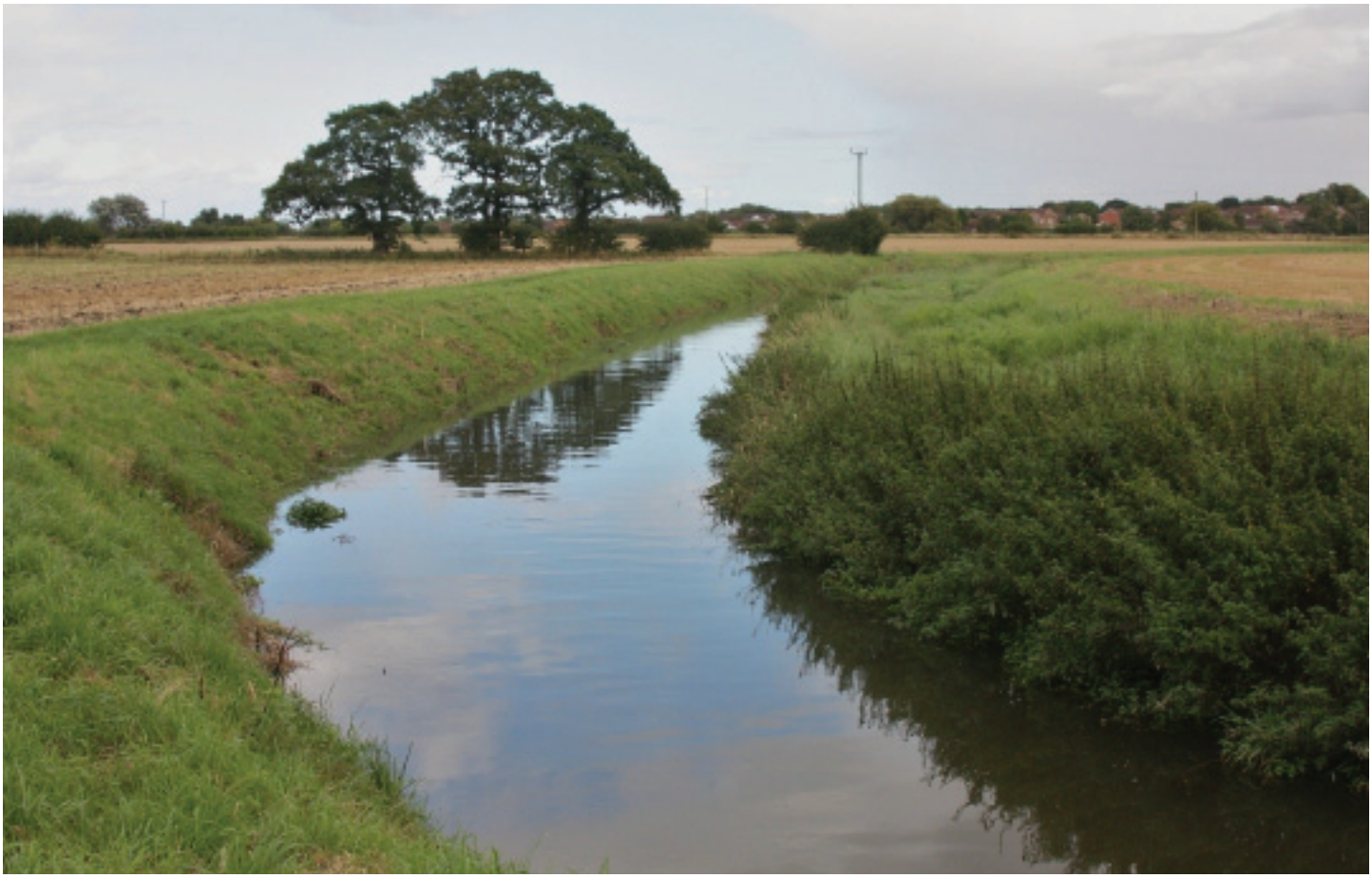
Plant life of the River Foss

Notes from walks in July 2017



The Foss upstream of Towthorpe Bridge, a section where herbicide is used to kill off emergent vegetation

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1. The Upper Foss and Oulston Reservoir

The River Foss begins just 23.3 km (14.5 miles) north of York as the crow flies, near to the village of Yearsley in the Howardian Hills. The Howardians are a modest range of hills and plateaux, sitting at the crossroads between Vales of York and Pickering to the west and east, the Yorkshire Wolds to the south and the foothills of the North York Moors to the north.

The geology of the Howardian Hills consists of inter-bedded sandstones, limestones and mudstones deposited during the Jurassic period. Alternating layers of porous and impermeable rocks give rise to numerous seepages and springs, one of which forms the source of the river at Foss Crooks. The Foss begins its journey at the modest elevation of 158 metres above sea level, flowing through a small valley cloaked by Forestry Commission plantations before entering Oulston (or Pond Head) Reservoir.

Immediately upstream of the reservoir, the embryonic river flows through natural wet woodland (or *carr*) - a habitat which is perhaps better-represented in the Howardian Hills than anywhere else in Yorkshire. Here, the young Foss branches into multiple rivulets between banks and flats of silt. Too treacherous and unstable to plant with timber crops, the woodland has been left to its own devices and comprises mainly Grey Sallow *Salix cinerea* with Alder *Alnus glutinosa* around the margins. Marsh Marigold *Caltha palustris*, Water Forget-me-not *Myosotis scorpioides*, Water Mint *Mentha aquatica* and Remote Sedge *Carex remota* are frequent in the herb layer with a wide range of other wetland and woodland plants occurring in lesser amounts. Amongst these are Water Horsetail *Equisetum fluviatile*, Lesser Water-parsnip *Berula erecta*, Opposite-leaved Golden Saxifrage *Chrysosplenium oppositifolium*, Wild Angelica *Angelica sylvestris*, Water Avens *Geum rivale*, Yellow Pimpernel *Lysimachia nemorum* and Bladder Sedge *Carex vesicaria*. The silty runnels of the Foss then pass through a small swamp of Water Horsetail, Marsh Marigold, Valerian *Valeriana officinalis* and Meadowsweet *Filipendula ulmaria* before entering the reservoir.

Oulston Reservoir was constructed in the 1790s to regulate the flow of water into the Foss Navigation downstream. It covers around 6.4 hectares (15.9 acres), divided by a berm. This man-made lake is much more natural-looking than a modern water supply reservoir, only the stone-clad embankment at the lower end giving away its function.

The smaller upper lake is stocked with Mallard for shooting and is rather turbid, though stands of Common Club-rush *Schoenoplectus lacustris* and Lesser Pond Sedge *Carex*

acutiformis grow around the margins. The larger lower reservoir is a valuable example of what ecologists refer to as a mesotrophic lake: a water body of only moderate fertility, where relatively clean, clear water allows a wide range of aquatic plants to flourish.

Submerged vegetation comprises patchy lawns of Common Stonewort *Chara vulgaris* – a complex alga rather than a flowering plant – with small amounts of Horned Pondweed *Zannichellia palustris* and the 'Canadian' waterweeds *Elodea canadensis* and *E. nuttallii*. In open water, the floating leaves of Amphibious Bistort *Persicaria amphibia* and Broad-leaved Pondweed *Potamogeton natans* form conspicuous stands: for some reason, the latter species has increasingly replaced the former over the past 20 years.

Most of the southern shore of the lower lake is shaded by overhanging trees but the northern shoreline supports diverse mixtures of emergent vegetation. Bottle Sedge *Carex rostrata*, a plant intolerant of high nutrient levels, predominates along with more discrete patches of Common Club-rush, a statuesque plant which reaches two metres height. There are smaller amounts of Water Mint, Branched Bur-reed *Sparganium erectum*, Common Spike-rush *Eleocharis palustris*, Sharp-flowered Rush *Juncus acutiflorus* and Common and Ivy-leaved Duckweeds *Lemna minor* and *L. trisulca*. At the very edge of the lake, this vegetation merges imperceptibly into seepage fen wetted by groundwater emerging from the adjacent slope. Many additional wetland plants grow in this very rich and colourful transition between land and water, including Hemp Agrimony *Eupatoria cannabinum*, Wild Angelica, Fleabane *Pulicaria dysenterica*, Lesser Spearwort *Ranunculus flammula*, Ragged Robin *Silene flos-cucculi*, Square-stalked St John's Wort *Hypericum tetrapterum*, Common Sedge *Carex nigra* and Marsh Horsetail *Equisetum palustre*. Common Spotted Orchid *Dactylorhiza fuchsii* is frequent in places.

Marginal fen with Hemp Agrimony at Oulston Reservoir

The lower lake at Oulston Reservoir, from the north bank

A recent (September 2017) survey of aquatic invertebrates in the lower lake indicates a diverse fauna with over 50 species identified. Most of these are widespread species of cleaner lakes and large ponds, including a good suite of water snails. Some are quite specialised in their requirements: the algivorous water beetle *Haliplus obliquus* is associated with stonewort beds, for example, while the diving beetle *Ilybius fenestratus* is characteristic of fish-rich lakes, where its ability to secrete steroidal chemicals protects it from predation. The nationally scarce reed-beetle *Donacia thalassina*, which feeds on Common Club-rush, was collected in 2008. One revealing finding was the presence of several southern insects which were unknown in North Yorkshire twenty years ago, such as Migrant Hawker dragonfly, Water Stick-insect, Saucer Bug and Pondweed Bug – an incontrovertible sign that climate change is affecting our local wildlife.

The slope descending to the north-western end of the lake contains extensive seepages amongst species-rich grassland and scrub. The complex layering of the underlying rocks means that plants characteristic of limestone grassland such as Quaking Grass *Briza media*, Meadow Oat-grass *Avenula pratensis*, Eyebright *Euphrasia nemorosa*, Fairy Flax *Linum catharticum* and Rough Hawkbit *Leontondon hispidus* can be found in close proximity to species more typical of acidic and intermediate ('neutral') conditions. An interesting mixture of grassland flora can also be found on the retaining embankment at the downstream end of the reservoir.

Below the outfall, the Foss is recognisable as an upper-reach river, cascading through broad-leaved woodland. The bed is a mixture of sandy silt, gravel, pebbles and cobbles with tree roots, undercut banks and woody debris providing a range of habitats. Bullheads, Freshwater Shrimps, Hairy Whirligigs, burrowing mayfly larvae and caddis larvae are typical of this habitat.

River Foss below Oulston Reservoir

2. The middle reaches

While the short, relatively natural upper section of the Foss is well-defined, it is less easy to distinguish its middle and lower sections because the natural characteristics of the river have been greatly altered by channel modification and the impacts of arable farming in the catchment.

Below Burton House, the river follows an unobtrusive course through mixed farmland, disappearing occasionally beneath belts of woodland, as at Marton Abbey. Downstream of Stillington, riverside land is predominantly arable until it reaches Strensall. Not much of the middle Foss is accessible from public rights of way, so our survey was limited to the footpath upstream of Sheriff Hutton Bridge and the length from Walbutts to Strensall Bridge.

We surveyed the section between Foss House and Sheriff Hutton Bridge (south-west of Sheriff Hutton village) on 20th July 2017. Upstream of the Whitecarr Beck confluence, the bed of the Foss is quite gravelly and a few plants of Stream Water-crowfoot *Ranunculus penicillatus* were noted in a riffle here - this is the 'streamer weed' characteristic of firm-bedded, clear-running rivers and streams. Also present were Spiked Water-millfoil *Myriophyllum spicatum* and Curled Pondweed *Potamogeton crispus*, plants more typical of slow-moving and still waters. Downstream of Whitecarr Beck, the bed of the Foss is noticeably more silty. Curled Pondweed, Spiked Water-millfoil and Common Duckweed occur in modest amounts with very occasional Water-cress *Nasturtium officinale*, Fool's Water-cress *Apium nodiflorum* and Blue Water-speedwell *Veronica anagallis-aquatica*. Branched Bur-reed occurs locally as an emergent.

A diverse tree line runs atop the left (east) bank upstream of Sheriff Hutton Bridge, containing Ash *Fraxinus excelsior*, Sycamore *Acer pseudoplatanus*, Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa*, White Willow *Salix alba*, Apple *Malus* sp and Alder. Black Currant *Ribes nigrum* occurs in very small amounts, shaded river banks perhaps being a native habitat of this species.

Kingfisher was seen on this section, Chubb were abundant in the river here and a well-used Otter run was noted.

Immediately above the outfall from Walbutts Sewage Treatment Works, Spiked Water-millfoil occurs in the sandy-bedded channel but submerged vegetation is scarce downstream. Broad-leaved Pondweed occurs in small amounts above Strensall Bridge and Branched Bur-reed is the dominant marginal species.

The predominant bankside vegetation along the middle and lower Foss is coarse grassland dominated by False Oat-grass *Arrhenatherum elatius* and Cock's-foot *Dactylis glomerata* with associated plants including Rough Meadow-grass *Poa trivialis*, Cleavers *Galium aparine*, Stinging Nettle *Urtica dioica*, Greater Willowherb *Epilobium hirsutum* and Hogweed

Heracleum sphondylium. A range of widespread grassland and arable plants occur opportunistically here and there where there are gaps in the sward. Referred to as False Oat grassland, this plant community is ubiquitous in other ungrazed habitats on fertile soils and can be found on road and railway verges, waysides and field margins as well as river banks.

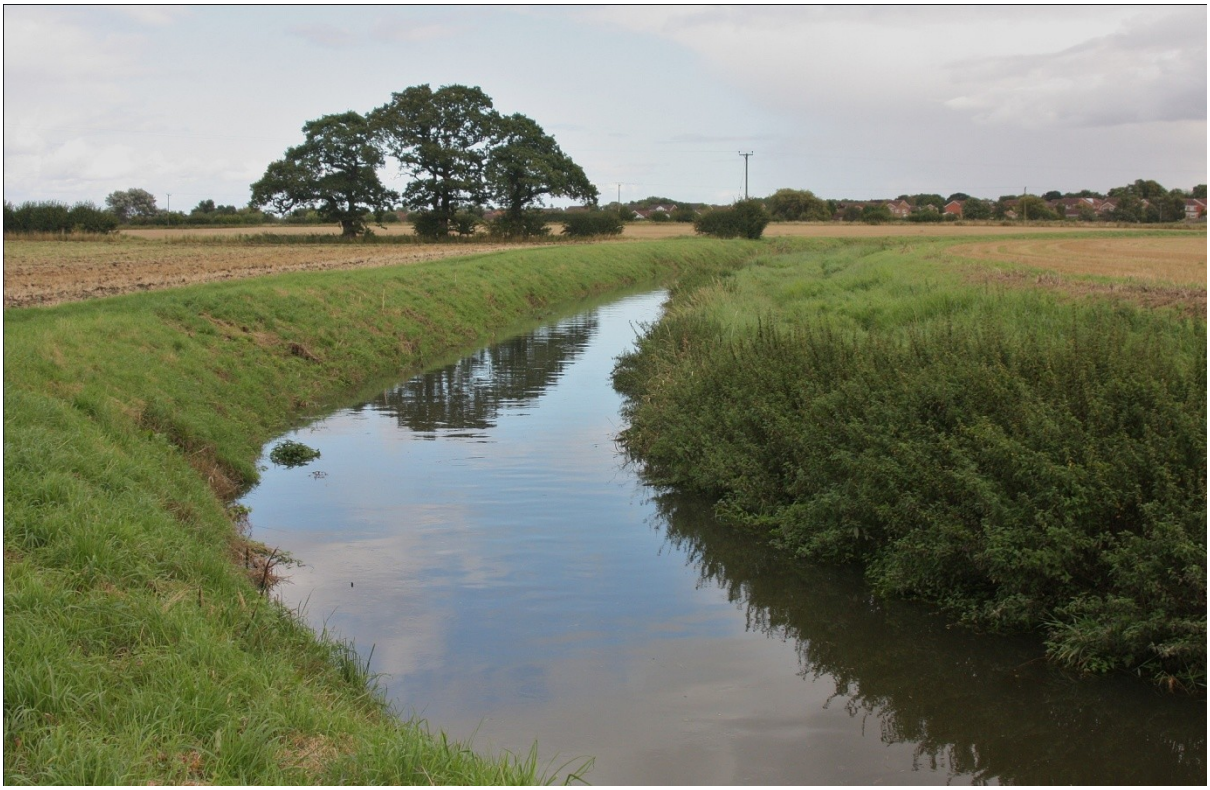
Along the bank top and adjacent path, Perennial Rye-grass *Lolium perenne*, Yorkshire Fog *Holcus lanatus*, Timothy *Phleum pratense*, Cow Parsley *Anthriscus sylvestris* and Greater Burnet Saxifrage *Pimpinella major* are typical of better-drained soils. By contrast, species of moist soils such as Hemlock *Conium maculatum* and Reed Canary-grass *Phalaris arundinacea* add a more distinctly riparian element, along with occasional plants of Valerian *Valeriana officinalis*, Water Figwort *Scrophularia auriculata* and the uncommon Green Figwort *S. umbrosa*.

Here and there, patches of more diverse grassland can be found along the river corridor. Near Lock House, upstream of Strensall, a short section of riverbank supports Meadowsweet, Common Knapweed *Centaurea nigra*, Meadow Vetchling *Lathyrus pratensis* and Meadow Crane's-bill *Geranium pratense*. At Brecks Lane, Meadowsweet, Wild Angelica, Meadow Crane's-bill and Bistort *Persicaria bistorta* can be seen along the left bank – a combination of species reminiscent of the floodplain hay meadows of the Ouse Ings, perhaps offering a clue to the past land use. On the opposite bank, the old dry dock supports colourful mixtures of Greater Burnet Saxifrage, Common Knapweed, Agrimony *Agrimonia eupatoria*, Crosswort *Cruciata laevipes*, Tufted Vetch *Vicia cracca* and Meadow Vetchling. These are fragments of flower-rich grassland are remnants of a vegetation which would have been commonplace along the river before WWII.

An interesting contrast to these relict habitats is recently-developed wet grassland on former arable on the left bank immediately upstream of Walbutts. This low-lying, floodable field has developed a patchy sward of Creeping Buttercup *Ranunculus repens*, Creeping Bent *Agrostis stolonifera*, Marsh Foxtail *Alopecurus geniculatus* and Reed Canary-grass with Soft Rush *Juncus effusus*, Compact Rush *J. conglomeratus* and Jointed Rush *J. articulatus*. Purple Small-reed *Calamagrostis canescens*, a scarce plant of peaty fens, has colonised from nearby Strensall Common.

3. The Lower Foss

From Strensall Bridge to Huntington Church Bridge, extensive sections of the Foss had been treated with herbicide prior to the survey and the in-channel flora was markedly sparse as a result. The section immediately upstream of Strensall New Bridge is moderately shaded by trees on both banks, limiting the growth of aquatic vegetation and at the same time demonstrating how nature can reduce the need for chemical treatments. River plants here include Unbranched Bur-reed *Sparganium emersum*, Common Water-plantain *Alisma plantago-aquatica*, Common Duckweed and a few shoots of Common Club-rush, not seen since Oulston Reservoir. Branched Bur-reed is present too but dappled shade reduces its vigour. Himalayan Balsam *Impatiens glandulifera* is locally-abundant on the river bank, as it is in several places further downstream.



The Foss upstream of Towthorpe Bridge, a section where herbicide treatment is used to kill-off emergent vegetation.

Further downstream, Unbranched Bur-reed, Amphibious Bistort, Common Duckweed, Nuttall's Waterweed and Broad-leaved Pondweed occur sporadically and in small amounts but carpets of filamentous algae cover much of the river bed, taking advantage of the removal of competition. A sizeable patch of a charophyte believed to be Pointed Stonewort *Nitella mucronata* was found growing over exposed sandy sediment downstream of the Outer Ring Road crossing. Branched Bur-reed dominates the river margin but much of it had been sprayed off. Reed Canary-grass and Creeping Bent grow along the lower river bank

with very occasional plants of Valerian and Green Figwort. The banks support a weedy type of False Oat grassland in which Greater Willowherb and Stinging Nettle are often abundant with sprawling vines of Hedge Bindweed *Calystegia sepium*.

Despite the intensive management of the channel, a large Water Vole population was in evidence for about a kilometre above the Outer Ring Road, with high densities of active burrows in the river bank.

From Huntington Church Bridge to New Earswick, the river vegetation is less intensively managed and more diverse. Yellow Water-lily *Nuphar lutea*, Arrowhead *Sagittaria sagittifolia* and Unbranched Bur-reed are frequent on the water surface with very occasional shoots of Flowering Rush *Butomus umbellatus*. Nuttall's Waterweed and Spiked Water-millfoil are locally-frequent submerged species.

Arrowhead growing in the Foss near Huntington

Downstream of Lock Cottage at New Earswick, aquatic vegetation includes frequent stands of Yellow Water-lily mixed with smaller amounts of Arrowhead, Unbranched Bur-reed and Nuttall's Waterweed; Spiked Water-millfoil is occasional. The pollution-tolerant Fennel Pondweed *Potamogeton pectinatus* first appears below the Huntington Road pumping station. Small amounts of Pointed Stonewort were found above Lock Cottage and in the old lock at Yearsley Bridge. Water Forget-me-not and Greater Yellow-cress *Rorippa amphibia* are occasional at the river's edge, where tall emergents include the occasional patch of Yellow Flag *Iris pseudacorus* as well as Branched Bur-reed.

Whilst the banks of the lower Foss mainly support the same kind of False Oat grassland described above, there is more variation in the urban sections from New Earswick

downstream. Around New Earswick village, Blue Sowthistle *Cicerbita macrophylla* and Russian Comfrey *Symphytum* x *uplandicum* are both escapes from cultivation, along with the invasive Japanese Knotweed *Fallopia japonica* and Ground Elder *Aegopodium podagraria*. The shaded banks around Lock Cottage have a modest range of woodland plants such as Ivy *Hedera helix*, Wood Avens *Geum urbanum* and Male Fern *Dryopteris filix-mas*. Himalayan Balsam is abundant on several sections of the lower river banks.

4. Noteworthy species

Pointed Stonewort, *Nitella mucronata*

Stoneworts are complex algae which resemble waterweeds. They are generally indicative of clean, clear, calcium-rich water but some species will appear opportunistically in more polluted waters where recent dredging has removed competition. Small amounts of a *Nitella* species were found at Foss Bridge (New Earswick) and Yearsley Bridge lock, with a larger patch on the river bed upstream of Huntington. A specimen was examined by stonewort expert Jonathan Graham and considered likely to be Pointed Stonewort, with the caveat that better material was needed for certain identification.

Pointed Stonewort is categorised as Nationally Scarce and occurs very locally in the southern half of Britain. Records on NBN Gateway (which are likely to be incomplete) show concentrations of records in East Anglia and on the Montgomery Canal on the English/Welsh border.

Narrow-leaved Water-plantain, *Alisma lanceolatum*

This species is much less frequent than Common Water-plantain, *Alisma plantago-aquatica*. Also, narrow-leaved specimens of the common species do occur, especially in deeper water, and can be mis-identified. During the survey, Narrow-leaved Water-plantain was recorded just upstream of Strensall New Bridge and near Foss Bridge (New Earswick). This plant occurs locally in the southern half of Britain with very localised occurrences further north; the River Foss is at the northern edge of its core range.

Green Figwort, *Scrophularia umbrosa*

Green Figwort has been known from the River Foss for some time, having been recorded at New Earswick at least as far back as 1980[1]. During the recent survey it was recorded occasionally from above Sheriff Hutton Bridge downstream to Heworth, always in small amounts but in roughly equal proportion to the much more widespread Water Figwort. Green Figwort is described as having "a puzzlingly patchy distribution" in Great Britain[2], though the map in the *New Atlas of the British and Irish Flora* suggests an association with canal systems. It is believed to be increasing.

[1] Yorkshire Naturalists' Union botanical report for 1980, *The Naturalist*, 1981: 149

[2] Preston, C.D., Pearman, D.A. & Dines, T.D. (eds) (2002). *New Atlas of the British and Irish flora*. Oxford University Press.