guano-fertilized growth of filamentous green algae led to the sparseness of submerged plants in these lakes.

The pattern of change amongst sometime dominant/abundant emergent plants (Table 4) was generally different from that shown by submerged ones. There had been little colonization by emergent plants by 2001 (Appendix 1). None was recorded as dominant or abundant (Table 4) with the exception of Celery-leaved Buttercup in the later-backfilled quarry that became Reed Bed Lake. Colonization and within-lake extensions of range then proceeded so that from 2004 to 2013 several emergents were able to spread from 2004 to 2013 because vacant littoral space was available. Thus, for example, Common Reed and Bulrush became dominant or abundant in many of the lakes. There were, however, some deviations from the pattern of continuous extension of cover by emergent plants that had reached lakes by natural dispersal; these reflected introductions and possibly inter-specific competition. The most obvious introduction is that of Common Reed to Reed Bed Lake. Also notable, however, are the emergent species that were introduced to Village Lake (West) in 2002 in coir rolls. By 2004 Soft-rush was dominant along the south margin of the lake and other introduced species included Lesser Pond Sedge and Reed Canary-grass. By 2007 the introductions were recorded as dominant/abundant but subsequently Soft-rush and Reed Canary-grass became less important, possibly outcompeted by vigorous growth of Common Reed. There also appears to have been competitive exclusion of emergents by Common Reed in Reed Bed Lake. The littoral community there had developed to include a range of dominant/abundant plants by 2007: Water-plantain, Common Spike-rush, Bulrush, Blue/Pink Water-speedwell and Brooklime, but by 2010 only Common Reed was recorded as dominant/abundant. Other conspicuous changes in the cover of emergent plants are less explicable; for example, a band of Brookweed, up to 3m wide and flowering profusely, was observed along the north shore of Main Lake in 2007. At the time this population looked as if it was about to be engulfed by encroaching willow scrub; it was never again recorded as dominant/abundant in any of the lakes.

Colonization of the North Cave lakes by water plants followed the model set forth by Talling (*loc. cit.*). After an initial rapid increase, the number of species in the lakes as a whole became stable with losses balancing further gains. It is likely that many of the colonizers came from local sources although long-distance transport by waterfowl was perhaps also important. The achievement of a steady state was perhaps more due to reduction in the pool of available colonizers than to competitive exclusion, although there was evidence of some within-lake competition and exclusion. The size of the reserve is in the process of incremental increase from its original 39ha to a proposed 138ha as further mineral workings are incorporated (Martin, *loc. cit.*). It will be interesting to see if the extended wetland area and greater habitat diversity leads to a further influx of aquatic plants. No nationally or regionally rare or scarce aquatic plants (Middleton & Cook, 2013) were found in the lakes but the site is nevertheless of botanical

interest and, furthermore, the water plants are a valuable food resource for the waterfowl that use the reserve. The North Cave lakes may be put into a wider context by comparison with an 81ha site at Farnham on the northern edge of Knaresborough which is also a nature reserve with emphasis on waterfowl (Atkinson & Mather, 1994) and which has lakes occupying 34ha from which gravel was extracted between c.1941 and 1980 (Evison, 1994). Thirty-five aquatic plants, i.e. Palmer & Newbold (*loc. cit.*) checklist species, have been recorded in the south lake at Farnham (area 10ha, excavated in the 1950s and early 1960s); that is 13 submerged and floating-leaved ones and 22 emergents (Mellard & Mettam, 1994; unpublished species lists up to 2008 supplied by J. E. Atkinson; the author's records in August 2014). This compares with c.40 species overall recorded in the North Cave lakes between 2001 and 2013. There was some affinity between the two sites in that 22 plants were recorded both in Farnham south lake and in the North Cave lakes.

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Table 1. Aquatic plants recorded in the lakes at North Cave Wetlands, 2001-2013

	Lakes in which the species was recorded
Submerged and floating-leaved plants	
<i>Callitriche</i> sp. water-starwort*	R
<i>Ceratophyllum demersum</i> Rigid Hornwort	(F) (C) Ve
<i>Chara vulgaris</i> agg. Stonewort*	(F) (C) M (Vw) (Ve) (I) (R)
<i>Elodea nuttallii</i> Nuttall's Waterweed	F C
<i>Lemna minor</i> Common Duckweed	(F) Ve I R
<i>Myriophyllum spicatum</i> Spiked Water-milfoil*	(F) C (M) Vw Ve (I)
<i>Persicaria amphibia</i> Amphibious Bistort	(F) M Vw Ve I (R)
<i>Potamogeton berchtoldii</i> Small Pondweed	(F) (M)
<i>Potamogeton crispus</i> Curled Pondweed*	F (C) (M) (Vw) Ve (I)

<i>Potamogeton pectinatus</i> Fennel Pondweed*	F C M Vw Ve
<i>Potamogeton pusillus</i> Lesser Pondweed*	F C M Vw Ve (I) R
<i>Ranunculus aquatilis</i> Common Water-crowfoot*	(C) (M) (R)
<i>Ranunculus baudotii</i> Brackish water-crowfoot	C (M) (Ve)
<i>Ranunculus circinatus</i> Fan-leaved Water-crowfoot	M Vw Ve
<i>Ranunculus peltatus</i> Pond Water-crowfoot*	(R)
<i>Ranunculus trichophyllus</i> Thread-leaved Water-crowfoot	(F) (C)
<i>Ranunculus</i> spp. (subg. <i>Batrachium</i>) water-crowfoot	F (C) (Ve)
<i>Zannichellia palustris</i> Horned Pondweed*	(F) (C) (M) (Vw) Ve (I) R
Emergent plants	
<i>Agrostis stolonifera</i> Creeping Bent*	F C M Vw Ve I R
<i>Alisma plantago-aquatica</i> Water-plantain	R
<i>Apium nodiflorum</i> Fool's Water-cress*	(F) (Vw) (Ve)
<i>Bolboschoenus maritimus</i> Sea Club-rush	I
<i>Carex acutiformis</i> Lesser Pond-sedge	Vw
<i>Eleocharis palustris</i> Common Spike-rush*	C M Vw Ve I R
<i>Equisetum fluviatile</i> Water Horsetail*	(R)
<i>Equisetum palustre</i> Marsh Horsetail	(Vw)
<i>Iris pseudacorus</i> Yellow Iris	C Vw Ve (R)
<i>Juncus effusus</i> Soft-rush*	F C M Vw Ve I R
<i>Mentha aquatica</i> Water Mint*	(F) M Ve I (R)
<i>Myosotis laxa</i> Tufted Forget-me-not	M (Vw) Ve I
<i>Myosotis scorpioides</i> Water Forget-me-not	Vw
<i>Nasturtium officinale</i> agg. Water-cress*	(F) M (Vw) Ve I (R)
<i>Phalaris arundinacea</i> Reed Canary-grass	Vw (I)
<i>Phragmites australis</i> Common Reed*	F M Vw Ve I R
<i>Ranunculus sceleratus</i> Celery-leaved Buttercup*	(F) (C) M Vw Ve I R
<i>Samolus valerandi</i> Brookweed*	(M) (Vw) (Ve) I (R)
<i>Schoenoplectus lacustris</i> Common Club-rush	(Vw) (Ve) R
<i>Typha latifolia</i> Bulrush*	C M Vw Ve I (R)
<i>Veronica beccabunga</i> Brooklime*	(F) C M (Vw) Ve I R
<i>Veronica catenata/anagallis-aquatica</i> Pink/Blue Water-speedwell*	F C M Vw Ve I R

Only taxa on the Palmer and Newbold (1983) checklist of aquatic plants found in England and Wales plus Stonewort *Chara vulgaris* agg. are included. Recording was done in 2001, 2004, 2007, 2010 and 2013;

Records are for F=Far Lake, C=Carp Lake, M=Main Lake, Vw=Village Lake (West), Ve=Village Lake (East), I=Island Lake and R=Reed Bed Lake.

Brackets indicate those no longer recorded in 2013; *indicates those present on the reserve at the beginning of the recording period (2001).

Table 2. The number of aquatic plant species recorded in the lakes as a whole, 2001-2013

	Submerged and Floating-leaved plants	Emergent plants	All aquatic plants
2001	9	13	22
2004	9	18	27
2007	12	21	33
2010	13	20	33
2013	14	19	33

Only taxa on the Palmer & Newbold (1983) checklist of aquatic plants found in England and Wales plus Stonewort *Chara vulgaris* agg. are included.

Table 3. Submerged and floating-leaved plants at some time recorded as dominant or abundant in lakes between 2001 and 2013

	2001	2004	2007	2010	2013
Far Lake					
<i>Chara vulgaris</i> agg. Stonewort	d/a	0	d/a	0	0
<i>Elodea nuttallii</i> Nuttall's waterweed	0	0	d/a	d/a	d/a
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	d/a	d/a	d/a	f	0
<i>Potamogeton crispus</i> Curled Pondweed	0	o/r	d/a	0	o/r
<i>Potamogeton pectinatus</i> Fennel Pondweed	0	f	d/a	o/r	o/r
<i>Potamogeton pusillus</i> Lesser Pondweed	d/a	d/a	d/a	0	o/r
Carp Lake					
<i>Chara vulgaris</i> agg. Stonewort	0	0	d/a	d/a	0
<i>Elodea nuttallii</i> Nuttall's waterweed	0	0	0	o/r	d/a
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	d/a	d/a	d/a	0	o/r
<i>Potamogeton pectinatus</i> Fennel Pondweed	f	d/a	d/a	d/a	o/r
<i>Potamogeton pusillus</i> Lesser Pondweed	d/a	d/a	d/a	o/r	o/r
Main Lake					
<i>Chara vulgaris</i> agg. Stonewort	d/a	d/a	d/a	o/r	o/r
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	d/a	d/a	d/a	f	0
<i>Potamogeton crispus</i> Curled Pondweed	d/a	o/r	f	0	0
<i>Potamogeton pectinatus</i> Fennel Pondweed	f	f	d/a	f	f
<i>Potamogeton pusillus</i> Lesser Pondweed	f	d/a	d/a	d/a	o/r
<i>Ranunculus circinatus</i> Fan-leaved Water-crowfoot	0	0	0	0	d/a
<i>Zannichellia palustris</i> Horned Pondweed	o/r	d/a	f	0	0
Village Lake (West)					
<i>Chara vulgaris</i> agg. Stonewort	d/a	d/a	f	o/r	0
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	0	d/a	d/a	d/a	d/a
<i>Potamogeton pusillus</i> Lesser Pondweed	d/a	d/a	d/a	d/a	o/r
<i>Zannichellia palustris</i> Horned Pondweed	d/a	o/r	o/r	0	0
Village Lake (East)					
<i>Chara vulgaris</i> agg. Stonewort	-	d/a	d/a	d/a	0
<i>Ceratophyllum demersum</i> Rigid Hornwort	-	0	0	0	d/a
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	-	d/a	d/a	d/a	d/a
<i>Potamogeton crispus</i> Curled Pondweed	-	o/r	d/a	o/r	o/r
<i>Potamogeton pusillus</i> Lesser Pondweed	-	d/a	d/a	d/a	d/a

Island Lake					
<i>Chara vulgaris</i> agg. Stonewort	-	d/a	f	0	0
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	-	d/a	o/r	0	0
<i>Potamogeton pusillus</i> Lesser Pondweed	-	d/a	d/a	o/r	0
Reed Bed Lake					
<i>Chara vulgaris</i> agg. Stonewort	0	o/r	d/a	0	0
<i>Potamogeton pusillus</i> Lesser Pondweed	d/a	d/a	d/a	f	o/r
<i>Zannichellia palustris</i> Horned Pondweed	o/r	0	d/a	f	f

Shading indicates dominant or abundant (d/a); f=frequent, o/r=occasional/rare, 0=not recorded, (-) indicates that separate records were not made for that lake.

Table 4. Emergent aquatic plants at some time recorded as dominant or abundant in lakes between 2001 and 2013

	2001	2004	2007	2010	2013
Far Lake					
<i>Phragmites australis</i> Common Reed	0	f	d/a	f	f
Carp Lake					
<i>Typha latifolia</i> Bulrush	f	f	f	d/a	d/a
Main Lake					
<i>Phragmites australis</i> Common Reed	o/r	f	d/a	d/a	d/a
<i>Ranunculus sceleratus</i> Celery-leaved Buttercup	o/r	d/a	o/r	f	o/r
<i>Samolus valerandi</i> Brookweed	0	0	d/a	o/r	0
Village Lake (West)					
<i>Carex acutiformis</i> Lesser Pond-sedge	0	o/r	d/a	d/a	d/a
<i>Juncus effusus</i> Soft-rush	o/r	d/a	d/a	f	f
<i>Phalaris arundinacea</i> Reed Canary-grass	0	o/r	d/a	f	o/r
<i>Phragmites australis</i> Common Reed	0	f	d/a	d/a	d/a
<i>Typha latifolia</i> Bulrush	o/r	f	d/a	d/a	d/a
Village Lake (East)					
<i>Phragmites australis</i> Common Reed	-	f	d/a	d/a	d/a
<i>Typha latifolia</i> Bulrush	-	f	d/a	d/a	d/a
Island Lake					
<i>Bolboschoenus maritimus</i>	-	0	f	d/a	o/r
<i>Eleocharis palustris</i> Common Spike-rush	-	0	f	d/a	d/a
<i>Phragmites australis</i> Common Reed	-	0	d/a	d/a	d/a
<i>Ranunculus sceleratus</i> Celery-leaved Buttercup	-	d/a	f	f	f
<i>Typha latifolia</i> Bulrush	-	o/r	d/a	d/a	d/a
<i>Veronica anagallis-aquatica/catenata</i> Blue/Pink Water-speedwell	-	f	f	f	d/a
Reed Bed Lake					
<i>Alisma plantago-aquatica</i> Water-plantain	0	0	d/a	f	o/r
<i>Eleocharis palustris</i> Common Spike-rush	f	0	d/a	f	f
<i>Phragmites australis</i> Common Reed	o/r	d/a	d/a	d/a	d/a
<i>Ranunculus sceleratus</i> Celery-leaved Buttercup	d/a	d/a	f	o/r	f

<i>Typha latifolia</i> Bulrush	o/r	0	d/a	o/r	0
<i>Veronica anagallis-aquatica/catenata</i> Blue/Pink Water-speedwell	f	o/r	d/a	f	f
<i>Veronica beccabunga</i> Brooklime	f	f	d/a	f	o/r

Shading indicates dominant or abundant (d/a); f=frequent, o/r=occasional/rare, 0=not recorded, (-) indicates that separate records were not made for that lake. Creeping Bent *Agrostis stolonifera* is omitted because it tended to be more terrestrial than aquatic.

Appendix 1 is available at <http://www.ynu.org.uk/node/493>

Establishment of Meadow Foxtail-Great Burnet meadows (MG4) on former pasture land at South Grange Farm, in the East Riding of Yorkshire

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Introduction

Meadow Foxtail–Great Burnet (*Alopecurus pratensis*–*Sanguisorba officinalis*) meadows (National Vegetation Classification (NVC) grassland type MG4, Rodwell, 1992) are very restricted in their current distribution and consequently are part of the British conservation programme as a priority Biodiversity Action Plan habitat type. Their present distribution is associated with alluvial flood meadows on free-draining, circum-neutral, alluvial loam soils where there is a high water table or surface flooding in autumn/winter (Jefferson & Pinches, 2009). This grassland type is sustained by low-intensity management of hay cutting and aftermath grazing. However, the MG4 grassland community is susceptible to damage by agricultural improvement (particularly drainage and fertilisation but also through prolonged waterlogging caused by neglect of surface drainage or through the raising of water levels (Gowing *et al.*, 2002; Benyon, 2003; Jefferson & Pinches, 2009). It is certain that the distribution of the grassland was much more extensive prior to the 19th century and earlier before the intensification of agriculture and drainage programmes of the 20th century. So little is left now that conservation partnerships and programmes have been formed to promote the restoration of the grassland type on agricultural land in the floodplains (Flood Meadows Partnership, 2014a & 2014b).

Whilst the focus of conservation effort in the UK for MG4 grassland has been on the protection and management of many of the remaining sites through the designation of Sites of Special Scientific Interest (SSSI) and stewardship grants, the need and opportunity to recreate the meadow grassland have been recognised since the 1980s, with several trials being undertaken

(Walker *et al.*, 2004). For example, about 6ha of the grassland was established on ex-arable land at Somerford Mead, Oxford, in 1986 and followed by a series of studies on its development and management (Woodcock *et al.*, 2005; McDonald, 2009). More recently, there has been seeding of 13.5ha of ex-arable land along the River Nene in 2007 and the reseeded of 30ha of semi-improved/degraded grassland on the River Ray in 2008 (Flood Meadows Partnership, *loc. cit.*).

The Light Owl Trust was also looking to create about 5.6ha of meadow grassland on semi-improved pasture grassland at its South Grange Farm in the East Riding of Yorkshire in 2000. This had been purchased with the aid of UK Coal Ltd as off-set mitigation for the environmental effects of underground mining in the River Derwent Valley (Carstairs, 2007). Other possible MG4 creation sites along the nearby River Derwent had been considered but these were assessed as prone to long durations of winter flooding, which has been demonstrated to be detrimental to the persistence of the grassland (Benyon, *loc. cit.*). In 2002 and 2003 trial strips were set up to inform the best approach to establishing the Meadow Foxtail–Great Burnet grassland at South Grange Farm prior to the seeding of a larger area in 2005. This paper reports the findings after ten years, the achievements and the lessons learnt.

South Grange Farm

South Grange Farm lies between the villages of Barlby and Pockington, c.1.5km south-east of the hamlet of Ellerton (see Plate IV, centre pages). It originally comprised c.68ha of a mixed farming unit of pasture and arable land use. The Light Owl Trust on acquiring the Farm aimed to create 5.6ha of MG4 grassland and c.14ha of grassland suitable for wintering birds, whilst maintaining the remainder as productive arable land to fund the proposed conservation work.

The Farm is situated on the middle/upper terrace of the Lower Derwent Valley c.2.5km east of the River Derwent at c.9m AOD and 3m above the current floodplain level. Unlike the active floodplain, as described by Parkin *et al.* (2004), the farmland is not subject to river inundation. It was enclosed under the 19th century Enclosure Acts and the grassland displays remnants of shallow ridge-and-furrow, created to promote surface drainage. This river terrace is drained by ditches maintained by the local Internal Drainage Board (IDB) as well as a number of connecting field ditches.

The typical soils of the proposed MG4 grassland area are: thin silty loam and very fine sandy loam upper topsoil over a silty clay loam, sandy clay loam and medium clay lower topsoil over a heavy clay loam and clay at a depth of 25cm. The soils are likely to belong to the Foggathorpe 2 Association described as slowly permeable, seasonally waterlogged, clay and fine loam over clayey-stoneless soils of glacio-lacustrine drift and till (Soil Survey of England & Wales, 1983). The fertility characteristics of the pasture are given in Table 1.

Table 1. Soil fertility (soil reaction and extractable nutrients) within the trial enclosure.

Number of Samples = 12	pH	P mg/l	K mg/l	Mg mg/l
Median	5.9	4	71	235
Range	5.7 – 6.2	3 - 5	57 - 87	175 - 269

The existing pasture vegetation prior to the setting up of the trial comprised species-poor sward dominated by Common Bent Grass *Agrostis capillaris* with a low frequency of Sorrel *Rumex*

acetosa and Meadow Buttercup *Ranunculus acris* with occasional Perennial Ryegrass *Lolium perenne*, Yorkshire Fog *Holcus lanatus* and Creeping Bent *Agrostis stolonifera*. This indicates a typical Perennial Ryegrass-Crested Dog's-tail *Lolium perenne-Cynosurus cristatus* pasture grassland (NVC MG6, Rodwell, *loc. cit.*). The South Grange Farm grassland was of a different character, comprising Meadow Foxtail, rushes and Tufted Hair-grass *Deschampsia cespitosa* in association with furrows, and probably having strong affinities to the Yorkshire Fog-Tufted Hair-grass *Holcus lanatus* – *Deschampsia cespitosa* NVC MG9 type (Rodwell, *loc. cit.*).

The Trial

Specifications for Trial Strips

The trial comprised two ground preparation options of cultivated (C) or not cultivated (N) before seeding. Strips (100m x 4m repeated twice (i.e. 800m²)) were prepared and seeded in 2002/2003 and repeated in 2003/2004.

In 2002/2003 the following actions were undertaken. The C-Strip was treated with glyphosate on 1 October 2002, ploughed in February 2003, rotovated on 5 May and 12/13 July and 'green-hay' from the nearby Ellerton Ings was cut and spread on the strip on 16 July and turned on 18 and 29 July. The N-Strip had no cultivation and green-hay was spread on 16 July 2003 and turned on 18 and 29 July. The standing grass sward was cut and removed on 15 August.

In 2003/2004, the C-Strip was treated with glyphosate on 27 October and ploughed in January 2004, rotovated on 19 July, spread with green-hay from Ellerton Ings on 30 July followed by removal of hay on 28 September. The N-Strip was chain-harrowed on 29 July followed by spreading of green-hay on 30 July and removal of hay on 28 September.

Specification One Acre Plot

The preparation for the larger scale One Acre Plot (K) comprised spraying the existing vegetation with glyphosate on 30 May 2005, discing the area on 13 June and power-harrowing on 26 July. A green-hay crop was harvested with a forage harvester from Ellerton Ings on 27 July and spread by manure spreader. The hay was turned on 8 and 16 August followed by sheep grazing in early October to reduce the 'hay thatch'.

Remainder of the Enclosure

The remainder of the fenced enclosure around the trials (R) was not cultivated in 2005 but was strewn with green-hay from Ellerton Ings on 27 July by manure spreader. The hay was turned on 8 and 16 August followed by sheep grazing in early October to reduce the hay thatch.

Management of Strips and One Acre Plot

The established plots were cut for hay on 12 July 2003 and left to shed seed to promote recruitment. The hay was turned on 15, 18 and 29 July and baled and removed on 29 August. In 2004, the previous year's strips were cut on 29 July and the hay left to shed seed, turned on 27 July and removed on 17 August. Sheep were grazed on the strips from 28 September. The entire enclosure, comprising the One Acre Plot, the treatment strips and the remainder of the enclosure, was grazed from 3 October 2005.

From 1 November 2006 until 31 October 2013 the entire enclosure was managed as follows:

- ☒ A hay cut taken after 15 July and the aftermath grazed with sheep or cattle until 15 October
- ☐ No artificial fertilisers allowed but an annual application (20-30 tonnes/ha) of well-rotted farmyard manure in August or September
- ☐ No herbicides other than to deal with localised weed problems as prior-agreed with the Landlord
- ☐ No insecticides applied at any time.

Monitoring

The Light Owl Trust made two annual visits on 12 June 2003 and 30 June 2004 to review progress. Jeff Lunn, Trustee and Natural England Area Manager, made the first quantitative recording of the botanical composition of the strips and the One Acre Plot as well as nearby grassland on 1 July 2005. Subsequent recording was carried out by Paul Benyon on 11 July 2007, 24 July 2008, 21 July 2010, 29 June 2011 and 23 July 2012. The Remainder part of the enclosure was only sampled once on 23 July 2012.

Recording methodology followed that for NVC surveys (Rodwell, 2006). Plants present, their frequency and cover were assessed in randomly placed 2m x 2m quadrats in each of the strips and the One Acre Plot. The sample quadrats were restricted to the ridges in the ridge-and-furrow areas. The number of quadrats recorded in each year is given in Table 2.

Table 2. Number of quadrats sampled per recording year.

Recording Year	Plots			
	N	C	K	R
2005	5	10	-	-
2007	10	10	10	-
2008	10	10	20	-
2010	10	10	20	-
2011	10	10	20	-
2012	10	10	20	20

Results

As the treatments varied between years and there was limited randomisation, the trial could not be analysed as an experiment to partition treatment, year and background sources of variation. However, it was apparent at the time of recording that there were marked differences in establishment. The data in each year of monitoring was aggregated for each year of sowing (2002/3 & 2003/4) and treatment for the strips (C & N) and for the One Acre Plot (K).

Non-Cultivated Strips (N)

In 2005 (ie one and two years after seeding) the grassland communities in the N-Strips without any ground preparation prior to green-hay spreading were still dominated by the *in situ* plants of the impoverished MG6 grassland. In total ten plants were recorded with three (Creeping Bent, Yorkshire Fog and Tufted hair-Grass) being consistently recorded, with occasional Sweet Vernal-Grass *Anthoxanthum odoratum*, Creeping Buttercup *Ranunculus repens*, Meadow Buttercup and Sorrel.



Plate I. Wild Tulip *Tulipa sylvestris* (see p163).

Left: Some of the many flowers present at Cattal. Linda Chapman

Below: Several flowers were found with 7 or even 8 'petals' (tepals). Roger Poyser



Plate II. Tardigrades. (see p167).

Left: *Paramacrobiotus richtersi* has been found in VC61, VC63 and VC64. Barry Natress

Below: *Diphascon scoticum* with 3 eggs, photographed using the Jamin Lebedeff interference contrast technique.

Mike Smith

Below left: Egg of *Paramacrobiotus richtersi*.

John Ramsbottom

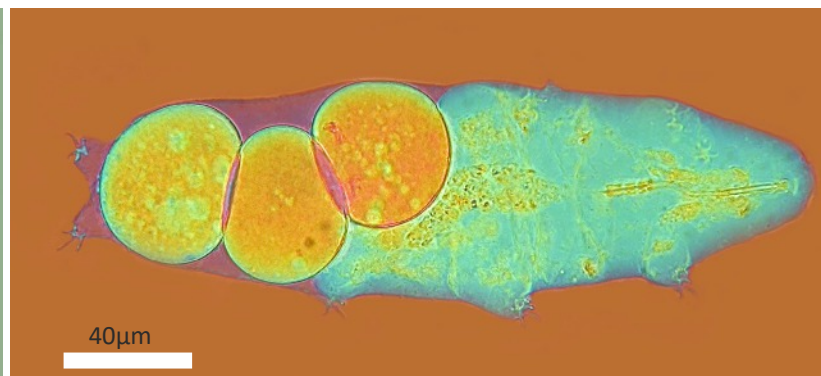
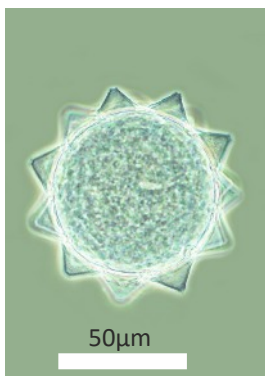




Plate III. Birds which no longer breed in Ainderby Steeple (see p181).

Above: Redshank *Tringa totanus*

Top right: Common Snipe *Gallinago gallinago*

Right: Sedge Warbler *Acrocephalus schoenobaenus*
Paul Simmons

Plate IV. Location of South Grange Farm, showing the River Derwent and conservation-designated land (see p198).





Plate V. Colonization by aquatic plants at North Cave Wetlands (see p185-197):

Above: Bulrush *Typha latifolia* (left) and Celery-leaved Buttercup *Ranunculus sceleratus* (right) colonizing bare lake margin in July 2001.

Below: Soft-rush *Juncus effusus* (left) introduced in 2002 to the margin of Village Lake in coir rolls, seen in July 2004 and (right) Common Reed *Phragmites australis* established in Reed Bed Lake with Common Club-rush *Schoenoplectus lacustris*, July 2013.

Ray Goulder





Plate VI. YNU Excursions 2014.

Top left: VC65. A new ruderal plant community on a gravel bar in the River Swale. Terry Whitaker

Top right: VC65. A veteran Hawthorn *Crataegus monogyna*, a source of several lichens, on the western rampart of Maiden Castle, Grinton. John Newbould

Centre left: VC64. Botanists deep in the study of the special flora of Austwick Moss. Joyce Simmons

Centre right: VC63. Bill Ely and Reserve Warden Mick Townsend examining a find at Thorpe Marsh Nature Reserve. Joyce Simmons

A Blood-vein moth *Timandra comae* (*bottom left*) and a Common Newt *Lissotriton vulgaris* (*bottom right*) were colourful finds on a dull day at Thorpe Marsh. Colin Rew

Two years later the community had changed markedly, having 25 plants, and a total of 35 recorded between 2007 and 2012. The grassland had 12 of the 14 constant species associated with the Ellerton Ings MG4 community, and 13 of the 15 constant MG4 species cited by Rodwell (1992) in the samples between 2007 and 2012 (Table 3). The two constant species absent from all sample quadrats were Common Dandelion *Taraxacum officinale* and Autumn Hawkbit *Leontodon autumnalis*. The apparent irregular recording of other plants in some years is probably due to their very low frequencies in the sward (hence a lower chance of being sampled).

Jefferson & Pinches (*loc. cit.*), in their monograph about MG4 grasslands in England, also comment on the more frequent occurrence of Creeping Bent, Cocksfoot *Dactylis glomerata*, Tufted Hair-Grass and Rough Meadow-Grass *Poa trivialis* and the presence of Meadow Brome *Bromus commutatus*, Smooth Brome *B. racemosus* and Meadow Barley *Hordeum secalinum* being a feature of the Lower Derwent MG4 meadows. Some of these were present at low densities in some of the sample quadrats. Their presence in the samples has a significant influence on the categorisation of the grassland community when using Rodwell's early account of MG4, and computer-aided comparison techniques using MATCH software (Malloch, 1990), and the outcome of this is that the newly established grassland has a typical MG6 (*Lolium perenne*-*Cynosurus cristatus*) character. The frequency of Great Burnet appears to be key, as where this has a high frequency, as in the quadrats recorded in 2010, the grassland has a strong affinity to Rodwell's MG4.

Table 3 Frequency Classes for Reference Sources and Monitored Area N (without ground preparation) 2007-2012.

	REFERENCE SOURCES		AREA N				
	NVC ¹	Ellerton Ings Transect 2000	2007	2008	2010	2011	2012
<i>Ranunculus acris</i>	V	II	II	V	V	V	V
<i>Trifolium pratense</i>	V		II	II	V	II	V
<i>Plantago lanceolata</i>	V		III		V	I	V
<i>Cynosurus cristatus</i>	V	II	V	V	V	V	V
<i>Rumex acetosa</i>	V	III	I		II		I
<i>Filipendula ulmaria</i>	V	I	I	I	II	I	II
<i>Taraxacum officinale</i>	V	II					
<i>Lolium perenne</i>	V	II	V	IV	V	V	V
<i>Leontodon autumnalis</i>	V						
<i>Anthoxanthum odoratum</i>	V	IV	V	IV	V	V	V
<i>Trifolium dubium</i>	V		I	III	II	I	III
<i>Bromus hordeaceus</i>	V	I		I	II		
<i>Poa trivialis</i>	V	IV			I		II
<i>Festuca rubra</i>	V	III	I		I	II	IV
<i>Sanguisorba officinalis</i>	IV	II	I	I	V		III
<i>Holcus lanatus</i>	IV	I	V	V	V	III	V

<i>Alopecurus pratensis</i>	III	IV	I	I	V	I	II
<i>Silaum silaus</i>	III	II			III		
<i>Cerastium fontanum</i>	II	I	I				
<i>Agrostis stolonifera</i>	II	IV	IV	V	V	V	
<i>Deschampsia cespitosa</i>	II	III	II	III	IV	I	II
<i>Hordeum secalinum</i>	II	I	I	I	I		I
<i>Lathyrus pratensis</i>	I	I	I	I	III	I	II
<i>Ranunculus repens</i>	I	III	IV		V		II
<i>Festuca pratensis</i>	I	I			II		
<i>Cardamine pratensis</i>	I	II					
<i>Trifolium repens</i>			I	I	V	I	II
<i>Rhinanthus minor</i>					I	II	III
<i>Centaurea nigra</i>						I	I
<i>Lotus corniculatus</i>				I		I	
<i>Agrostis capillaris</i>			I	I		II	V
<i>Prunella vulgaris</i>			II		I	I	II
<i>Vicia cracca</i>		II	I	II	II	I	I
<i>Phleum pratense</i>		I	II	I	III		I
<i>Juncus effusus</i>					I		1I
<i>Oenanthe silaifolia</i>		II			I		
<i>Rumex crispus</i>					I		
<i>Agrostis canina</i>		V	II				
<i>Alopecurus geniculatus</i>		I					
<i>Elymus repens</i>				I			
<i>Achillea ptarmica</i>		I					

¹ after Rodwell, 1992

Whilst the frequency of some of the constant MG4 plants, and particularly that of Great Burnet, Meadow-sweet *Filipendula ulmaria* and Meadow Vetchling *Lathyrus pratensis*, is lower than that cited by Rodwell, they are present and persistent in the community sampled within the strip without treatment (N) and can be judged to have a character of Lower Derwent MG4 meadow.

Cultivated Strips (C)

In 2005, in contrast to the unprepared N-Strip, the C-Strip with ground preparation had a total of 31 plants including a number of constant MG4 species which had been absent from the grassland before spreading the green-hay; these were Red Clover *Trifolium pratense*, Ribwort Plantain *Plantago lanceolata*, Great Burnet, White Clover *Trifolium repens*, Meadow-sweet and Common Dandelion. 13 of the 15 constant MG4 species cited by Rodwell (1992) were present in 2005 with one or two years of sowing with green-hay.

Two years later the grassland had 16 plants with 36 recorded between 2007 and 2012 (Table 4). The grassland had the same complement of species as Ellerton Ings, as well as published MG4 constant species as in the non-cultivated N-Strips. These latter species were also present between 2007 and 2012 in the C-Strips cultivated prior to the spreading of the hay, as well as grassland plants mentioned above as being typical of the Lower Derwent MG4 variant (Jefferson & Pinches, 2009). Consequently, computer analysis shows that the grassland has a typical

MG6(a) character owing to the relatively low frequency of Great Burnet.

Jefferson & Pinches (*loc. cit.*) refer to a number of scarce plants that are sometimes associated with MG4 grassland. The Narrow-leaved Water Dropwort *Oenanthe silaifolia* is a Nationally Scarce umbellifer and was recorded in 2005 and 2010 in one of the quadrat samples in C-Strip. This umbellifer is normally associated with standing and slightly flowing water. Meadow Barley is Locally Scarce but well represented, however, in the Derwent Valley grasslands where it has persisted in the re-created swards. The fortunes of Yellow Rattle *Rhinanthus minor* were also of interest, with an initial flush of abundance in the C-Strip but then a decline to a more minor component of the community.

Table 4 Frequency Classes for Reference Sources and Monitored Area C (with ground preparation) 2007-2012.

	REFERENCE SOURCES		AREA C				
	NVC ¹	Ellerton Ings Transect 2000	2007	2008	2010	2011	2012
<i>Ranunculus acris</i>	V	II	III	V	V	V	IV
<i>Trifolium pratense</i>	V		IV	IV	V	IV	V
<i>Plantago lanceolata</i>	V		V	V		V	IV
<i>Cynosurus cristatus</i>	V	II	I	V	V	V	V
<i>Rumex acetosa</i>	V	III	II	I	II		I
<i>Filipendula ulmaria</i>	V	I		II	II		IV
<i>Taraxacum officinale</i>	V	II					
<i>Lolium perenne</i>	V	II	IV	V	V	V	V
<i>Leontodon autumnalis</i>	V						
<i>Anthoxanthum odoratum</i>	V	IV	V	V	V	IV	V
<i>Trifolium dubium</i>	V			IV	II	I	IV
<i>Bromus hordeaceus</i>	V	I			II		
<i>Poa trivialis</i>	V	IV			V		II
<i>Festuca rubra</i>	V	III	IV		III		V
<i>Sanguisorba officinalis</i>	IV	II	I	II	II	IV	III
<i>Holcus lanatus</i>	IV	I	V	V	V	III	V
<i>Alopecurus pratensis</i>	III	IV		II	II	II	
<i>Silaum silaus</i>	III	II			III	II	II
<i>Cerastium fontanum</i>	II	I					
<i>Agrostis stolonifera</i>	II	IV	III	IV	V	III	
<i>Deschampsia cespitosa</i>	II	III	V	III	V	II	V
<i>Hordeum secalinum</i>	II	I		I		I	
<i>Lathyrus pratensis</i>	I	I		II		II	I
<i>Ranunculus repens</i>	I	III	V	IV	V	I	I
<i>Festuca pratensis</i>	I	I			I	I	
<i>Cardamine pratensis</i>	I	II					
<i>Trifolium repens</i>				V	III	V	II
<i>Rhinanthus minor</i>				I	I	II	IV
<i>Centaurea nigra</i>							I

<i>Lotus corniculatus</i>							I
<i>Agrostis capillaris</i>			II	IV		IV	V
<i>Prunella vulgaris</i>			II	I	I	I	IV
<i>Vicia cracca</i>		II		II	II	II	IV
<i>Phleum pratense</i>		I		I	I	III	
<i>Juncus effusus</i>						I	
<i>Cirsium vulgare</i>			I				
<i>Oenanthe silaifolia</i>		II					
<i>Agrostis canina</i>		V		II		I	
<i>Alopecurus geniculatus</i>		I					
<i>Pimpinella saxifraga</i>					V		
<i>Achillea ptarmica</i>		I				I	

The establishment of the other signal plant of the community, Meadow Foxtail, is also of interest. Whilst present in most of the samples, its abundance was quite variable, especially in the early years of development. However, the timing of the taking of the green-hay crop may well have played a part in this as the July donor cropping may have missed the best time for maximising the seed take for this early flowering species, resulting in a sparse establishment.

One Acre Plot (K)

This area of the trial enclosure was established in 2005 and had a total of 42 plants between 2007 and 2012 (Table 5). Thirteen of the 14 Ellerton Ings constant species and 14 of the 15 constant published MG4 species have been recorded in the Plot (which was cultivated prior to the spreading of the hay). This included both Common Dandelion and Autumn Hawkbit that were absent in sample quadrats within the strips. Unlike the N- and C-Strips, the bulky dicotyledon Meadow-sweet was absent from the One Acre Plot K.

Table 5 Frequency Classes for Reference Sources and Monitored Area K (with ground preparation) 2007-2012 and Area R (without ground preparation) 2012.

	REFERENCE SOURCE		AREA K					AREA R
	NVC ¹	Ellerton Ings Transect 2000	2007	2008	2010	2011	2012	2012
<i>Ranunculus acris</i>	V	II	II	V	V	V	V	IV
<i>Trifolium pratense</i>	V			II	II	II	II	IV
<i>Plantago lanceolata</i>	V		I	I	II	II	II	II
<i>Cynosurus cristatus</i>	V	II	V	V	V	V	V	V
<i>Rumex acetosa</i>	V	III	I		II	I	I	I
<i>Filipendula ulmaria</i>	V	I						I
<i>Taraxacum officinale</i>	V	II				I		
<i>Lolium perenne</i>	V	II	V	V	V	V	IV	IV
<i>Leontodon autumnalis</i>	V			I	I			
<i>Anthoxanthum odoratum</i>	V	IV	V	V	V	V	V	V
<i>Trifolium dubium</i>	V			I	I	I	V	V
<i>Bromus hordeaceus</i>	V	I		I	II	II		
<i>Poa trivialis</i>	V	IV			III	I		V

<i>Festuca rubra</i>	V	III			III	III	V	II
<i>Sanguisorba officinalis</i>	IV	II					I	
<i>Holcus lanatus</i>	IV	I	V	V	V	I	III	IV
<i>Alopecurus pratensis</i>	III	IV		III	V	V	IV	III
<i>Silaum silaus</i>	III	II					I	I
<i>Cerastium fontanum</i>	II	I		I	I	I	II	I
<i>Agrostis stolonifera</i>	II	IV	V	V	V	V		
<i>Deschampsia cespitosa</i>	II	III	V	V	V	IV	IV	IV
<i>Hordeum secalinum</i>	II	I	V	IV	II	III	III	II
<i>Lathyrus pratensis</i>	I	I			I	I	II	I
<i>Ranunculus repens</i>	I	III	V	V	V	II	I	III
<i>Festuca pratensis</i>	I	I			I	I		
<i>Cardamine pratensis</i>	I	II			I			
<i>Trifolium repens</i>					I	I	II	I
<i>Rhinanthus minor</i>					I	II	III	III
<i>Centaurea nigra</i>			I	II	II	II	IV	II
<i>Lotus corniculatus</i>								I
<i>Agrostis capillaris</i>				III	V	V	V	V
<i>Prunella vulgaris</i>			II	III	IV	III	II	III
<i>Vicia cracca</i>		II		I	I		I	I
<i>Phleum pratense</i>		I	II	III	II	III	II	I
<i>Poa pratensis</i>					I	I		
<i>Juncus effusus</i>					II			I
<i>Cirsium vulgare</i>							I	I
<i>Oenanthe silaifolia</i>		II	IV	II	V	III	III	
<i>Agrostis canina</i>		V				II		
<i>Alopecurus geniculatus</i>		I			I	I		
<i>Elymus repens</i>				I				
<i>Lychnis flos-cuculi</i>				I	II			
<i>Pimpinella saxifraga</i>							I	
<i>Rhytiadelphus squarrosus</i> (a moss)								I
<i>Achillea ptarmica</i>		I						
<i>Juncus conglomeratus</i>			I	I				

Of particular note in Plot K has been the consistent presence of Narrow-leaved Water Dropwort in each of the recording years from 2007 to 2012 where, on average, 50% of the quadrats contained this scarce plant.

Remainder of the Enclosure (R)

Area R had 30 plants in 2012 and the same Ellerton Ings and published MG4 constant ones as recorded for the N- and C-Strips and Plot K, along with the Lower Derwent additional grasses (Table 5).

Discussion

Establishment of MG4 grassland at South Grange Farm

The hay was taken from part of Ellerton Ings where grassland of a lower Derwent MG4 type (*sensu* Jefferson & Pinches, 2009) is known to occur, but within the same field, other wetter grassland communities are also present. Column 2 in Tables 3, 4 and 5 gives the constancy values for the species cited by Rodwell (1992) for MG4 grassland and column 3 in the tables gives the constancy of species recorded along a transect (including some wetter areas of non-MG4 vegetation) across the northern field at Ellerton Ings in 2000. No records were made of the botanical composition or seed maturity/prior dispersal at the time the hay was harvested. The species and amount of viable seed introduced is likely to vary between years because of different plant phenologies and suitable conditions for seed set (Humphries, 2012), and could account for the difference in communities established in the One Acre Plot (K) and the Strips N and C, and also account for the absence of the two composites.

Although no records were made of the botanical composition or seed maturity at the time the hay was harvested, the newly established grassland at South Grange Farm has almost the full suite of the Ellerton Ings and NVC MG4 constant species, in particular the two bulky dicotyledons Great Burnet and Meadow-sweet, as well as other specialist wet grassland plants such as Narrow-leaved Water Dropwort. This also suggests that the grassland established is a result of the seeding.

The presence of Great Burnet, Meadow-sweet and Meadow Vetchling in the treatments C, N, and K suggests that a character of a NVC MG4 meadow community has become established. Interestingly, the communities within N and C are indistinguishable from each other. Despite the absence of Meadow-sweet in Plot K, this community also has a character of NVC MG4 meadow and is similar to those of the two trial strips. The community sampled within the remainder of the enclosure (R) also had a character of NVC MG4 meadow. The communities within the two strip treatments, the One Acre Plot and area R are also largely indistinguishable from each other.

The apparent stronger tendency to affinity with MG6 grassland rather than MG4 meadow appears to result from the frequency of three bulky dicotyledons (Great Burnet, Meadow-sweet and Meadow Vetchling) within the quadrat samples. Clearly, the sowing has markedly changed the grassland communities on South Grange Farm towards an Ellerton Ings MG4 type. Given there was only one sowing from a general hay cut, with further seeding of these and other less well represented or 'absent' plants, the sown MG4 community is likely to have had a much stronger affinity to NVC MG4 meadows and less towards the MG6 pasture type.

The apparent variation in the presence and frequency of some plants between years is also a manifestation of randomly sampling a variable distribution of plants rather than being symptomatic of their disappearance and reappearance. Taking this into account, the data suggest that once plants are established they persist and provide a stable community. This is indicative of the soil and management conditions being favourable for establishing MG4-like grassland at South Grange Farm. For those plants that might be considered to be under-represented or absent, further over-sowing could be a way to ensure their establishment and a fuller complement of constant and scarcer species.

Given that only a single application of green-hay was applied, it is indicative that the establishment of the MG4 meadow community is relatively easy to achieve given appropriate site and seed source.

MG4 establishment trials and schemes elsewhere

Historic attempts to establish MG4 grassland report successful and persistent communities (Walker *et al.*, *loc. cit.*; McDonald, *loc. cit.*). The more recent Flood Meadows Partnership (*loc. cit.*) initiatives on the River Ray and River Nene suggest that here it is early days and the situation could be similar to South Grange Farm where it took two to three years before establishment was evident.

It is interesting to note that the green-hay method has been widely and successfully used in establishing other grasslands (Atkinson *et al.* (*loc. cit.*); Walker *et al.* (*loc. cit.*); Flood Meadows Partnership, (*loc. cit.*)). The examples include cultivated land as well as sowing into established grassland where cultivation was considered to be necessary.

It appears that the preparation of the land and existing grassland, provided that it is unproductive (nutrient poor) and species poor, is not of such importance as initially anticipated, given that appropriate site conditions and management are provided, as pointed out by Gowing *et al.* (*loc. cit.*), Duranel *et al.* (2007) and McDonald (*loc. cit.*).

There is seemingly no botanical difference between the two preparation treatments in the establishment of the MG4 meadow communities in the species-poor, short, semi-improved grassland at South Grange Farm. However, establishment was markedly slower on the Non-cultivated Strip, leading to the decision to adopt the cultivation approach for the One Acre Plot. However, after about three years, the initial difference had disappeared.

Scope for MG4 community creation

Wheeler *et al.* (2004) considered that “If a stand of MG4 has been recently lost, but is still under non-intensive grassland management, then corrective management may rehabilitate the community in the short to medium term (e.g. 5-20 years)” as appears to have been the case at South Grange Farm. The findings and experience gained at South Grange Farm are supported by other reports of successful achievements.

The *in situ* plant communities at South Grange Farm were typical of semi-improved MG6 grasslands and of a type commonly found in the floodplains of England as, for example, at Hoveringham Pastures in Nottinghamshire (Natural England, 2010), which has resulted in its denotification as a SSSI. Given the success of the conversion of the MG6 grassland to a MG4 meadow type at South Grange Farm, this suggests that MG6 grassland sites such as Hoveringham Pastures may be candidates for re-establishing MG4-like meadows.

The successful achievement at South Grange Farm also questions the dependency of these grasslands on flooding, thereby implying that the MG4 grassland had a far wider distribution in the past than just the margins of alluvial floodplains. This is logical in that agricultural improvement took place preferentially away from flooded areas, resulting in the early loss of MG4 meadows, leaving them to hang on in areas where improvement was not profitable on un-

drained floodplains. Given this, as is suggested in Jefferson & Pinches (*loc. cit.*), MG4 meadow communities would probably have had a wider spectrum of community variants than the implied single type described by Rodwell (1992). This raises the prospect that a wider perspective might be taken in the future when considering opportunities for the establishment of MG4 and MG4-like suites of grassland communities.

Conclusions & Recommendations

The basis for a grassland community of a type similar to the Lower Derwent MG4 meadows as described by Jefferson & Pinches (*loc. cit.*) and the generalised MG4 type described by Rodwell (1992) has been established at South Grange Farm. The tendency for the community being a little more like NVC MG6 than MG4 is simply dependent on the frequency of the bulky dicotyledons Great Burnet, Meadow-sweet and Meadow Vetchling which, of course, could be increased by further sowing.

In terms of establishment practice, the initial conversion of the *in situ* grassland is likely to benefit from cultivation as this seems to give quicker establishment, but successful supplementary sowing is not dependent on wholesale re-cultivation. However, the periodic removal of the standing crop during the establishment phase and minor cultivation such as creating slots is likely to be necessary to ensure the establishment of the supplementary sowings in established grassland.

Given the above, it can be concluded that the original purpose of establishing MG4 grassland as off-site benefit and mitigation for the potential effects of mining close to the Lower Derwent Ings has been achieved in principle, leaving its persistence and development to the implementation of traditional management practices and some further over-sowing, as recommended above.

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Leeds Naturalists' Club 1870 - 2014

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The Leeds Naturalists' Club and Scientific Association, to give it its full name, was founded in 1870. We know this because it says so on our annual syllabus card, but detailed knowledge of this event and how it came about has hitherto been lacking. However, a contemporary account contained in one of the very few old documents we possess gives the answers (see p216 for documents consulted).

The Early Years - Foundation

The Club was formed as the result of a talk given by a Mr James Brodie in February 1870 to members of the Leeds Young Men's Christian Association, in which he explained the working of a similar society in Dundee. It was resolved to form a society in Leeds and this met for the first time on 12 April 1870. The name adopted by the club was The Leeds Naturalists' Field Club.

At about the same time there was a private Scientific Association in Leeds, a group of five men who met informally each week in the house of one or other of its members for the purpose of reading papers and discussing matters of scientific interest. This society was gradually absorbed into the Leeds Naturalists' Field Club, an arrangement that was formalised in 1872 by the creation of the Leeds Naturalists' Field Club and Scientific Association. The opening meeting of this re-named organisation was held on 16 April 1872. The word 'Field' was removed from the title shortly afterwards. One of the 'five gentlemen' was F. Arnold Lees (1847–1921) who is best remembered for his *The Flora of West Yorkshire* (Lees, 1888) but, although botanical reports by Lees for 1873 and 1874 were in the Club library in 1876, his name does not appear in the lists of members from 1876 and 1890.

Activities

In the first year of the newly established Club it was resolved that meetings should be held weekly on Tuesday evenings and that they should be devoted alternately to the reading of papers and the exhibition of specimens and conversation. During the year 22 papers were read and there were five excursions which, although a reduction on the previous year, were "productive of great interest to those members who took part in them".

The 21st Annual Report (1890) notes that 36 meetings, not including excursions, had been held during the previous year. Eleven had been held in the Library of the Leeds Philosophical and Literary Society on Park Row, four at the Leeds Medical School and the remaining 20 at the Club's room in the Municipal Buildings. Three of these were practical evenings and there were six which could broadly be classed as general exhibits meetings. There were eight summer excursions.

This pattern of meetings has been maintained over the years, although with fewer meetings. General Exhibits meetings, which had been relegated to four or five summer evenings, were abandoned quite recently, partly because of an increasing reluctance of members to collect

specimens.

One notable visitor to Leeds in 1890 was Professor O.C. Marsh of Yale University who was, and still is, famous for his discovery of an amazing number of dinosaur fossils. It is recorded that he presented the Club with a series of his papers on American Palaeontology.

First Members

The Club's membership was given as "about 50" in 1871 and 32 in 1872 but the list of 1876 shows 108 members, all of them male. There was a rather complicated fees structure under which the cost of membership, either 4/- or 5/- per annum, was determined by the date when the member had joined the club. Non-resident members paid 2/6 and honorary members were required to pay "not less than 10/6 per annum", quite a sizeable sum in those days. Life membership cost £5.

By 1890 the membership list showed 201 ordinary members and 15 honorary and life members. Amongst these were Lord Walsingham of Merton Hall at Thetford, Sir Edwin Gaunt of Carlton Lodge in Leeds and Dr Henry Clifton Sorby FRS of Sheffield, who is commemorated in the natural history society of that name in Sheffield.

Several members were significant figures in Victorian Leeds. Mr E.J. Arnold of No 3 Briggate was the founder of the firm that bore his name and which became probably the largest supplier of educational stationery and equipment in the country. Two very active members, Mr R. Reynolds FIC¹ and Mr F.W. Branson FIC, must surely have been the founders of Reynolds and Branson Ltd of Lower Briggate, suppliers of laboratory equipment to schools, colleges and hospitals and indispensable in the 1930s and 40s to schoolboys with chemistry sets. Other prominent citizens have been identified and further research would no doubt find more. 17 of those listed appear to have been doctors (mostly surgeons), one was a dentist and 14 have degrees or professional qualifications. There were 8 women members and 3 MPs.

One member who probably deserves a whole article to himself is Louis Compton Miall (1842–1921), who came to Leeds in 1871 when appointed Curator of the Leeds Philosophical and Literary Society's Museum. In 1876 he was appointed Lecturer in and later Professor of Biology at the Yorkshire College and, when Leeds University was founded in 1904, he became its first Professor of Biology. This is really quite surprising as his formal education is said to have ended when he was about 15 years of age. It is also stated that he attended the Leeds Medical School, but for how long and with what result is not known. He was also known for having dissected an elephant from a travelling circus that had died in Leeds in 1874. The dissection took three years to finish.

Miall was born in Bradford and was related, through his mother, to the Mackenzie family that included amongst its members Compton Mackenzie the novelist and Fay Compton the actress. He wrote 23 books, the first as co-author, on the flora of the West Riding in 1862. He is remembered at Leeds University by the Miall Lecture Theatre and the LC Miall Building, the home of the School of Biology.

¹ Fellow of the Institute of Chemistry

The University Years

There is a gap in our documentary evidence from the Transactions of 1890 until the start of the Club's Council Meetings Minute Book beginning in 1925 and continuing to the present.

Leeds University was founded in 1904 and, when we open the minute book, we find that the Club was then firmly established within the orbit of the University. How this came about we do not know but we find that Professors W. Garstang and J.H. Priestley were honorary Council members in 1926. Over the following years several other University biologists were honoured in this way. Dr Pearsall (later Professor W.H. Pearsall FRS, the author of *Mountains and Moorlands* in the *New Naturalist* series) is also recorded in the minutes, and many other members of the University appear in the following years, taking office, writing minutes, acting as recorders and generally showing considerable commitment to the Club. This involvement of University biologists must have been an inspiration to many of the ordinary members; a more practical benefit probably was the arrangement that allowed the Club to hold its meetings in a University lecture theatre. We do not know when this arrangement began but it is possible that it began with Professor Miall (a member of the Club since its early days) and that it might even date back to the days of the Yorkshire College.

One University botanist deserves special mention. William Arthur Sledge (1904–1991) first figures in a minute in 1925 and he appears to have continued as a Council member more or less continuously, holding a variety of offices up to 1990, although he did not attend in the last year or two of his life owing to poor health. Dr Sledge was a leading Yorkshire botanist for a large part of the 20th century, and a President of the YNU and Editor of *The Naturalist* for many years. It is remarkable that he was able to continue his association with the Club for so long when he was no doubt busy in several other areas, not least as Reader in Botany. In his last published work (in Lavin & Wilmore, 1994) he records how, as a schoolboy, he visited Dr Arnold Lees, taking specimens for identification and thus establishing a link between West Yorkshire botany of the 1870s and that of much of the 20th century.

Membership

In 1938 life membership was offered at a fee of £5/5/-, almost the same as in 1876. The ordinary membership fee was raised to 5/- in 1963, just what it had been in 1872 and, with the change to decimal currency in 1971, it was raised again to 40 pence. It was raised to £1 in 1976 and further increases followed as the cost of living rose. The annual fee is now £10.

These minutes do not tell us very much about the day-to-day life of the Club; Council meetings were normally held only once a year until 1975, when a proposal for two meetings a year was adopted, and were mainly concerned with proposals for officers and the programme for the coming year. It is clear, however, that the pattern of meetings which began in the 1870s still continued fundamentally unchanged.

Membership figures are mentioned only infrequently in this period but in 1928/9 there were 145 members and 96 in 1949, Towards the end of the 20th century increasing amounts of business were conducted in Council meetings and more frequent statements of numbers were given. For several years membership hovered around 100 then was followed by a gradual decline to 53 in 2009 and to 44 in 2010.

Protest, Conservation and Surveys

The Club appears to have been rather inward-looking during the 1920s and 30s. This is hardly surprising: interest in natural history was not widespread, the conservation movement had hardly started and nature reserves were few. The pace of agriculture was dictated by the speed of the horse and the flood of artificial fertilisers and pesticides was still to be unleashed. An early concern about environmental change was the suggestion in 1928 that the Club should protest about the “cutting up” of the Meanwood Valley by the creation of a Ring Road. This was not proceeded with as it was thought (no doubt accurately) that protest would be useless.

Conservation

Wildlife conservation gained momentum during the 1960s, 70s and, particularly, the 1980s, when there seemed to be a surge of interest in the natural world. Several environmental groups became active in Leeds in this period with two of them, Eye on the Aire and the Leeds Urban Wildlife Group, perhaps filling a vacuum that the Club was not equipped to fill but both relying to some degree on the expert knowledge held by Club members. Although interest in these new groups was strong in the late 1980s and early 1990s the tide of enthusiasm ebbed away and neither of them survived very long into the 21st century, perhaps in the case of Eye on the Aire because its basic purpose, the reduction of pollution in the River Aire, had largely been achieved. The Club, which had been a long-time supporter of the Yorkshire Wildlife Trust, supported several of these recently formed groups and appointed its own Conservation Secretary in 1986. In 1994 the Club decided to be involved with City Council conservation targets and in 1996 agreed to be one of the organisations supporting the formation of the Rodley Nature Reserve.

Surveys

Surveys of the Club’s area should have been a basic activity but no formal project appears to have been undertaken until, in 1936, it was decided to undertake “an intensive floristic and faunistic survey on systematic and ecological lines in the Meanwood Valley from Adel Bridge to the Ring Road”, the results of which would be published. Also to be published were “entomological lists of the Leeds area drawn from the Club’s own record books”. A Publications Committee was formed but there is no record that the Meanwood Valley survey was published; however, a minute of November 1937 reports that entomological lists were published in *The Naturalist* in that year (Hincks, 1937; Dibb, 1937).

In 1957 It was suggested that the Club should conduct an investigation into either the flora of the City of Leeds (a rather ambitious project)² or the flora etc. of the Meanwood Valley, which was agreed, and some progress was noted in 1958. In 1967 reference was made to the Bardsey Beck investigation, which was apparently proceeding, and an investigation to be made at Hetchell Wood with a strict time limit for completion.

In 1970 surveys of the Leeds and Liverpool Canal and the Aire and Calder Navigation were proposed. In 1976 the Hetchell survey was published as a ‘preliminary report’ and 100 copies

² It is worth noting that a Flora of Leeds and District compiled by students of the Swarthmore Educational Centre directed by Dr G.A. Nelson, the proposer of this survey, was published in 1963 (Nelson, 1963).

were printed, though I am not aware of whether any still exist. In 1978 a draft of the Meanwood survey was produced but in 1979 it was minuted that the Club could not afford to publish it. A survey of the whole of the Leeds Metropolitan District was proposed in 1983 while in 1987 it was recorded that work on the Meanwood survey was proceeding with a view to publication in 1990. However, there is no evidence that any of the surveys apart from that on Hetchell Wood was separately published, but the Club's Newsletter (1980-1984) published numerous elements of contemporary surveys of mammals, birds, molluscs, insects, bryophytes, fungi and lichens from the Meanwood Valley, the Leeds and Liverpool Canal and Hetchell Wood. Sadly, although during the whole of the Club's history much work was carried out and some hundreds of completed record cards are still in existence, very few of these records were published and very few appear now to be readily accessible.

The Second World War

There is no reference to the 1939/45 war in the minutes but the normal November meeting did not happen in 1939; there was, however, an extra meeting in January 1940. This meeting and the normal November meeting were held at the Leeds City Museum but the fact that the museum was badly damaged in an air raid in 1941 is not mentioned. It appears that Club meetings during the war were not held at the University.

Excursions

With the increase in motor car ownership it became possible to arrange evening excursions to places not served by public transport and annual visits to the Yorkshire Dales or elsewhere that would have been impossible without private transport. In 1980 there was a suggestion that an outdoor meeting should be held on motorway verges. Not surprisingly, this suggestion was not taken up.

The Ordinary Member

In the 1950s and 60s many of the long-standing University biologists had left the Club and, whether because of the change in emphasis away from field studies or the pressure of increasing numbers of students, fewer new academics were joining. In the 1970s the affairs of the Club appeared to be in the hands of what might be called the ordinary members and it is remarkable to find so many outstanding naturalists who made large contributions. Some who stand out for their long service and for their willingness to take on duties and responsibilities can be identified from the Club's minutes and from the recollections of those who were members at that time: Dr John H. Elliott, a biology lecturer at the Leeds College of Technology who was Secretary for many years, Dr G.A. Nelson, a university pharmacologist who also occupied many Council posts, John Flint, a librarian by profession and a conservationist and a leading entomologist with a special interest in Coleoptera, and Dr R. Henson who had an interest in Zoology. Also prominent in this period were John Armitage who, after half a lifetime as a professional naturalist, was Curator of Biology at Leeds City Museum and expert in many fields, and Mr T. Cockerline, a keen botanist and member for many years who did much of his botanising in the Meanwood Valley. Current and recent members, many of whom have similar levels of expertise and a similar commitment to the Club's affairs, have not been included in this survey as it would be invidious to select a few when so many deserve to be mentioned. Perhaps another opportunity to take a deeper look at the Club's active and enthusiastic members will present itself at some future time.

Changing Times

At the beginning of the 19th century few people studied natural history. The image we have today, which may not be completely accurate, is of country parsons such as Gilbert White with time to spare or landed gentry who, perhaps, combined their studies with the collection of trophies for the cabinet. In 1870, when the Club was formed, the leading members seem to have been drawn from the emerging and increasingly prosperous middle class that had benefitted from the introduction of the railway, improved access to education and the beginnings of modern society. Several of these men made an impact on the life of Leeds and they were, perhaps, inspired by the Victorian ideal of self-improvement and enthused by the frequent lectures on scientific as well as natural history subjects.

By 1925 when our minute book starts all this had changed. If there were any entrepreneurs amongst the members then we do not hear about them. However, the influence of Leeds University was very strong and this support no doubt provided a stimulus to a wider group of naturalists and membership remained buoyant, although the study of natural history remained a minority interest. The surge of interest in the 1970s and 80s stemmed, perhaps, from the growing numbers of nature reserves and the realisation that people, not necessarily naturalists, working together could influence the course and extent of development and, by submitting evidence to public enquiries, could mitigate some of the harmful environmental effects of proposals from developers, local authorities and other statutory bodies.

Few local authorities employed even one ecologist when this movement started and the weak provisions of the Countryside Act of 1963 were mostly ignored. A much stronger duty was placed on statutory bodies with the passing of the 1981 Wildlife and Countryside Act and development plans began to include substantial sections on environmental protection. The feeling that the battle had been won might account for the sudden loss of interest by those people who had joined the conservation movement with such enthusiasm in the 1980s.

Given the growing division between the University biologist and the naturalist, together with concerns about security, health and safety and rising student numbers, it was perhaps inevitable that the Club's association with the University should come to an end in 2010 after probably a century of co-operation.

The Future

The future of the Club, like the future of the amateur naturalist in general, seems doubtful. Nature conservation has been taken over by the professionals, whose aims do not always coincide with those of the amateur naturalist. Professionals come and go and it seems that only the dedicated amateur with a long-term commitment to a site will have the necessary background to monitor the performance of the "conservation profession".

Although there may well be an increasing number of people with a benevolent interest in wildlife there does not seem to have been a corresponding increase in naturalists keen to take part in the investigation and recording of wildlife. This is increasingly important when environmental change can be so far-reaching and can take effect so quickly. It is particularly sad that so few young people are joining naturalists' societies. Without new and younger members with energy, initiative and knowledge, the future is indeed bleak.

Many possible reasons have been put forward for the decline of naturalists' clubs but perhaps their rise and current decline should be seen as part of, and stemming from, changes in the wider society over the past two centuries. It seems likely that society will continue to change and with those changes there will no doubt be changes in the study of natural history. The Club is now well into its second century but still many years away from its 200th birthday. The important question today is not whether it will reach that goal, but will it be able to celebrate 150 years of existence in 2020?

Acknowledgements

I am grateful to Mrs Phyl Abbott and Dr Peter Tannett for information drawn from their long experience of the Club and its members. If there are any errors they will be mine.

Leeds Naturalists' Club & Scientific Society documents consulted:

6th Annual Report 1875-6
Constitution 1876
Transactions 1890
Council Meetings Minute Book 1925 to present

The first three documents, in the possession of the author, are probably the only ones in existence. The Minute Book is held by Club officers.

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Information on Professor LC Miall from Wikipedia

Obituary: John Wint 1946-2014

Like some of the best Yorkshiremen John wasn't born in the county, but he grew up and was educated in Sheffield where he developed his life-long interest in birds. This interest, in his own words, was 'never really activated' until his late twenties, by which time he was well into a career as an insurance claims manager and living in Wakefield. This gave him easy access to Winterset Reservoir where he trained as a bird ringer with the newly formed Winterset Ringing Group, remaining as a stalwart of the Group in the late 1970s and 1980s. However, his ringing activities were soon extended to other localities, including wader ringing on the Humber and annual trips to Spurn Bird Observatory.



After moving to the Selby district in the 1990s he began ringing at sites on the River Aire, including a mining subsidence 'flash' now called Beal Carrs which began to develop in late 1999 and became his main study area. By the time of his Presidency of the YNU in 2011 he had compiled 11 years of data for the site and a list of 175 bird species. He not only ringed at Beal Carrs but became its unofficial warden. His Presidential Address, *I only wanted to watch Birds*, reveals, through a series of amusing anecdotes, the amazing range of threats that such a site faces both from arable farming and from the local population and shows the need for constant vigilance and considerable inter-personal skills if the site is to be conserved. John possessed these attributes.

His inter-personal skills were also put to good use in training bird ringers. He was involved in the very successful programme of week-end courses run jointly by the BTO and the Field Studies Council at Flatford Mill in Suffolk. Nearer to home he introduced bird ringing into the YNU course in field skills provided for students on the University of Leeds MSc in Biological Conservation. He also provided ringing demonstrations at the annual Rutland Bird Fair and for one-off events such as Bioblitzes.

John became a trustee of the YNU in 2001, serving first as its Development Officer and subsequently as a member of the Education Committee and as Deputy Chair of the Executive. In that position he provided a steady hand and wise advice as the Union and its publications portfolio were re-structured for modern conditions. In the last decade he has also been the Bird Recorder for VC63, in which role he worked tirelessly promoting the cause of the centralised recording of data for the benefit of the County's avifauna.

His sudden serious illness in 2013 and his subsequent death came as a shock to his many friends. He will be greatly missed. Our sympathies go out to his wife Pauline.

John Bowers and Mike Denton

Obituary: Leslie Magee B.A., C.Eng., M.I.Mech.E., M.I.E.T. 1918-2013



Leslie Magee was born in Barnsley in 1918, two years before his brother Jack. His first fishing outing was when he was about eight and he very soon became a committed fisherman in a mining town where it was no more than twenty minutes walk in any direction to open country with still or running water. He fished in the rivers, streams, ornamental lakes and serpentine of the great estates that lay nearby to the south and west, the landscapes

of Wentworth and Wharnccliffe especially engraving themselves firmly within his memory, sceneries of his youth which he always spoke of in later life with great fondness; all this with no note of trespass for his father, in his younger days, had been employed by a local grandee.

He attended Bishop Holgate Grammar School and looked back on happy times there, his lifelong love of science, technology and the natural world encouraged and nurtured there, strengthened by his enquiring mind. He had been keeping a closely written nature diary from the age of ten and, when twelve years old, he was appointed secretary of the junior school rambling club, writing reports on egg-collecting, bird-watching, botanising and days spent fishing. During the interwar years of his adolescence he was learning the art of fly-tying, taking full advantage of every self-respecting gamekeeper having a gibbet hung with birds of prey and other 'vermin', the multi-coloured feathers needed for dressing a fly being freely available.

In his later teens an inborn leaning led him into the world of engineering and, when World War II broke out, he was engaged in vital war work at Vickers foundry, starting there as Fitter and Turner before very soon taking his Higher National Diploma. During the war years, he met Peggy, who became his wife in 1942. Their courtship was a time when, during their country walks, she intensified his interest in wild flowers and their names so that, with his keen observational skills and his prior knowledge of wild birds, his passion for natural history began to know no bounds.

Janet Lynne, their first daughter, was born in 1942 and her sister, Lesley Jane, in 1948. At this point Les moved to Crofts Engineers in Bradford, becoming in his leisure time a stalwart member of the Bradford Naturalists; this move was followed by one to Head Wrightson at Thornaby on Tees, where he inevitably joined the Middlesbrough Naturalists, with the botanical and entomological riches of Teeside nearby. Later, a further move, to Renolds in Bradford, found him once again living close by the River Wharfe, reinvigorating his interest in his earlier never quelled passion, angling. He explored the Wharfe's reaches and niches, learning its turns and twists and its countless denizens and moving into a fresh field of intensive study, the Ephemeroptera.

Fascinated by the Yorkshire fishermen who had gone before him, Les rekindled his angling

concerns, collecting a mass of text and illustration from a great variety of sources, including many rare and valuable antiquarian volumes, generously loaned by friends and others aware that he was planning a book on angling in Yorkshire. This culminated in his authorship of *Fly Fishing, the North Country Tradition*. This book, a mixture of anecdote, history and technical description, now recognised as a classic, was published by Smith Settle of Otley at £22, with a deluxe numbered edition of 50 copies, bound in goatskin, each containing 30 flies tied by Simon Ashworth and available on subscription at £325 for its two volumes. In the £22 version that Les was kind enough to give me he inscribed as epigraph a quotation from T. E. Pritt, the renowned Victorian angler: "One of the great charms of angling is that it generates an endless field for discussion, argument and experiment." These three fruits of angling seem to me to sum up much of Les' life and character as a natural historian, for he was a great talker with many years of memory to draw upon, and keen to enjoy with others the exchange of story and opinion. This profusion of knowledge and story served him well during his time as County Correspondent of the periodical *Trout and Salmon* and made him welcome on so many club, syndicate and private waters across Yorkshire and further afield.

Les' working life was by now that of a consultant chartered engineer, much in demand, taking him into Europe, Egypt, Thailand, South Korea and China, where he seized the opportunity of seeing different cultures at close quarters, making new friendships and encountering a new diversity of landscapes, complementing his experience of the British flora, fauna and habitats.

His first encounters with the YNU had been as a schoolboy through the affiliated membership of the Barnsley Naturalists but in 1956, at the invitation of George Shaw and A. Malins-Smith, he became a full member. With Douglas Richardson he set about the re-establishment of the YNU's Freshwater Biological Section, which still flourishes and was officially renamed the Freshwater Ecology Section in 2001, Les occupying the Section secretaryship for many years. He wrote regularly for *The Naturalist* and the *YNU Bulletin*: among his contributions were (as Botanical Recorder for VC64) the Mid-West Yorkshire Annual Botanical Reports for 1983-1994, numerous book reviews and Freshwater Section Excursion Reports. A particularly important paper in the society's journal in 1993 was 'A Review of the Grayling (*Thymallus thymallus* L.) in Yorkshire and some records of transfers of fish and ova.' In the same year Les was elected to the Presidency of the Union, a position he held to be among the highest honours the Society or the County could bestow and in which he took the greatest pride. The paper he gave as his Presidential Address, 'Yorkshire Mayflies', remains one of his major achievements, as readable and engaging today as at the time of its presentation.

Over the years Les was also twice President of the Bradford Naturalists' Society and of the Cleveland Naturalists' Club, and during the 1960s he was a founder member of the Darlington and Northumberland Field Trust. Throughout his long life he was polymath in nature and practice, so that his friends were unsurprised to find him in his later years adding to his interests in history, literature, French and Mandarin by studying successfully for a degree in Spanish!

Les is survived by his wife Peggy and their two daughters and by his grand, great-grand and great-great-grandchildren. His company and conversation will be sadly missed by all his naturalist friends and the angling community.

Albert Henderson

Field Note: Positive news of Floating Water-plantain in the Calder & Hebble Navigation

Ray Goulder email: r.goulder@hull.ac.uk

The gloomy conclusion of the YNU excursion held on 18 May 2013 was that Floating Water-plantain *Luronium natans* (scarce in Britain and with EU-wide protection) has died out from the canal at Cromwell Bottom because of an increase in boating (*The Naturalist* 138, p.223). It is good to report that this is overly pessimistic. On 12 June 2014 conditions were particularly favourable for observing underwater plants from the towing path; that is bright sunlight, little ripple and clear water. Along the canal from Brookfoot Lock (SE135228) westwards to Cromwell Lock and beyond towards Park Nook Lock (c.2.3km) much of the canal bed was seen to be occupied by up to 100% cover of the linear-leaved rosettes of submerged Floating Water-plantain in water depths varying from c.50cm to 1m. Furthermore, loose, free-floating, stolon-linked rosettes were observed at the water's edge, presumably dislodged by boats and/or geese. The oval floating leaves of the plant were, in contrast, very scarce and no flowers were seen.

Underwater rosettes of Floating Water-plantain grow closely against the canal bed and it is possible that they tend to escape mechanical damage by boats. Other submerged aquatic plants that have buoyant leafy shoots that grow upright in the water column are perhaps more vulnerable. Other submerged plants observed included water-starwort *Callitriche* sp., Nuttall's Waterweed *Elodea nuttallii*, Arrowhead *Sagittaria sagittifolia* (largely its submerged ribbon-like leaves) and Unbranched Bur-reed *Sparganium emersum*. Clearly in this canal there is co-existence between a plant community of conservation significance and boat traffic.

Field Note: Rough Niger - a first record for the North of England

Heather Walker New Zealand, Aberford, Leeds LS25 3DX

I first saw this plant growing in a crack in the concrete near my kitchen door in Aberford but by December 2013 it measured over 80cm high and about 50cm wide. The branches from a hollow central stem started to form clumps of green-petalled flowers about as big as a little fingernail.

I took a sample of the plant to the YNU AGM but nobody could identify it. I then sent a sample to the YNU Recorder for Alien Plants, Geoffrey Wilmore, who could not identify it either but sent it on to Eric Clements in Hampshire. He identified it as Rough Niger *Guizotia scabra*, a member of the dandelion family.

This appears to be the first record for the North of England and only the third for England. The two previous English records are from Hampshire and Kent in 2010 and 2011. The Aberford plant was very probably imported with the bird seed I feed to my canary. Its origin is uncertain, probably tropical or sub-tropical from Ethiopia or Abyssinia!

Sadly, during the gales in late December, the plant was snapped from the bottom and completely destroyed.

Yorkshire Naturalists' Union Excursions in 2014

Compiled by **Albert Henderson** and **Adrian Norris**

Forge Valley, Scarborough (VC62) 17 May 2014

INTRODUCTION (Adrian Norris)

The late delivery of *The Naturalist* with the meeting details may have affected the number of people at the Forge Valley meeting, although details were available on the YNU website. Only 12 members attended the event and fewer still the meeting at the village hall in Ayton. It was most unfortunate that Mike Carroll was unable to be with us as he had to attend a memorial service at the last minute. Nonetheless, the day was most successful with recorders of several major and minor groups having a very fruitful day. The weather proved to be very warm with unbroken sunshine throughout.

The indoor meeting held at the Parish Hall in East Ayton at 4pm proved just as productive, with a great deal of discussion on the various groups recorded and the environment of the areas visited. Those who did attend would like to thank Mrs Joy Tomlinson for her help and cooperation on the day.

COMMENTS ON THE ENVIRONMENT (Adrian Norris)

Several members commented that the woodland on the western bank of the River Derwent has been affected by the drainage of the steep slopes above the wooden footpath which snakes along the riverbank. A series of drains has been cut into the slopes allowing the water to be directed into channels, presumably so that work on the footpaths could take place more easily. The lower slopes are dominated by lime-rich tufa. The changes have also had a drastic effect on the woodland which was very rich in damp-loving plants such as Great Water Horsetail *Equisetum telmateia* and Great Pendulous Sedge *Carex pendula*, both of which appeared to be diminished. The woodland was dominated by Ramsons *Allium ursinum*, usually considered to be more abundant in drier woodland.

Discussion took place about the area of scrubby Gorse *Ulex europaea* situated to the north-west of the woodland at c.SE980875 below Spikers Hill. This has become overgrown over the years and, although it is very good for spiders and small birds, it is far less diverse in other groups of animals and plants. The area further to the north-west includes two deep channels cutting down through the whole area at SE980876 and SE979876, draining the many original spring lines and changing the environment considerably, with the loss of the very rich springs that used to occur here.

Several footpaths are in need of repair, mainly due to broken slats which could be dangerous. In the long term it might be better to replace the wooden decking by one made of recycled plastics.

It was also noted that several trees appeared to have developed Ash Dieback *Hymenoscyphus pseudoalbidus*, a problem requiring careful monitoring.

LEPIDOPTERA (Terry Crawford)

Many butterflies were active in the warm conditions. The majority were Orange-tip and Green-veined White, although a further seven species were noted as singletons or in very small numbers: Large White, Small White, Brimstone, Red Admiral, Peacock, Small Tortoiseshell and Comma. Surprisingly, no Speckled Wood was reported. Three geometrid moths were seen, a Common Carpet, a Silver-ground Carpet and a Common Marbled Carpet.

PARASITIC HYMENOPTERA (Bill Ely)

I stopped at four car parks and spent an hour collecting specimens at each, two on the banks of the Derwent in Ruston Cliff Wood and two away from the river in Raincliffe Woods. I collected 19 species of ichneumons and 4 proctotrupoids that I could identify. The most exciting proctotrupoid was a male *Acropiasta* which does not accord with the description of any species known from Europe. It seems to be undescribed. No ichneumon was found in all four samples but one was in three of them and three were in two samples. Ten were represented by singletons. Ten ichneumons were new to SE98 and raised its total to 102, making this the nineteenth Yorkshire hectad to reach the 100-species mark. Two of the Ruston Cliff Wood specimens were new to VC62: the tenth Yorkshire record (8th site) of the cryptine *Atractodes* (*Atractodes*) *obsoletor* and the fourth Yorkshire record of the orthocentrine *Aperileptus infuscatus*. The campoplegine *Campoletis ensator* from Raincliffe Woods was also new to VC62 and the fifth confirmed Yorkshire record. The orthocentrine *Orthocentrus spurius* was the third Yorkshire record. To summarise, this visit in early summer recorded one fifth of the ichneumons known from this area (increasing the total by 10% in the process) and just 2% of the Yorkshire fauna with half the species represented by single specimens. I consider this to be a successful result but I suspect that most other recorders would regard these as very thin pickings.

MOLLUSCS (Adrian Norris)

Four members and friends, including our President-Elect, surveyed the woodland bordering the River Derwent close to the junction of the main valley and Lady Edith's Drive within SE9887. A total of 46 molluscs was noted, including several rare or very local in Yorkshire. The more interesting snails included Point Snail *Acicula fusca*, Round-mouthed Snail *Pomatias elegans*, Toothless Chrysalis Snail *Columella edentula*, *C. aspera*, English Chrysalis Snail *Leiostryla anglica*, Plated Snail *Spermodea lamellata* and Brown Snail *Zenobiella subrufescens*. There was a single specimen of Ash-black Slug *Limax cinereoniger*. The best record, however, was Hollowed Glass Snail *Zonitoides excavatus*, first located by Geoff Oxford at SE98448753 in acid woodland on the lower side of Lady Edith's Drive. This is a stretch of fairly dry acid woodland in an area dominated by very wet limestone/neutral woodland, at least close to the river. The only record of this snail from Forge Valley dates back to the late E. Arnold Wallis who found it at Spikers Hill prior to 1954. I have searched for it in the area over many years and was delighted with this find.



Thorpe Marsh YWT Nature Reserve (VC63) 14 June 2014

INTRODUCTION (Joyce Simmons)

By ill luck, the highways authority chose June to close the usual entrance road to the YWT Thorpe Marsh Nature Reserve, so hasty information was posted as to an alternative route. Thankfully, 22 members of 10 affiliated societies found the new entrance.

The Reserve has varied habitats with dry, now disused, railway embankments, one with numerous mature oaks; relatively young woodland; unimproved and semi-improved meadows; some small water bodies and the main mere. The day was cloudy and warm with a lunchtime shower and some drizzle. Previous rain had led to luxuriant growth and to some areas being very wet underfoot. The damp conditions kept Lepidoptera numbers low but other insects were abundant, with the Coleoptera find of the day being the Alder Leaf Beetle *Agelastica alni*, which has spread northwards. A young Common Newt was found as people were arriving (see Plate VI, centre pages) and mammals were in short supply; just singles of Fox *Vulpes vulpes*, Rabbit *Oryctolagus cuniculus* and Grey Squirrel *Sciurus carolinensis*. Botanical findings included interesting sedges and some orchids. Colin Wall found 40 mosses, though none were rare.

It was felt that the Reserve would benefit from some management of trees. There is encroachment of the Reed-bed by willows which will rapidly shade them out. For much of its length the railway embankment is well shaded with abundant growth of Stinging Nettle *Urtica dioica*. Some of the trees, particularly those on south-facing slopes of the many old railway embankments, could be removed to allow more light to reach the ground for the benefit of delicate plants and associated insects. The wetland habitats are the primary interest of the Reserve, but clearing some of the trees would encourage the establishment of drier habitats which would help increase the total biodiversity of the site.

I am grateful for the help given to me by Mick Townsend and his very small team of Thorpe Marsh volunteers in arranging this meeting, dealing with the difficulties following the closure of the road and making the visit enjoyable for everyone who attended.

FLOWERING PLANTS (Louise Hill)

Our route took us from the old visitor centre location westwards along the old railway embankment up to the main East Coast Railway Line. The majority is now heavily shaded and dominated by birch woodland with Stinging Nettle and bramble, including *Rubus eboracensis*. Some interesting clinker communities survive on the unshaded section at the farthest end. Notable plants included Squirreltail Fescue *Vulpia bromoides*, Common Cudweed *Filago vulgaris*, Fairy Flax *Linum catharticum*, Thyme-leaved Speedwell *Veronica serpyllifolia*, Mouse-ear-hawkweed *Pilosella officinarum*, Thyme-leaved Sandwort *Arenaria serpyllifolia*, Common Stork's-bill *Erodium cicutarium*, Common Centaury *Centaureum erythraea* and a moss-like carpet

of Rabbit-nibbled Lady's Bedstraw *Galium verum*.

An area of partially inundated rush pasture and marsh in the south-west corner of Reedholme, near the Cockshaw Drain, included a suite of rushes together with Common Spotted-orchid *Dactylorhiza fuchsii*, Great Burnet *Sanguisorba officinalis*, Greater Bird's-foot-trefoil *Lotus pedunculatus*, Hairy Sedge *Carex hirta* and Cuckooflower *Cardamine pratensis*. A detour along the very wet southern edge of Reedholme crossed numerous flooded furrows in the grassland where a number of sedges were encountered: Oval Sedge *Carex ovalis*, Greater Pond-sedge *C. riparia* and False Fox-sedge *C. otrubae*. The sward of the adjacent pasture included locally frequent Common Spotted-orchid, Field Wood-rush *Luzula campestris* and Quaking-grass *Briza media*.

Two recently-established waterbodies, Louis' pond and Applehurst Flash, support a range of aquatic and emergent plants including Grey Club-rush *Schoenoplectus tabernaemontani*, Water-purslane *Lythrum portula*, Marsh Yellow-cress *Rorippa palustris*, Common Water-crowfoot *Ranunculus aquatilis* and Pink Water-speedwell *Veronica catenata*. The much older and larger waterbody Applehurst Pond contains a number of tall emergents including the less common Lesser Bulrush *Typha angustifolia* and Cyperus Sedge *Carex pseudocyperus*, together with an abundance of Skullcap *Scutellaria galericulata*. Several plants of what is believed to be Fine-leaved Water-dropwort *Oenanthe aquatica* were also seen. This plant is known to occur within the Thorpe Marsh area but the deep mud at the margin of the pond prevented access to confirm this identification.

Returning to the main entrance track (by way of a padlocked, and high, field gate!) to an area of tall fen near the old pond-dipping platform near Sicklecroft, the group encountered Spiked Sedge *Carex spicata*, *C. x sooi* (= *Carex acutiformis* x *riparia*), Hairy Dog-rose *Rosa caesia* and Common Fleabane *Pulicaria dysenterica*. Taking the main track back to the starting point we passed several spikes of Broad-leaved Helleborine *Epipactis helleborine* and a low scrub layer of Dewberry *Rubus caesius*. A short diversion in front of the Mere Scrape Hide was made, resulting in the discovery of a new colony of Brown Sedge *Carex disticha*. Lesser Hawkbit *Leontodon saxatilis* was also found on the margins of the adjacent Mere.

A final wander south through Cockshaw Fields took in Devil's-bit Scabious *Succisa pratensis*, Great Burnet and Trailing Tormantil *Potentilla anglica* within the species-rich meadow and our final foray into the sedge-choked oxbow of the old Ea Beck found further colonies of both Grey Club-rush and Spiked Sedge.

PLANT GALLS (Tom Higginbottom)

The uncommon bud galls on oak caused by gall wasps were highlights of the day. The slight curve and reddish hairs, a feature of *Andricus solitarius*, was one of the first discoveries and *A. callidoma*, with its longish stalk and flattened surfaces, was another good find. The Ramshorn Gall *A. aries*, a more recent arrival in Yorkshire, was found on the epicormic shoots. The botanists passed on a swollen stem of Rosebay Willowherb *Chamerion angustifolium* which indicated the presence of the micro-moth galler *Mompha sturnipennella* while the midge galler *Dasineura spadicea* had thickened the pods of Tufted Vetch *Vicia cracca*. *Gymnosporangium clavariiforme*, which forms a dramatic fungal gall on the underside of a Hawthorn *Crataegus*

monogyna leaf or on the petiole, was also discovered. The anthers of White Campion *Silene latifolia* had been attacked by the fungus *Microbotryum lychnidis-dioicae* so that many of the petals were covered in the purple smut.

LEPIDOPTERA (Paul Simmons, Ken Woolley, Terry Crawford, Peter Tannett)

Due to torrential rain the previous evening it was not possible for David Chesmore to moth-trap. The cool and cloudy conditions on the day were not conducive to finding many butterflies or moths but, as several recorders were present, 8 butterflies and 19 moths were seen. Meadow Brown was the most numerous followed by Large Skipper, reflecting the large meadow areas. An early Ringlet was perhaps the most surprising of the butterflies. The commonest macro-moth was the attractive Blood-vein *Timandra comae*, and one perfect specimen was the subject of many photographs (see Plate VI, centre pages). Others of note were Barred Yellow *Cidaria fulvata*, a local moth with few recent records in the area, and Clouded Border *Lomaspilis marginata*, a woodland moth whose caterpillars feed on willow which is plentiful in the reserve. Of the micros, The Yellow-barred Long-horn *Nemophora degeerella* is always an interesting find and the most colourful micro was the Green Oak Tortrix *Tortrix viridana*. The leaf-mines of *Cameraria ohridella* were noted on Horse-Chestnut *Aesculus hippocastanum*. A visit about a month later confirmed the presence of Purple Hairstreaks on the oaks on the old railway embankment.

COLEOPTERA (Bob Marsh)

A fairly wide variety of habitats was investigated and, generally speaking, the day produced a wide range of fairly common and widespread beetles. Cow dung was examined in Reedholme and several species of *Cercyon* were identified, along with *Sphaeridium lunatum* and the aleocharine *Aleochara intricata*, widely but thinly distributed in Yorkshire with about 20 county records. The Reed-beds around the Mere produced large numbers of the melyrid *Anthocomus rufus* in one small location and at quite an early date in the year for it. Once quite scarce, this beetle has increased in range in VC63 and now may be found more often in beds of Common Reed *Phragmites australis* and Bulrush *Typha latifolia* where water quality is good. The beating of Hawthorn foliage on the Main Embankment produced *Malthinus seriepunctatus*, a rather local and infrequent soldier beetle with only 20 county records. The wetland below the Main Embankment hide overlooking the Mere produced the Alder Leaf Beetle *Agelastica alni*, and Mike Denton reported gravid females and pairs in cop on Alder *Alnus glutinosa*. This beetle was considered a great rarity in Britain, occurring in only half dozen sites in the far south of England, until its discovery on the western side of the Pennines in 2004. It has now spread to South Yorkshire and has occurred in many sites in VC63, mainly in its southern half, over the last two or three years. Its appearance in the north of England and its subsequent rapid spread is unexplained. In all, the day produced 94 beetles. A surprising consequence of our day's work is that 29 of these (i.e. 30%), all common and widespread, were new to the Reserve, which indicates that there is still much work to be done on this interesting and varied site.

ODONATA (Peter Tannett)

Apart from good numbers of Ruddy Darter *Sympetrum sanguineum* and several Common Blue Damselfly *Enallagma cyathigerum* and Blue-tailed Damselfly *Ischnura elegans*, only singles of Southern Hawker *Aeshna cyanea*, Brown Hawker *A. grandis* and Common Darter *S. striolatum* were seen. The torrential rain of the previous days would have limited numbers.

MOLLUSCS (Adrian Norris)

Terry Crawford and I recorded some 20 species of molluscs from 3 ten-kilometre squares, the main areas studied being SE5709, SE5809 and SE5909. The most notable was a single specimen of *Lymnaea (Stagnicola) fusca* located in a drainage ditch in SE5809. This is a fairly recent split from *L. (S.) palustris*, which now appears to be rather rare in the county, so is a recent addition to the Yorkshire list and we are still trying to work out its distribution. Sowerby's Keeled Slug *Tandonia sowerbyi* is mainly a pest of root crops and thus more commonly found in areas of intense agricultural activity, particularly among crops such as potatoes and carrots, but proved to be very common near one of the hides at SE590091. A total of 35 records made a substantial addition to our knowledge.

BIRDS (Paul Simmons)

A fly-by Cuckoo welcomed us all to the Reserve during the introductory session and proved to be the most unusual bird of the day, given its catastrophic decline in recent years. The wide range of habitats meant that a reasonable range of species was seen or heard, with woodland birds dominating. The four common warblers (Willow Warbler, Chiffchaff, Blackcap and Whitethroat) were all encountered though, as expected, tits were harder to find at this time of year. Of the birds dependent on the water bodies in the Reserve, Kingfisher and Curlew were the most notable sightings, both probably breeding on it or nearby. Buzzard and Kestrel were seen overhead. In all, 34 birds were found on the day.



Austwick & Lawkland Moss SSSI (VC64) 12 July 2014

INTRODUCTION (Terry Whitaker)

The Yorkshire Moths Group trapped on Austwick Moss on the Friday night, an act with reduced players consisting of the Divisional Secretary and Charlie Fletcher, ably assisted by David Fisher, John Perry, Paul and Joyce Simmons and Sharon and Peter Flint, who helped with the logistics of getting the trapping equipment onto this large and difficult site. Seven Robinson traps with MV lamps powered by three generators were set up, two in the eastern area, three centrally and two near the western boundary, in two separate 1km squares. The traps were supposed to run all night but the central generator failed and moths were only caught in five traps.

On Saturday at 07:30 the lepidopterists began emptying the moth traps just as the sun was getting hot. At 10.30 other people started to arrive and Judith Allinson lead a general natural history walk around the Moss. Eventually 31 people attended, including nine from Craven Conservation Group (CCG). Later in the day several people, mainly botanists, went east along the footpath to Lawkland Moss.

Helen Sergeant reported: "Terry Whitaker, John Perry and David Fisher ferried moth traps through the wet birch woods and returned with a couple of fungi. One was the Yellow Swamp

Russula claroflava. It is supposedly good to eat (said to taste mild but a bit hot). TMW took it away to show to the reporting meeting so I didn't get chance to eat it. Later on we looked at the separately designated piece of calcareous flushed grassland to the north. Nearby were Sharon and Peter Flint and Stuart Ralph in the deep ditch surrounding the Moss. The conchologists also found this a much better location."

The reports meeting with tea and biscuits at the Dalesbridge Centre was attended by 15 members from 12 affiliated societies.

LANDSCAPE & VEGETATION (Terry Whitaker)

Austwick Moss consists of a cut-over lowland raised bog situated near the head waters of the River Wenning. It is bounded by Fen Beck, which was deepened by the local Internal Drainage Boards in the late 1960s to the great detriment of the wetland habitats of the area. To the east of Middlesber Farm and its mainly in-bye improved pasture, the land is slightly higher and consequently the smaller Lawkland Moss is drier, less acidic and more wooded with wet birch and willow woodland and small fen meadows.

The central area of Austwick Moss is a mosaic of bog and wet heath habitats (NVC M18 *Erica tetralix* - *Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris* - *Eriophorum vaginatum* blanket mire) with some planted Scots Pine *Pinus sylvestris* (dating from the late 1960s) and scattered colonising Downy Birch *Betula pubescens* and scrub willow. Old peat cuttings here are linked by several drier causeways, possibly laid on brush-wood foundations. The drainage cuts have caused the ombrogenous mire to dry out and wet birch woodland (W2 *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland), of very limited extent in the 1940s, has spread to cover at least 5ha on the northern boundary. There are still extensive areas of Bog Myrtle *Myrica gale* scrub towards the north-western boundary but much of the species-rich fen meadows (M26) near the western boundary, which were present in the late 1990s, have dried out and mainly become the less speciose U2 *Deschampsia flexuosa* grassland. This grassland is extensive on the eastern part of Austwick Moss, replacing many areas which were originally M25 *Molinia caerulea* - *Potentilla erecta* mire. To the north and west of Austwick Moss is a grassy area of calcareous flush vegetation containing Blunt-flowered Rush *Juncus subnodulosus*, Black Bog-rush *Schoenus nigricans* and Birds-eye Primrose *Primula farinosa*.

FLOWERING PLANTS & FERNS (Phyl Abbott & Don Grant)

Austwick Moss was rather species-poor, being dominated by tufts of Purple Moor Grass *Molinia caerulea* with damper areas of bog-mosses in between. The highlights here were a few patches of Cranberry *Vaccinium oxycoccus* and a pretty, flowering Round-leaved Sundew *Drosera rotundifolia*. There were also several plants of *Rubus scissus*.

Lawkland Moss was more diverse with areas of woodland as well as damp grassland. We were pleased to see Dyer's Greenweed *Genista tinctoria*, Slender St John's-wort *Hypericum pulchrum*, Blunt-flowered Rush, Bogbean *Menyanthes trifoliata*, Marsh Cinquefoil *Comarum palustre*, Bay Willow *Salix pentandra* and Saw-wort *Serratula tinctoria* accompanied by the bedraggled leaves of Autumn Crocus *Colchicum autumnale* - a promise of better things to come. We were unable to find Coralroot Orchid *Corallorhiza trifida* or Adder's Tongue *Ophioglossum vulgatum* which had been seen during a YNU meeting in May 1984.

Thanks go to the organisers, Terry Whitaker and Judith Allinson (CCG), to the landowner Mr Anthony Fields and to Mr David Wilson of the adjacent Middlesber Farm for allowing access to their land.

BUTTERFLIES (Terry Whitaker)

Eight species of common butterflies were seen in the two 1km squares SD7566 and SD7666: Small Skipper (freshly emerged), Large Skipper (rare, worn), Green-veined White (second brood, freshly emerged and mating), Small Tortoiseshell (several freshly emerged seen in fields around the Moss), Peacock (larvae locally abundant, 'thousands' on nettles by Fen Beck) and the Small Pearl-bordered Fritillary (seen only on Lawkland Moss, three, very worn), Ringlet (very worn) and Meadow Brown.

NB No Small Pearl-bordered Fritillary was seen in SD7566, although this western area was an important location until 1999, and three or four were reported at SD761663 by SR earlier in season.

MOTHS (Charles Fletcher)

The night was fairly warm and when the traps were opened on the Saturday morning 109 moths were recorded. The most notable macro moth was the insignificant-looking Marsh Oblique-barred *Hypenodes humidalis* at its only Yorkshire site apart from some old records at Malham Tarn. Many of them had been seen flying at dusk on the Friday night. Good numbers of Fen Square-spot *Diarsia florida* were in the traps – an uncommon moth in the process of evolutionary separation from Small Square-spot *Diarsia rubi*. Other notable macros were Blackneck *Lygephila pastinum*, Bordered Beauty *Epione repandaria* and Minor Shoulder-knot *Brachylomia viminalis*. Micro moths included two Nationally Scarce B species – Mountain Groundling *Bryotropha boreella* and Mint Bent-wing *Pseudopostega crepusculella* along with other rarely-recorded ones such as Jointed-rush Case-bearer *Coleophora tamesis*, White Sallow Case-bearer *C. albidella* and Sallow Flat-body *Agonopterix conterminella*. Several more species were added to the list flying by day on the Saturday with the most notable being Wood Tiger *Parasemia plantaginis*, Cinquefoil Twist *Philedone gerningana* and Bilberry Tortrix *Aphelia viburnana*.

There was no sign of Silvery Arches *Polia trimaculosa*, found at this site in 2011, but it was felt that the site would repay further trapping at different times of year as other scarce moths may well be present.

PARASITIC HYMENOPTERA (Bill Ely)

All twelve ichneumons collected at Austwick Moss are new to the site although *Ichneumon extensorius*, collected by TMW at the western edge and by WAE at the north-east corner, was reported from 'Austwick' by W.J. Fordham in 1920. There were no previous ichneumon records from Lawkland Moss so all ten collected from the rushy meadow south of the woodland on this meeting are new site records. Only one, the ichneumonine *Centeterus rubiginosus*, was collected on both Austwick and Lawkland Mosses, a single male in each sample.

The ichneumonine *Tricholabus strigatorius* from Lawkland Moss is new to Yorkshire. Three ichneumons are new to VC64 including the pimpline *Polysphincta vexator*, which Roy Crossley

has found in the North York Moors and the Plain of York in recent years; this was also found from Lawkland Moss and is the fourth Yorkshire record. This ichneumon only occurs in rich wetlands where it parasitises the bright green orb-web spider *Araneus quadratus*, which is not restricted to this habitat! The tryphonine *Cosmoconus ceratophorus* from Austwick Moss has a dozen previous records in Yorkshire and parasitises sawfly larvae. The cryptine *Gambrus bipunctatus* from Lawkland Moss is the second Yorkshire record, having been added to the list on the 2013 Excursion to Fylingdales. This genus parasitises moth and sawfly larvae.

Three other ichneumons, all from Lawkland Moss, are rare in Yorkshire. The wingless cryptine *Gelis discedens* is the fourth record, the previous VC64 one being from the YNU visit to Austwick Moss in May 1987. The tryphonine *Erromenus zonarius* is the fifth record, previously found at Malham Tarn Fen on the YNU visit in July 1984. The ichneumonine *Ichneumon molitorius* is the sixth record (fourth confirmed) and the first from the Pennines. The diapiiid *Basalys fumipennis* also from Lawkland Moss is a fairly common proctotrupoid in Yorkshire but has never been reported from the Pennines before.

MOLLUSCS (David Lindley)

The acid environment of Austwick and Lawkland Moss SSSI sites is not conducive to finding large numbers of molluscs. Because of this it was decided to concentrate on the periphery of Austwick Moss and in particular to look at the limestone walls and those areas of marsh with a more neutral pH.

In total 33 molluscs were found during the day. Freshwater snails White-lipped Ramshorn *Anisus leucostoma* and Margined Ramshorn *Planorbis planorbis* were in the streams on the north and west sides of the wood in small numbers and also in some of the ponds within the wood itself. Margined Ramshorn is rare in this area of the Dales due to lack of suitable habitat. In the small streams at the wood boundary were very large numbers of Jenkins' Spire Snail *Potamapyrgus antipodarum*. The terrestrial *Balea heydeni* was found in small numbers on the periphery wall on the north side together with Rock Snail *Pyramidula pusilla* and both were also seen on one of the track walls when approaching the site.

A small area of fen on the north-western edge was the most productive area and it was satisfying to find both Striated Whorl Snail *Vertigo substriata* and Marsh Whorl Snail *V. antiveritigo* in this area. Both of these marsh-loving snails have been lost at a number of locations in recent years due to land drainage. Marsh Whorl Snail is not particularly common in the Yorkshire Dales.

FRESHWATER BIOLOGY (Sharon & Peter Flint)

We arrived fairly early in the morning in order to check on the caddis flies which had been attracted overnight to the light traps set by the lepidopterists. Several were in the traps including *Athripsodes albifrons* and *A. bilineatus* whose larvae live in the surrounding streams. One of the nicest non-lepidopteran finds in the light traps, however, was the Glow-worm *Lampyris noctiluca*, of which two adult males were found in separate traps.

We moved on to investigate some of the ponds, remnants of old peat workings, which are scattered over the area. Some are peaty with bog-mosses, though only just on the mildly acidic

side of neutral while others, particularly those in the north western area of wet woodland, are somewhat calcareous. We also investigated the small calcareous stream which forms the northern and western boundaries of the Moss. In many of the bog-moss-dominated ponds were large numbers of Water Spider *Argyroneta aquatica*. Several dytiscid water beetles were found, including the large and spectacular *Dytiscus marginalis* and *D. semisulcatus*; in one of the ponds we took both these species together with the slightly smaller, saucer-shaped *Acilius sulcatus*. Several species of lesser water-boatmen and all three freshwater species of water boatmen occur on the moss, and in one pond we found all three (*Notonecta glauca*, *N. obliqua* and *N. maculata*) together. Several specimens of the small Emerald Damselfly *Lestes sponsa*, which breeds in the peaty ponds, were seen flying, and juveniles of the Large Red Damselfly *Pyrrosoma nymphula* and the Common Hawker dragonfly *Aeshna juncea* were found in these ponds. Larvae of the large phryganeid caddisfly *Oligotricha striata* were also found. The crustaceans *Gammarus pulex* and *Asellus aquaticus* are abundant in the stream, the latter occurring, together with *Crangonyx pseudogracilis*, in the calcareous ponds. We found no crustaceans in the peaty ponds.

Altogether it was a successful day in an interesting habitat.

BIRDS (Stuart Ralph)

Sedge Warbler, Reed Bunting, Spotted Flycatcher (nesting), Willow Warbler, Grasshopper Warbler, Lesser Whitethroat, Long-tailed Tit, Great Spotted Woodpecker, Woodcock, Curlew, Kestrel and Common Buzzard have recently been seen on the site.

MAMMALS AND OTHER VERTEBRATES (Terry Whitaker)

Noted during the meeting at SD7566 on the western side of Austwick Moss were Stoat *Mustela erminea*, Palmate Newt *Lissotriton helveticus*, a small Frog *Rana temporaria*, a Toad *Bufo bufo* and a Viviparous Lizard *Zootoca vivipara*; at SD7666 on the Moss were a Palmate Newt, two Common Frogs and one Brown Hare *Lepus europaeus*; and in the stream on the north side were Bullhead *Cottus gobio* and Three-spined Stickleback *Gasterosteus aculeatus*. Viviparous Lizard was also seen on Lawkland Moss. Stuart Ralph said that Roe Deer *Capreolus capreolus*, Badger *Meles meles* and Red Fox were regularly seen on the Moss.



Swaledale, Grinton, Harkerside Moor (VC65) 26 July 2014

INTRODUCTION (John Newbould)

Just five members turned up at Grinton Church for the reports meeting. Five other members of the Yorkshire Lepidoptera Group had moth-trapped overnight in the National Trust's Hudswell Wood, Richmond (NZ157008). This represented just eight affiliated societies but fortunately did not lessen the amount of recording undertaken at the meeting. In addition to Charlie Fletcher's group, Terry Whitaker moth-trapped at Low Whitta near the Juniper woodland (SE012983) whilst JAN moth-trapped at Fremington on 25 and 26 July with some of the best results he has

had from four years here. In addition, JAN ran a bat detector adjacent to Arkle Beck by Reeth Bridge on the evening of the 25th.

Following a hot day in the field, the small party held the tea meeting at the Bridge Inn, Grinton.

LANDSCAPE (John Newbould)

The day was spent surveying land to the south west of Grinton and the River Swale including the following broad habitat types: rivers and streams; boundary and linear features; neutral grassland – lowland meadows; dwarf shrub heath (upland heath); and fen, marsh and swamp (Purple Moor-grass and rush pasture). We also surveyed a small part of the Lovely Seat and Stainton Moor SSSI, which includes Maiden Castle, a hillfort considered to have been constructed as a defensive settlement in the mid-prehistoric period (7th -5th centuries BC).

TMW, Judith Allinson and Bill Ely surveyed in the co-axial meadows south of the River Swale from Grinton to Reeth (see Fig.1), and in the afternoon went to Cogden Gill, whilst Richard Wilson and JAN surveyed the moorland fringes of Harkerside Moor south of Swale Hall Lane with its many relic lead mines, wet flushes and heather moorland. Here we were looking over Healaugh to the north, where meadows are again co-axial below Reeth Low Moor. Nearly all the hay meadows had been cut by early July leaving little to survey. One key feature of these lowland Dales meadows is the drystone walls, with many fields having Ash *Fraxinus excelsior* trees, especially adjacent to the villages. In the Grinton area, the Swale itself is lined mainly with Ash, but also Alder and various willows. TMW followed the footpath on the south side of the River Swale to Reeth. Near SE037936 he encountered several very large (ancient?) Sycamore trees *Acer pseudoplatanus*, some with girths at breast height in excess of 2m. The river water was so warm that many people were finding deep pools to swim in.



Figure 1. The upper Swale valley showing co-axial fields with traditional stone walls and ash trees growing adjacent. *John Newbould*

FLOWERING PLANTS (John Newbould and Terry Whitaker)

Following our inspection of the Juniper woodland *Juniperus communis* at Low Whita in 2013, JAN arranged to look at the area from the road whilst TMW ran moth traps nearby. With the reported *Phytophthora* infection we expected many dead plants but we both considered the amount of dead branches similar to that in our 2013 visit. The only slight difference we noted was that patches of terminal needles had turned brown in a very few areas, but this is following a dry spring and summer. Several female plants were bearing young fruit.

Unlike JAN's local Dorset heaths, the moors surrounding the ancient earthwork at Maiden Castle are not rich pickings for botanists with NVC H1 *Calluna vulgaris*–*Festuca ovina*, H9 *Calluna vulgaris*–*Deschampsia flexuosa* together with Heath Bedstraw *Galium saxatile* and H18 *Vaccinium myrtillus*–*Deschampsia flexuosa* communities. Mat-grass *Nardus stricta* was present with Tormentil *Potentilla erecta* forming patches of U5 Grassland. Wet flushes had a range of rushes and Lesser Spearwort *Ranunculus flammula*. Burnt areas had the moss *Ditrichum heteromallum* whilst an acid grassland area had abundant *Rhytidiadelphus squarrosus*. *Sphagnum cuspidatum* was present in most wet flushes. Maiden Castle has Heather *Calluna vulgaris* on its ramparts whilst the flat area has Bracken *Pteridium aquilinum*, Bilberry *Vaccinium myrtillus* and Heather.

Note: A Himalayan Balsam-dock-Ragwort ruderal community (Terry Whitaker)

An interesting ruderal community was encountered on river shingle by the River Swale near Reeth. Since 2008 the river has cut off a large oxbow, scoured away any soil and vegetation and deposited a large (c.1ha) coarse shingle bank which forms an occasionally isolated island at SE033988. The vegetation that has developed is dominated by just five plants: Himalayan Balsam *Impatiens glandulifera*, Curled Dock *Rumex crispus* and Broad-leaved Dock *R. obtusifolius*, Common Ragwort *Senecio jacobaea* and Colt's-foot *Tussilago farfara*, but is remarkably speciose. All of the other 46 plants encountered occur at less than 1% frequency. I consider it not really valid to try to designate a rigorous NVC type of definition to a ruderal community (as per Rodwell) because they are usually early seral stages or short-lived communities and depend for establishment almost entirely on local colonisation opportunities rather than being semi-stable closed communities where interspecific competition is taking place. However, many people have been trying to do it. It may be that we are seeing the development of semi-stable *Impatiens*-dominated communities alongside our rivers accompanied by common native ruderal weeds.

LICHENS (John Newbould)

Bare peat under the heath here and there was liberally colonised by *Parmelia saxatilis* and *Cladonia portentosa*. On the western rampart of Maiden Castle was a single veteran Hawthorn with a trunk of 0.4m diameter. On its northern side was a moribund branch totally covered in *Hypogymnia physodes*, *H. tubulosa*, *Lecanora conizaeoides*, *Melanelixia subaurifera*, *Ochrolechia androgyna*, *Parmelia sulcata*, *Phycia tenella*, *Ramalina farinacea* and *R. fastigiata*.

LEPIDOPTERA (Charles Fletcher, Terry Whitaker and John Newbould)

Although nearing the end of the season the good weather enabled ten butterflies to be seen. JAN and his wife walked the Round Howe meadows at Hudswell Woods on 25 July recording eight species of butterflies including Large Skipper *Ochlodes venata*, Small Skipper *Thymelicus sylvestris* and Small Heath *Coenonympha pamphilus*. We noted just two end-of-season Chimney

Sweeper *Odezia atrata* moths. A single Dark-green Fritillary *Argynnis aglaja* flew past at speed on the western rampart of Maiden Castle where a day-flying Burnished Brass *Diachrysis chrysis* was also seen. A Striped Twin-spot Carpet *Nebula salicata* was spotted in Cogden Gill.

CHF provided a list of 122 moths trapped at Round Howe (NZ157008) using five MV traps overnight on 25-26 July, commenting that he felt to be only scratching the surface. The most important ones included: Square-spotted Clay *Xestia rhomboidea* (Nationally Scarce B) (i.e. found in 30 - 100 x 10K squares in GB since 1980 and formerly a UK BAP species) occurring typically in old woodland in the north and north-west of the county, its larvae feeding on a wide variety of herbs including Stinging Nettle and Primrose *Primula vulgaris*; Plain Clay *Eugnorisma depuncta* (Nationally Scarce B) at the edge of its limited range in Yorkshire, its larvae feeding on a wide variety of herbs including Stinging Nettle, Primrose and stitchworts; Northern Tubic *Denisia similella* (provisional Nationally Scarce B), a northern moth whose larvae feed on fungi under bark; Speckled Case-bearer *Coleophora sternipennella* (provisional Nationally Scarce B) feeds on oraches and goosefoots; and a further eleven classed as local (100-300 x 10km squares since 1980), including Sorrel Bent-wing *Opostega salaciella*, Two-spotted Neb *Eulamprotes atrella*, Plum Fruit Moth *Grapholita funebrana*, Coronet *Craniophora ligustri*, Buff Footman *Eilema lurideola* and Lempke's Gold Spot *Plusia putnami*. NB: Coronet is an important species of upland ash woodland in the county and should be monitored in view of Ash Dieback disease. At Low Barn, Fremington an actinic trap collected 17 moths on 25-26 July and 29 on 26-27 July despite heavy rain in the early hours of the 27th, including Tawny Speckled Pug *Eupithecia icterata* and Scalloped Oak *Crocallis elingaria*.

TMW, in full biosecure mode, moth-trapped overnight on 25-26 July near the Juniper. He used two Robinson Traps with MV bulbs and an 8w actinic Heath trap; 742 specimens of 77 species were caught. The only significant one was Chestnut-coloured Carpet *Thera cognata* (Nationally Scarce B), the first confirmed record and the only VC65 record since 1880. The local upland moths Scarce Silver Y *Syngrapha interrogationis* and Light Knot Grass *Acronicta menyanthidis* were also seen. Juniper Pug *Eupithecia pusillata* was caught in numbers (56 specimens). It is usually recorded in relatively small numbers associated with domesticated Juniper *Juniperus chinensis*.

PARASITIC HYMENOPTERA (Bill Ely)

The euphorine braconid *Pygostolus sticticus*, which TMW trapped at light at Low Whita, the campoplegine ichneumon *Casinaria ischnogaster*, the metopiine *Chorinaeus brevicar* and the diplazontine *Diplazon varicoxa*, all from Grinton Church, were all new to VC65.

The ophionine ichneumon *Ophion pteridis*, also trapped by TMW at light at Low Whita, the diplazontine *Sussaba pulchella* from the fields west of Grinton, the banchine *Lissonota gracilenta* and the ichneumonine *Centeterus confector* (both fifth Yorkshire records) from Cogden Gill were all new to Swaledale, while the only previous Swaledale record of *Lissonota clypeator*, found in the fields west of Grinton, was east of Northallerton in VC62.

PLANT GALLS (John Newbould)

In the Grinton-Fremington-Reeth area the squares SE0498 and SE0499 are two of the best recorded in Swaledale and this meeting added little. The terrain on Harker Moor is not

particularly good for plant galls but it was pleasing to see the rarely recorded *Trisetacus quadrisetus* still present on the fruits on female Juniper at Low Whitta. The weevil gall *Apion rubens* is worth searching for on the small leaves of Sheep's Sorrel *Rumex acetosa*. I also risked pricking my fingers for the larvae of *Tephritis conura* in the flower heads of Marsh Thistle *Cirsium palustre*.

Many of the riverbank Alders had leaves with vacated blotch mines of the European Alder Leafminer *Fenusa dohrni* (Hymenoptera, Tenthredinidae).

BIRDS (Terry Whitaker and John Newbould)

Three Oystercatchers in flight, some 20 Swifts and ten Swallows still feeding young were at Low Fremington and House Martin had successfully fledged from Low Barn at Fremington. Just south of Reeth TMW saw a Yellow Wagtail, 12 Greylag Geese, 20 Sand Martin (colonising the river banks), 7 House Martin, 8 Lapwing, a Snipe and 3 Oystercatcher. On the moorland RW and JAN noted Wheatear, Mistle Thrush, Carrion Crow and Common Buzzard. Five Red Grouse and 50 Lapwing flew into the meadow north of the Maiden Castle car park at lunchtime.

MAMMALS AND OTHER VERTEBRATES (John Newbould)

On the evening of 25 July at dusk a still section of Arkle Beck at Reeth Bridge had Daubenton's Bat *Myotis daubentonii* associated with the river, whilst at Low Fremington Common Pipistrelle *Pipistrellus pipistrellus* and Soprano Pipistrelle *P. pygmaeus* were detected. There were plenty of Rabbits *Oryctolagus cuniculus* on the moorland and many Rabbit road kills on the Dale roads. Brown Trout *Salmo trutta* was noted in Arkle Beck (SE042991) and TMW reported Frogs in the slacks below Reeth.



Skerne Wetlands YWT Nature Reserve (VC61) 9 August 2014

INTRODUCTION (Sarah White)

There had been torrential rain overnight but 17 intrepid members nevertheless braved the elements to gather in this remote part of the Hull Valley. They were rewarded with a dry though breezy day and the chance to have a first look at a largely unrecorded new YWT reserve. Jon Traill, the reserve manager, gave an introductory talk about the history of the site as a commercial fish farm and its recent acquisition by the Trust. He is preparing a management plan for the site so the visit was a useful opportunity to set a baseline of species present.

Ten members, representing 13 Affiliated Societies, gathered afterwards at the WI Hall in Hutton Cranswick for tea and to discuss the day's finds. It was agreed that the site was at present rather species-poor, the inevitable consequence of its past intensive management. However, it was felt that it has enormous potential as a wetland reserve, given the right management, and the Trust was congratulated on its bold and far-sighted action in acquiring it. It was suggested that the priority was to excavate some of the areas of willowherb to create shallow open water and,

importantly, plenty of muddy habitats for invertebrates. Recently excavated open areas are often particularly valuable, so there should be a rolling programme of new excavations together with water level control. The many separate small stew ponds could be used to safeguard vulnerable wetland plants now scarce in the Hull Valley. Habitats currently of particular value which should be retained are the trackway, which was used by a colony of Wall butterflies and Fleabane *Pulicaria dysenterica*, which provided an important source of nectar.

There was a vote of thanks to the Yorkshire Wildlife Trust and Jon Traill in particular, for allowing our visit.

FLOWERING PLANTS (Richard Middleton)

With the exception of barely two hectares at the northern end of the site, the vegetation bore the scars of several decades of strict management. Aerial photographs from the time of the commercial fish farm show, as would be expected, that much of the area was clear of vegetation – either access tracks or clear open water. It was the northern section which provided a glimpse of the original wetland plant community with Purple-loosestrife *Lythrum salicaria*, Water Dock *Rumex hydrolapathum*, Gypsywort *Lycopus europaeus* and Blunt-flowered Rush *Juncus subnodulosus* present, albeit in small quantity.

The reserve is of primary interest because of its wetland habitats. The Yorkshire Wildlife Trust should also consider clearing some of the south-facing slopes of the many old railway embankments to encourage the establishment of drier habitats. This would help to increase the total biodiversity of the site.

The ditches and open ponds carried a luxuriant growth of submerged vegetation, if of low diversity, the dominant plants being a thread-leaved Water-crowfoot, probably *Ranunculus penicillatus*, a starwort, Common Duckweed *Lemna minor* and Ivy-leaved Duckweed *L. trisulca* with Canadian Waterweed *Elodea canadensis* and Nuttall's Waterweed *E. nuttallii*. The apparent absence of pondweeds *Potamogeton* spp. was somewhat unexpected. The steep sides to the ponds and drains limited the vegetation severely, although Bittersweet *Solanum dulcamara*, Marsh Woundwort *Stachys palustris* and Common Fleabane *Pulicaria dysenterica* were seen in several places. The drained ponds had sprouted a luxuriant green cover dominated by Great Willowherb *Epilobium hirsutum* along with Bulrush, Reed Canary-grass *Phalaris arundinacea* and Common Reed, presumably nourished by a nutrient-rich substrate.

The fast-flowing West-beck, with its extensive beds of Water Crowfoot, also supported Branched Bur-reed *Sparganium erectum*, Unbranched Bur-reed *S. emersum* and Reed Sweet-grass *Glyceria maxima*.

The site has been extensively planted with sometimes exotic shrubs and trees, the most striking of which were three species of alders – Grey Alder *A. incana* and Italian Alder *A. cordata* as well as the native one, along with a wide range of willows. Other unexpected plantings included a Dawn Redwood *Metasequoia glyptostroboides*, noticed by KW, and Cockspurthorn *Crataegus crus-galli*.

From a botanical point of view any development of this site must include the extensive re-

introduction of significant wetland plants. The fish-farming activities have effectively created a blank canvas with little prospect of any viable seed-bank. Fortunately, the infrastructure for water-level management, essential for fish rearing, still seems to be in place. This, coupled with the many discrete, often linear, ponds would provide an excellent opportunity for the provision of a refugium for the many aquatic plants which are now often confined to very few stations in the vice-county. It could form a valuable educational resource and the experience gained managing the plants under controlled conditions would provide valuable experience to inform the management of more natural sites.

LICHENS (Colin Howes)

A deal of colour was imparted to the day by the proliferation of the golden-orange-yellow *Xanthorion* community at times festooning the trees, a response to the nitrogenous eutrophication of substrates. Concrete posts around the fish ponds were gaily adorned by the brightness of a similar flora.

LEPIDOPTERA (Peter Tannett)

It was a pleasure to see a good number of Wall butterflies, mostly about the tracks which had stone chippings. The list of mainly common species included Gatekeeper and Small Skipper and apart from the Green-veined White were not numerous. Moths noted were also common ones: Yellow Shell *Camptogramma bilineata*, Blood-vein, Common Carpet and the micros Mother-of-pearl *Pleuroptya ruralis*, Pale Straw Pearl *Udea lutealis*, Common Nettle-tap *Anthophila fabriciana*, Satin Grass-veneer *Crambus perlilla* and the Horse-Chestnut Leaf Miner.

ODONATA (Roy Crossley & Peter Tannett)

Brown Hawker dragonflies were patrolling the River Hull and there were good numbers of Ruddy Darter *Sympetrum sanguineum*. The occasional Southern Hawker and single examples of Common Darter and the Blue-tailed Damselfly were seen, the torrential rain of the previous day doubtless limiting numbers.

PARASITIC HYMENOPTERA (Bill Ely)

22 ichneumons had been recorded from TA05 before this meeting and that was raised to a more respectable 42 by Roy Crossley and myself. Most of those found on this Excursion are proving to be common in Holderness but the campoplegine *Campoplex restrictor* that I collected and the Metopiine *Triclistus lativentris* that Roy collected are new to Yorkshire.

Campoplex punctulatus, which we found east of the River Hull, is the fourth Yorkshire record. The pimpline *Fredegunda diluta*, which has a scatter of records across the low-lying south-east edge of VC63, the Humber estuary and Holderness, was found on the river bank. It has been reared from the Brown-veined Wainscot *Archanara dissoluta*, whose larvae feed internally in Reed stems, at nearby Hornsea Mere. Another campoplegine *Diadegma crataegi*, which parasitises leaf-mining gracillariid moths (*Parornyx* and *Phyllonorycter*) on Hawthorn, Blackthorn *Prunus spinosa*, apples, birches and oaks was in several places east of the Hull but, despite its wide host range, was only the seventh Yorkshire record. The ichneumonine *Barichneumon heracliana* has several records in VC63 and a few on the Holderness coast but this was the first inland record for VC61. The large figitid wasp *Callaspidea defonscolombe* was west of the Hull and is new to Holderness; the only previous record for VC61 was from Allerthorpe Common in

1950. Along the ditch west of the Hull was a young gall caused by *Andricus grossulariae*, one of the wasps which affect developing acorns. This wasp is a recent coloniser of the UK and I found the gall a couple of times in 2011 in Hull and near Hornsea but this is just the third Yorkshire record. Roy collected the proctotrupid wasp *Exallonyx minor*, which is new to VC61, while *E. ater* was east of the Hull and is new to Holderness, the only previous VC61 record is from Flamborough. The four proctotrupids collected are parasitoids of beetle larvae, the four diplazontine ichneumonids and *Callaspidea* are parasitoids of hoverfly larvae, *Cylloceria melancholica* is reported to parasitise craneflies and the rest attack lepidoptera caterpillars, though the very common pimpline *Itoplectis maculator* is also able to attack other ichneumonoid larvae which are parasitising these hosts.

OTHER INSECTS (Roy Crossley)

The main period of activity of many fly families is over by mid-to-late August in most years but, following this exceptionally hot summer, that time had been reached by the beginning of the month. Consequently I did not expect that there would be much to report from this meeting and furthermore, due to the rampant growth of vegetation this summer, access was restricted to the paths throughout much of the site.

In the event, the list of nine dolichopodids was as much as could be expected and most of these were found in the vicinity of the ponds at the north end of the site. Seven or eight hoverflies were also recorded and the numerous patches of Fleabane attracted many of these nectar-seeking flies. The black snail-killing fly *Sepedon spegea* was found near the ex-trout hatchery. The flies we recorded are common generalists but are worthy of note as Skerne is in an under-recorded 10km square and all records will be 'firsts' for the Reserve list!

The extensive western marsh, which was inaccessible due to the density of the vegetation, and the north ponds, are likely to be the most productive areas for many dipteran families in the next few years, and this initial foray served to whet the appetite for further recording visits at more auspicious times in the field season.

High summer is the time when many bugs mature, having spent the previous months developing from over-wintering eggs. Adult Woundwort Shieldbug *Eysarcoris venustissimus*, Blue Shieldbug *Zicrona caerulea* and immature Green Shieldbug *Palomena prasina* were present with the Tree Damsel Bug *Himacerus apterus* and many plant bugs. There were few beetles about and the only ladybirds seen were individual Harlequins *Harmonia axyridis*.

SPIDERS (Colin Howes)

A population of the orb-web spider *Larinioides sericatus* was established on tubular metal railings around a deep water feature. This waterside arachnid, not of vegetation but of the built environment, preferring concrete, brickwork and metal structures, is indicative of the site's former industrial status.

MOLLUSCS (David Lindley)

In total 30 molluscs were found on the reserve, the majority of which were unsurprisingly freshwater species. Due to its size it was not possible to examine the whole reserve and the area to the north-west side of the bridge was concentrated on. In general chalk streams can be very poor for molluscs but, due to the number of man-made ponds from the old trout farm, variety

increased. It was interesting to note that both Margined Ramshorn and Keeled Ramshorn *Planorbis carinatus* were to be found in many of the ponds and Common Bithynia *Bithynia tentaculata* was particularly common. Flat Ramshorn *Hippeutis complanatus* was only seen in a small eutrophic area near the apex of the reserve together with the common Red-crust Pea Mussel *Pisidium personatum*. A single specimen of the Giant Pea Shell *Pisidium amnicum* was found in the feeder stream. This is normally quite heavily sculptured but it was interesting to note that the specimen found was completely smooth. A single fresh valve of the Duck Mussel *Anodonta anatina* was found in dredgings from an area of the feeder stream.

BIRDS (Ken White)

August is a quiet month for birds but despite this 25 were recorded. A particular highlight was Kingfisher, heard calling repeatedly throughout the day as birds flew up and down the river. Jon Traill said there were two resident pairs and, judging by the amount of calling, there were several young birds on the wing. Other breeding birds were Whitethroat, Kestrel, Pheasant, Moorhen (immatures of all these were seen), while the alarm call of Sedge Warbler was heard and predated eggs of Woodpigeon were found. Other notable sightings were several Stock Doves, Grey Heron, Cormorant, Little Grebe, Linnet, Swallow, House Martin and Sand Martin.

NON-AVIAN VERTEBRATES (Colin Howes)

Brown Trout and Grayling *Thymallus thymallus* were frequent in the river in the shade of bridge and overhanging trees. On an embankment by the fish (stew) ponds, a Grass Snake *Natrix natrix* basked on a sunlit pile of vegetation, the only other herptile noted being one of the imported marsh frogs, possibly *Pelophylax ridibundus*, populations of which began to occur in a number of waters in the Hull Valley from the 1980s. Fish stocks imported from Europe could well have been the inadvertent origin of this isolated population.

Mole *Talpa europaea* hills were on embankments and in nearby pastures. A dead Pygmy Shrew *Sorex minutus* was found and shrew pelvises and unidentified rodent incisors were discovered in a bird of prey pellet. Two batches of black to dark-purple Fox droppings were largely composed of bramble pulp and achenes and Hogweed *Heracleum sphondylium* seeds.

Roe Deer slots formed tracks across recent unvegetated dredgings from an adjacent drain. Interestingly, concentrations of herbivore droppings were all from Roe Deer, suggesting that the primary mammalian grazers on site were deer rather than lagomorphs. Apart from a long-dead carcase of a Rabbit no lagomorphs were seen, though traces were discovered in fox droppings. The sighting of a Stoat indicated that a population of Rabbits, normally its staple food, may have been present somewhere in the vicinity.

Near a pile of waste barley, Brown Rat *Rattus norvegicus* burrows pock-marked an exposed ditch side. In one of the stew ponds a Water Vole *Arvicola amphibius* was seen diving and signs were in the form of a grazed tussock of Reed Canary-grass and three droppings on a wooden jetty. No latrines or grazed lawns were noted by the river or drains.

Yorkshire Naturalists' Union Conference

The Yorkshire Naturalists' Union will not hold a conference in 2015 but plans are already underway to organise a conference for 2016. It will be held on a weekend date in late March at the National Science Learning Centre in York, which received very positive feedback as the venue for our previous conferences. The YNU's Education Committee has proposed the topic of species names, taxonomy and evolutionary relationships in relation to natural history studies, and some excellent potential speakers have already been identified.

If you would like to help us organise the conference, we are looking for volunteers to:

- Contact speakers and plan the structure of the day

- Chair a session at the conference

- Write up the conference proceedings for publication in the *Naturalist* and on the YNU website

Please contact Sarah West, Chair of the Education Committee, on sarah.west@york.ac.uk if you would like to be involved.

National Forum for Biological Recording Conference

The National Forum for Biological Recording and the British Ecological Society are organising a conference at Sheffield University on the 23rd to 25th April 2015 on the theme '*A Question of Ecology – answers from biological recording*'.

Biodiversity information is crucial to understanding ecological relationships and supporting conservation effort in a changing climate. *A Question of Ecology* will showcase original work which is advancing our understanding of species and ecosystems through accurate observation and recording, and celebrate the work of naturalists who are uncovering new ecological knowledge from their own records. There will be presentations, software demonstrations, a poster exhibition, quickfire talks and a discussion workshop on how to foster collaboration between the professional research community and volunteer recorders on the collection and interpretation of biological records to answer ecological questions.

The keynote address will be given by Professor Kate Jones, Chair of Ecology and Biodiversity at University College London and Chair of the Bat Conservation Trust, on the subject of 'Technology for Nature?'.

On Saturday 25th April there will be a field trip to Thorne and Hatfield Moors, which form the core of the Humberhead Peatlands NNR, the largest lowland raised mire system in the UK and the beating heart of the Humberhead Levels Nature Improvement Area.

We hope that many YNU members will attend the conference and the field meeting. For further information, including the programme and booking information, visit www.nfbr.org.uk or contact Paula Lightfoot on p.lightfoot@btinternet.com.

YNU Calendar 2015

Up-to-date information can also be found on the YNU website at:

www.ynu.org.uk/events/general

Apr	11	Conchological Section field meeting. Semerwater. Meet at 10.30 in the parking area at the north-east end of the lake SD921875.
	23-25	National Forum for Biological Recording - Conference – see previous page.
May	9	Bryology Section field meeting VC65. Sedburgh area. Meet at 10am on Howgill Lane at SD654923.
	9	Conchological Section field meeting. River Derwent at Low Hutton. Meet at 10.30 in car park east of railway on bank near suspension bridge SE764677. Joint with YNU Freshwater Biology Section.
	16	VC61 Excursion Jeffrey Bog YWT reserve.
	19	Entomological Section field meeting Ox Close Wood, East Keswick. By invitation of the East Keswick Wildlife Trust. Meet at 10:30am at Crabtree Lane car park at the junction with the A659 at SE362454 – marked on the O.S.map). See articles in <i>The Naturalist</i> 1084 for information on the site.
	30	Botanical Section field meeting VC64. Bishop Wood nr Selby. Meet at 10.30 at the entrance at SE555334.
Jun	13	VC62 Excursion Upper River Rye, Hawnby.
	27	Botanical Section field meeting VC61. Stillingfleet nr Selby. Meet at 10.30 by the church at SE593410.
July	11	VC63 Excursion Worsborough near Barnsley.
	24-25	VC64 Excursion Trough of Bowland.
Aug	1	Botanical Section field meeting VC63. Silkstone Fall Woods and Transpennine trail. Meet at 10.30 on the roadside at Silkstone Railway Station at SE290043.
	1	Marine and Coastal Section field meeting jointly with the YWT. South Landing, Flamborough. Meet at 9.30 at the Living Seas Centre NZ809160. Morning on the shore, afternoon in the centre using the microscopes. Low water 12.00 mid-day. Advance booking is necessary – contact p.lightfoot@btinternet.com
	2	Marine and Coastal Section field meeting jointly with Darlington and Teesdale Naturalists' Field Club. Saltburn. Meet at 9.30 at the car park on Saltburn Rd NZ668215. We will be on the rocky shore at Saltburn Scar until 12.00 mid-day. Advance booking is necessary – contact p.lightfoot@btinternet.com
	7-8	VC65 Excursion Whitsundale near Keld.
	15	Marine and Coastal Section field meeting jointly with the National Trust. Ravenscar. Meet at 10.00 at the Ravenscar Visitor Centre NZ979016 (YO13 ONE). This is part of the NT's Coastal Bioblitz programme. Low water 11.30.
	16	Marine and Coastal Section field meeting jointly with Whitby Naturalists' Club. Meet at 9.30 in the car park in Staithes NZ781185. Low water 12.00 mid-day.
Sept	5	Conchological Section field meeting. Fridaythorpe area. Meet at 10.30 at the side of the road near to the village pond in Fridaythorpe SE874591.
Oct	3	Conchological Section field meeting. Ryedale area for Murton Wood and Park scar. Park off road at 'T' junction at SE536882.
	10	Bryology Section field meeting VC62. Kilburn. Meet in the White Horse car park SE514811.

Yorkshire Naturalists' Union

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The Naturalist

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Notice to contributors

Contributors should indicate whether they wish their manuscripts to be subjected to anonymous peer review. All other manuscripts will be reviewed by the Editorial Board who at their discretion may send them to third parties for comment and advice.

Original articles should be submitted electronically as an MS Word document to Dr A. Millard at a.millard@leedsmet.ac.uk.

Please look at a recent issue of the journal for a general idea of how to present your article. Also see *The Naturalist Guide to Consistency* on p77 of *The Naturalist* 1079 and please **avoid** the following:

- using any paragraph formatting and line spacings other than single.
- using tabs to tabulate information (please use MS Word table format or separate the column entries in a single row with commas and enter a paragraph mark at the end of the row).
- inserting any figures, graphs or plates into the text; indicate their proposed locations in the text and send as separate files.

Good quality, high resolution images are very welcome and should be sent as .jpg files, with a separate MS Word file containing the caption and name of the person to whom the image should be attributed.

If electronic submission is not possible, contributions should be sent to Dr. A. Millard, Woodland Villas, 86 Bachelor Lane, Horsforth, Leeds LS18 5NF (Tel. 0113 258 2482)

Contributors should ensure the accuracy of reference citations. The Editorial Board and Council accept no responsibility for opinions expressed by contributors.

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Appendix 1. Aquatic plants recorded in the Lakes at North Cave Wetlands 2001-2013

Only taxa on the Palmer and Newbold (1983) checklist of aquatic plants found in England and Wales plus Stonewort *Chara vulgaris* agg. are included; d/a=dominant or abundant, f=frequent, o/r=occasional or rare, 0=not recorded.

June-July 2001

	Far Lake	Carp Lake	Main Lake	Village Lake (West)	Island Lake & Village lake (East)	Reed Bed Lake
Submerged and floating-leaved plants						
<i>Callitriche</i> sp. water-starwort	0	0	0	0	0	o/r
<i>Chara vulgaris</i> agg. Stonewort	d/a	0	d/a	d/a	d/a	0
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	d/a	d/a	d/a	0	o/r	0
<i>Potamogeton crispus</i> Curled Pondweed	0	0	d/a	0	0	0
<i>Potamogeton pectinatus</i> Fennel Pondweed	0	f	f	0	o/r	0
<i>Potamogeton pusillus</i> Lesser Pondweed	d/a	d/a	f	d/a	d/a	d/a
<i>Ranunculus aquatilis</i> Common water-crowfoot	0	o/r	o/r	0	0	o/r
<i>Ranunculus peltatus</i> Pond water-crowfoot	0	0	0	0	-	o/r
<i>Zannichellia palustris</i> Horned Pondweed	o/r	f	o/r	d/a	d/a	o/r
<i>n</i> of submerged and floating-leaved species	4	5	7	3	5	5
Emergent plants						
<i>Agrostis stolonifera</i> Creeping Bent	f	f	o/r	o/r	o/r	f
<i>Apium nodiflorum</i> Fool's Water-cress	0	0	0	0	o/r	0
<i>Eleocharis palustris</i> Common Spike-rush	0	0	o/r	0	0	f
<i>Equisetum fluviatile</i> Water Horsetail	0	0	0	0	0	f
<i>Juncus effusus</i> Soft-rush	o/r	0	0	o/r	o/r	o/r
<i>Mentha aquatica</i> Water Mint	0	0	o/r	0	0	0
<i>Nasturtium officinale</i> agg. Water-cress	0	0	0	f	o/r	f
<i>Phragmites australis</i> Common Reed	0	0	o/r	0	f	o/r
<i>Ranunculus sceleratus</i> Celery-leaved Buttercup	f	o/r	o/r	f	f	d/a
<i>Samolus valerandi</i> Brookweed	0	0	0	0	0	o/r
<i>Typha latifolia</i> Bulrush	0	f	0	o/r	f	o/r
<i>Veronica beccabunga</i> Brooklime	f	o/r	0	f	o/r	f
<i>Veronica anagallis-aquatica</i> Blue Water-speedwell	0	0	0	f	f	f
<i>n</i> of emergent species	4	4	5	7	9	11
Total <i>n</i> of species	8	9	12	10	14	16

June-July 2004

	Far Lake	Carp Lake	Main Lake	Village Lake (West)	Village Lake (East)	Island Lake	Reed Bed Lake
Submerged and floating-leaved plants							
<i>Ceratophyllum demersum</i> Rigid Hornwort	f	0	0	0	0	0	0
<i>Chara vulgaris</i> agg. Stonewort	0	0	d/a	d/a	d/a	d/a	o/r
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	d/a	d/a	d/a	d/a	d/a	d/a	0
<i>Persicaria amphibia</i> Amphibious Bistort	f	0	0	f	f	f	o/r
<i>Potamogeton crispus</i> Curled Pondweed	o/r	o/r	o/r	0	o/r	o/r	0
<i>Potamogeton pectinatus</i> Fennel Pondweed	f	d/a	f	0	f	0	0
<i>Potamogeton pusillus</i> Lesser Pondweed	d/a	d/a	d/a	d/a	d/a	d/a	d/a
<i>Ranunculus trichophyllus</i> Thread-leaved Water-crowfoot	f	o/r	0	0	0	0	0
<i>Zannichellia palustris</i> Horned Pondweed	o/r	o/r	d/a	o/r	o/r	o/r	0
<i>n</i> of submerged and floating-leaved species	8	6	6	5	7	6	3
Emergent plants							
<i>Agrostis stolonifera</i> Creeping Bent	f	d/a	d/a	d/a	d/a	f	d/a
<i>Apium nodiflorum</i> Fool's Water-cress	o/r	0	0	0	f	0	0
<i>Carex acutiformis</i> Lesser Pond-sedge	0	0	0	o/r	0	0	0
<i>Eleocharis palustris</i> Common Spike-rush	0	0	0	o/r	o/r	0	0
<i>Iris pseudacorus</i> Yellow Iris	0	0	0	o/r	0	0	0
<i>Juncus effusus</i> Soft-rush	f	0	0	d/a	o/r	0	o/r
<i>Mentha aquatica</i> Water Mint	o/r	0	o/r	0	0	0	o/r
<i>Myosotis scorpioides</i> Water Forget-me-not	0	0	0	o/r	0	0	0
<i>Nasturtium officinale</i> agg. Water-cress	o/r	0	0	0	o/r	0	0
<i>Phalaris arundinacea</i> Reed Canary-grass	0	0	0	o/r	0	o/r	0
<i>Phragmites australis</i> Common Reed	f	0	f	f	f	0	d/a
<i>Ranunculus sceleratus</i> Celery-leaved Buttercup	o/r	o/r	d/a	o/r	f	d/a	d/a
<i>Samolus valerandi</i> Brookweed	0	0	0	0	0	0	o/r
<i>Schoenoplectus lacustris</i> Common Club-rush	0	0	0	o/r	o/r	0	0
<i>Typha latifolia</i> Bulrush	0	f	o/r	f	f	o/r	0
<i>Veronica anagallis-aquatica</i> Blue Water-speedwell	0	o/r	f	f	o/r	f	o/r
<i>Veronica beccabunga</i> Brooklime	o/r	f	0	0	o/r	0	f
<i>Veronica catenata</i> Pink Water-speedwell	0	0	f	0	0	0	o/r
<i>n</i> of emergent species	8	5	7	12	11	5	9
Total <i>n</i> of species	16	11	13	17	18	11	12

July 2007

	Far Lake	Carp Lake	Main Lake	Village Lake (West)	Village Lake (East)	Island Lake	Reed Bed Lake
Submerged and floating-leaved plants							
<i>Ceratophyllum demersum</i> Rigid Hornwort	0	o/r	0	0	0	0	0
<i>Chara vulgaris</i> agg. Stonewort	d/a	d/a	d/a	f	d/a	f	d/a
<i>Elodea nuttallii</i> Nuttall's Waterweed	d/a	0	0	0	0	0	0
<i>Lemna minor</i> Common Duckweed	0	0	0	0	f	o/r	f
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	d/a	d/a	d/a	d/a	d/a	o/r	f
<i>Persicaria amphibia</i> Amphibious Bistort	o/r	0	o/r	f	f	f	o/r
<i>Potamogeton crispus</i> Curled Pondweed	d/a	0	f	o/r	d/a	0	0
<i>Potamogeton pectinatus</i> Fennel Pondweed	d/a	d/a	d/a	0	o/r	0	0
<i>Potamogeton pusillus</i> Lesser Pondweed	d/a	d/a	d/a	d/a	d/a	d/a	d/a
<i>Ranunculus baudotii</i> Brackish Water-crowfoot	0	0	o/r	0	0	0	0
<i>Ranunculus</i> sp. (subg. <i>Batrachium</i>) water-crowfoot	o/r	f	0	0	0	0	0
<i>Zannichellia palustris</i> Horned Pondweed	o/r	0	f	o/r	o/r	0	d/a
<i>n</i> of submerged and floating-leaved species	9	6	8	6	8	5	6
Emergent plants							
<i>Agrostis stolonifera</i> Creeping Bent	o/r	f	f	d/a	d/a	d/a	d/a
<i>Alisma plantago-aquatica</i> Water-plantain	0	0	0	0	0	0	d/a
<i>Apium nodiflorum</i> Fool's Water-cress	0	0	0	0	f	0	0
<i>Bolboschoenus maritimus</i> Sea Club-rush	0	0	0	0	0	f	0
<i>Carex acutiformis</i> Lesser Pond-sedge	0	0	0	d/a	0	0	0
<i>Eleocharis palustris</i> Common Spike-rush	0	o/r	o/r	o/r	f	f	d/a
<i>Equisetum palustre</i> Marsh Horsetail	0	0	0	o/r	0	0	0
<i>Iris pseudacorus</i> Yellow Iris	0	o/r	0	f	0	0	o/r
<i>Juncus effusus</i> Soft-rush	0	0	f	d/a	o/r	o/r	f
<i>Myosotis laxa</i> Tufted Forget-me-not	0	0	0	0	o/r	0	0
<i>Myosotis scorpioides</i> Water Forget-me-not	0	0	0	o/r	0	0	0
<i>Nasturtium officinale</i> agg. Water-cress	0	0	0	0	f	f	0
<i>Phalaris arundinacea</i> Reed Canary-grass	0	0	0	d/a	0	0	0
<i>Phragmites australis</i> Common Reed	d/a	0	d/a	d/a	d/a	d/a	d/a
<i>Ranunculus sceleratus</i> Celery-leaved Buttercup	0	0	o/r	o/r	o/r	f	f
<i>Samolus valerandi</i> Brookweed	0	0	d/a	0	0	o/r	0
<i>Schoenoplectus lacustris</i> Common Club-rush	0	0	0	0	0	0	o/r
<i>Typha latifolia</i> Bulrush	0	f	o/r	d/a	d/a	d/a	d/a
<i>Veronica anagallis-aquatica</i> Blue Water-speedwell	0	o/r	f	o/r	f	f	o/r
<i>Veronica beccabunga</i> Brooklime	0	f	o/r	0	f	o/r	d/a
<i>Veronica catenata</i> Pink Water-speedwell	0	0	o/r	0	o/r	0	d/a
<i>n</i> of emergent species	2	6	10	12	12	11	12
Total <i>n</i> of species	11	12	18	18	20	16	18

July 2010

	Far Lake	Carp Lake	Main Lake	Village Lake (West)	Village Lake (East)	Island Lake	Reed Bed Lake
Submerged and floating-leaved plants							
<i>Chara vulgaris</i> agg. Stonewort	0	d/a	o/r	o/r	d/a	0	0
<i>Elodea nuttallii</i> Nuttall's Waterweed	d/a	o/r	0	0	0	0	0
<i>Lemna minor</i> Common Duckweed	o/r	0	0	0	f	f	f
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	f	0	f	d/a	d/a	0	0
<i>Persicaria amphibia</i> Amphibious Bistort	o/r	0	o/r	f	o/r	f	o/r
<i>Potamogeton berchtoldii</i> Small Pondweed	o/r	0	o/r	0	0	0	0
<i>Potamogeton crispus</i> Curled Pondweed	0	0	0	o/r	o/r	0	0
<i>Potamogeton pectinatus</i> Fennel Pondweed	o/r	d/a	f	f	o/r	0	0
<i>Potamogeton pusillus</i> Lesser Pondweed	0	o/r	d/a	d/a	d/a	o/r	f
<i>Ranunculus baudotii</i> Brackish Water-crowfoot	0	0	o/r	0	o/r	0	0
<i>Ranunculus circinatus</i> Fan-leaved Water-crowfoot	0	0	0	o/r	0	0	0
<i>Ranunculus</i> sp. (subg. <i>Batrachium</i>) water-crowfoot	0	o/r	0	0	f	0	0
<i>Zannichellia palustris</i> Horned Pondweed	0	0	0	0	o/r	0	f
<i>n</i> of submerged and floating-leaved species	6	5	7	7	10	3	4
Emergent plants							
<i>Agrostis stolonifera</i> Creeping Bent	f	f	f	d/a	d/a	d/a	d/a
<i>Alisma plantago-aquatica</i> Water-plantain	0	0	0	0	0	0	f
<i>Apium nodiflorum</i> Fool's Water-cress	0	0	0	o/r	0	0	0
<i>Bolboschoenus maritimus</i> Sea Club-rush	0	0	0	0	0	d/a	0
<i>Carex acutiformis</i> Lesser Pond-sedge	0	0	0	d/a	0	0	0
<i>Eleocharis palustris</i> Common Spike-rush	0	o/r	o/r	o/r	f	d/a	f
<i>Iris pseudacorus</i> Yellow Iris	0	o/r	0	o/r	0	0	o/r
<i>Juncus effusus</i> Soft-rush	o/r	0	o/r	f	o/r	o/r	o/r
<i>Mentha aquatica</i> Water Mint	0	0	0	0	o/r	0	0
<i>Myosotis laxa</i> Tufted Forget-me-not	0	0	0	o/r	f	f	0
<i>Myosotis scorpioides</i> Water Forget-me-not	0	0	0	o/r	0	0	0
<i>Nasturtium officinale</i> agg. Water-cress	0	0	0	o/r	o/r	o/r	0
<i>Phalaris arundinacea</i> Reed Canary-grass	0	0	0	f	0	0	0
<i>Phragmites australis</i> Common Reed	f	0	d/a	d/a	d/a	d/a	d/a
<i>Ranunculus sceleratus</i> Celery-leaved Buttercup	0	0	f	o/r	o/r	f	o/r
<i>Samolus valerandi</i> Brookweed	0	0	o/r	o/r	o/r	f	0
<i>Schoenoplectus lacustris</i> Common Club-rush	0	0	0	o/r	0	0	o/r
<i>Typha latifolia</i> Bulrush	0	d/a	0	d/a	d/a	d/a	o/r
<i>Veronica anagallis-aquatica/catenata</i> Blue/Pink Water-speedwell	0	o/r	f	o/r	f	f	f
<i>Veronica beccabunga</i> Brooklime	0	f	o/r	o/r	o/r	o/r	f
<i>n</i> of emergent species	3	6	8	17	12	12	11
Total <i>n</i> of species	9	11	15	24	22	15	15

July 2013

	Far Lake	Carp Lake	Main Lake	Village Lake (West)	Village Lake (East)	Island Lake	Reed Bed Lake
Submerged and floating-leaved plants							
<i>Callitriche</i> sp. water-starwort	0	0	0	0	0	0	o/r
<i>Ceratophyllum demersum</i> Rigid Hornwort	0	0	0	0	d/a	0	0
<i>Chara vulgaris</i> agg. Stonewort	0	0	o/r	0	0	0	0
<i>Elodea nuttallii</i> Nuttall's Waterweed	d/a	d/a	0	0	0	0	0
<i>Lemna minor</i> Common Duckweed	0	0	0	0	o/r	f	o/r
<i>Myriophyllum spicatum</i> Spiked Water-milfoil	0	o/r	0	d/a	d/a	0	0
<i>Persicaria amphibia</i> Amphibious Bistort	0	0	o/r	f	o/r	o/r	0
<i>Potamogeton crispus</i> Curled Pondweed	o/r	0	0	0	o/r	0	0
<i>Potamogeton pectinatus</i> Fennel Pondweed	o/r	o/r	f	f	f	0	0
<i>Potamogeton pusillus</i> Lesser Pondweed	o/r	o/r	o/r	o/r	d/a	0	o/r
<i>Ranunculus baudotii</i> Brackish Water-crowfoot	0	f	0	0	0	0	0
<i>Ranunculus circinatus</i> Fan-leaved Water-crowfoot	0	0	d/a	o/r	f	0	0
<i>Ranunculus</i> sp. (subg. <i>Batrachium</i>) water-crowfoot	o/r	0	0	0	0	0	0
<i>Zannichellia palustris</i> Horned Pondweed	0	0	0	0	o/r	0	f
<i>n</i> of submerged and floating-leaved species	5	5	5	5	9	2	4
Emergent plants							
<i>Agrostis stolonifera</i> Creeping Bent	o/r	f	f	d/a	f	f	f
<i>Alisma plantago-aquatica</i> Water-plantain	0	0	0	0	0	0	o/r
<i>Bolboschoenus maritimus</i> Sea Club-rush	0	0	0	0	0	o/r	0
<i>Carex acutiformis</i> Lesser Pond-sedge	0	0	0	d/a	0	0	0
<i>Eleocharis palustris</i> Common Spike-rush	0	o/r	o/r	o/r	o/r	d/a	f
<i>Iris pseudacorus</i> Yellow Iris	0	o/r	0	o/r	o/r	0	0
<i>Juncus effusus</i> Soft-rush	o/r	o/r	o/r	f	o/r	o/r	o/r
<i>Mentha aquatica</i> Water Mint	0	0	o/r	0	f	o/r	0
<i>Myosotis laxa</i> Tufted Forget-me-not	0	0	o/r	0	o/r	f	0
<i>Myosotis scorpioides</i> Water Forget-me-not	0	0	0	o/r	0	0	0
<i>Nasturtium officinale</i> agg. Water-cress	0	0	o/r	0	o/r	o/r	0
<i>Phalaris arundinacea</i> Reed Canary-grass	0	0	0	o/r	0	0	0
<i>Phragmites australis</i> Common Reed	f	0	d/a	d/a	d/a	d/a	d/a
<i>Ranunculus sceleratus</i> Celery-leaved Buttercup	0	0	o/r	o/r	o/r	f	f
<i>Samolus valerandi</i> Brookweed	0	0	0	0	0	f	0
<i>Schoenoplectus lacustris</i> Common Club-rush	0	0	0	0	0	0	o/r
<i>Typha latifolia</i> Bulrush	0	d/a	o/r	d/a	d/a	d/a	0
<i>Veronica anagallis-aquatica/catenata</i> Blue/Pink Water-speedwell	o/r	o/r	o/r	f	f	d/a	f
<i>Veronica beccabunga</i> Brooklime	0	o/r	o/r	0	o/r	o/r	o/r
<i>n</i> of emergent species	4	7	11	11	12	13	9
Total <i>n</i> of species	9	12	16	16	21	15	13

Reference

Palmer, M. & Newbold, C. (1983) *Focus on Nature Conservation No. 1, Wetland and Riparian Plants in Great Britain*. Nature Conservancy Council, Shrewsbury.