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Lost Flora of the Washlands

Notes on the lost plants of the
Swale and Ure Washlands



Martin Hammond

February 2021



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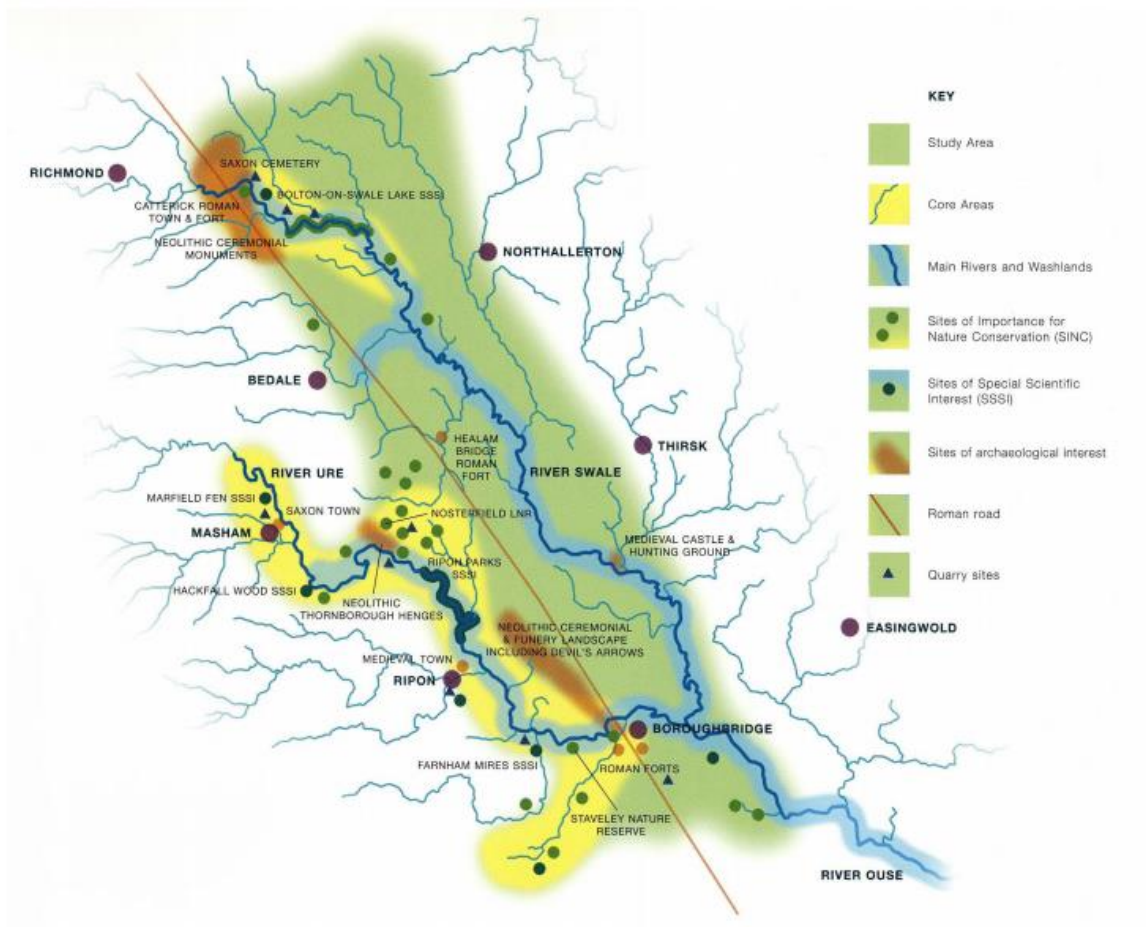
Notes on the lost plants of the Swale and Ure Washlands

A report for the Lower Ure Conservation Trust & Yorkshire Wildlife Trust

Martin Hammond Ecology

February 2021

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Swale and Ure Washlands Study Area

1. Introduction

This study investigates local extinctions of vascular plants (flowering plants and ferns) in the area of central North Yorkshire referred to as the Swale and Ure Washlands. Disappearances from the local flora help us understand environmental change and the drivers of biodiversity loss.

This report updates initial studies undertaken in 2004 and 2006 which were funded by North Yorkshire County Council and the Lower Ure Conservation Trust.

2. The study area

The Swale and Ure Washlands was originally defined by the Lower Ure Conservation Trust as a project area for promoting nature conservation restoration of mineral sites in the lower Swale and Ure valleys. It encompasses most of the Vale of Mowbray and the magnesian limestone ridge which flanks it to the west (See map on title page).

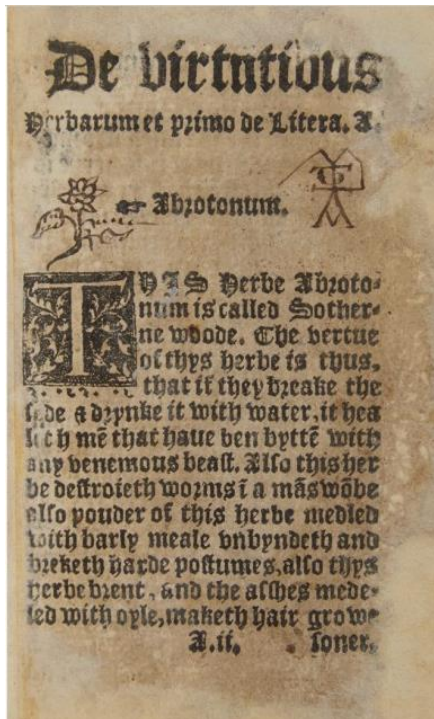
This study does not include:

- Studley Roger, Lindrick and Aldfield parishes in the Skell valley to the west of Ripon (a well-known area botanically)
- Knaresborough parish (there are many old botanical records but these refer mainly to the Nidd gorge, which is a distinct and separate landscape)
- The parishes of Grewelthorpe, Swinton-with-Warthermarske, Fearby and Ellington High and Low: although covered by the original Washlands project, these parishes extend into upland-fringe landscapes distinct from the lowland river valleys. The Ure gorge at Hackfall has, however, been included as few records are separable by parish.

Halnaby Carr was referred to in the earlier study but its location has now been identified as lying within the Tees catchment.

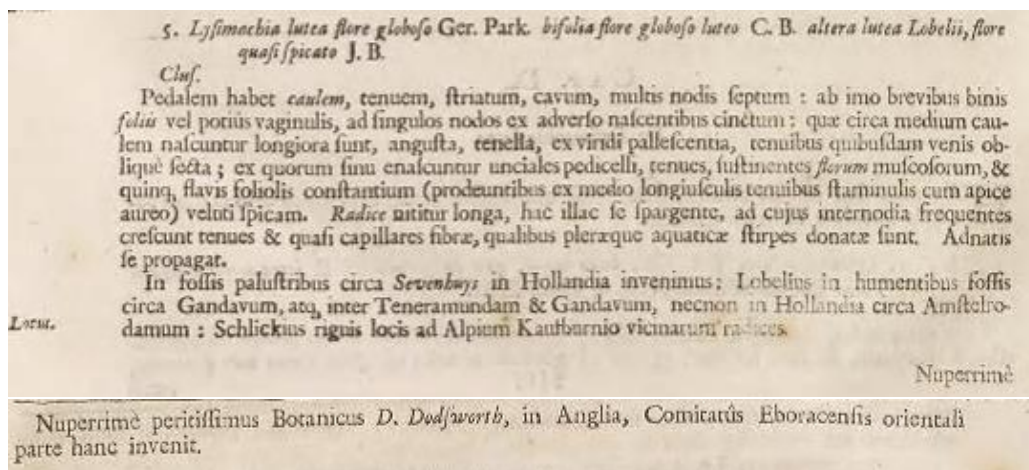
3. Background: botanical recording in the Washlands

There is a particularly rich archive of botanical records for the lowland valleys of the Swale & Ure, which form the central heart of North Yorkshire. This enables us to track changes in the local flora in some depth for the past 200+ years, and allows us to interpret the underlying causes.



People were knowledgeable about wild plants long before it was considered useful to catalogue them in a systematic way. Anthony Askham was a 16th century herbalist and astrologer, born at Kirby Wiske, who became Vicar of Burneston in 1553. In 1550 he had published *A Lytel Herball* and his *Treatise of Astronomie*. These works mention what would have been familiar species like Bugloss, Calamint, Valerian, Vervain and Houseleek among more exotic plants. Unfortunately, we don't know where these plants would have been obtained, but Askham clearly had a very extensive botanical knowledge and many of the plant names are recognisable today.

The first formal record appeared in the second volume of John Ray's *Historia Plantarum* in 1688. Under *Lysimachia lutea flore globoso* (yellow loosestrife with globular flowers, i.e. Tufted Loosestrife *Lysimachia thyrsiflora*) he wrote, "*Nuperrime peritissimus Botanicus D. Dodsworth, in Anglia Comitatus Eboracensis orientali parte hanc invenit*" ("Found recently by the most skilled botanist D. Dodsworth in the eastern part of the County of York"). Matthew Dodsworth¹ appears to have spent periods in the 1680s pursuing botanical studies under the patronage of Sir John Dawnay (Ratcliffe, 2016). He became Vicar of Sessay in 1690 and remained in post until his death in 1695. While the location of this record remains uncertain, it is more likely to have been Leckby Carr than anywhere in the East Riding.



Some of Matthew Dodsworth's specimens survive in the Sloane Herbarium at the Natural History Museum, London (Ratcliffe, 2016). The extent of his botanical activity in North Yorkshire is unclear as he employed the services of a simpler (professional herb collector), Thomas Willisel, a veteran of Cromwell's army. However, Dodsworth certainly collected material from the vicinity of Knaresborough (Britten, 1909). He supplied specimens to, and corresponded with two important early botanists, Leonard Plukenet and Christopher Merrett.

¹ The initial 'D' is either a mistake or abbreviates Latin *dominus*, master.

* An. 2. Pedicularis major angustifolia ramosissima, flore minore luteo, labello purpureo *D. Richardson*. *Crista galli angustifolia montana C. B. Pin. 163. Pr. 86. descr.* The first time I met with this Plant, was within a Mile of *Burrowbridge* amongst the Corn in the Way-side from *Knaresborough* thither; afterwards I found it in very great Plenty in the large Corn-fields betwixt *Wetherby* and *Catall* (both these Places are within ten Miles of *York*.) I also observed it this Year 1723, amongst the Corn nigh *Westnewton* in *Northumberland*, upon the Borders of *Scotland*.

About 40 years later, the Washlands provided the first British record of Greater Yellow Rattle *Rhinanthus angustifolius*. This appeared in Dillenius's 8th edition of Ray's *Synopsis Methodica Stirpium Britannicum*, published in 1724. "The first time I met with this Plant," he

wrote, "was within a Mile of Burrowbridge amongst the Corn."

Around the middle of the 18th century, William Gawthorp of Ripley began to keep records of wild plants he found in the Harrogate area including from Ripon, Staveley and Hackfall (Cundall, 1986)². These unpublished records took the form of annotations to a copy of John Wilson's pre-Linnean *Synopsis of British plants* (1744). Gawthorp found Water Violet *Hottonia palustris* commonly in ditches around Ripon and Marsh Gentian *Gentiana pneumonanthe* near Thirsk.

The latter part of the century heralded a long and productive period of botanical study in central North Yorkshire. 'An account of the most curious plants and shrubs in the neighbourhood of Knaresborough' forms part of the fourth edition of Hargrove's *History of the Castle, Town & Forest of Knaresborough* (Hargrove, 1782), though its authorship is unclear. This provides early records for Staveley Carrs including Lesser Bladderwort *Utricularia minor* and Water Violet.

William Brunton of Ripon (1775-1806) was a correspondent of James Edward Smith and supplied specimens to the illustrator of Smith's *English Botany*, James Sowerby³. Brunton also contributed many records to Turner & Dillwyn's *Botanist's Guide* (1805) and his 'Catalogue of rare plants found in the neighbourhood of Ripon' formed part of a popular historical guide to the town published shortly after his death (Anon, 1806).

Rev James Dalton (1764-1843) became Vicar at Copgrove in 1789, transferring later to Catterick (1791) then Croft-on-Tees (1805). Dalton provided the first British record of Rannoch Rush *Scheuchzeria palustris* from Leckby Carr in 1787 (Wilkinson, 1906); a plant of boreal bogs, it acquired its vernacular name much later, referencing its only surviving station on Rannoch Moor in Perthshire. Bogg (1909) referred to it as Swamp Arrow-rush.

Dalton also provided many early records from the vicinity of Copgrove including numerous species which have subsequently disappeared from the Washlands, and a large number of his specimens can still be found in the herbarium of the Yorkshire Philosophical Society at the Yorkshire Museum, York. Most of his Copgrove specimens are from 1790 although he continued collecting into the 1820s. Wilkinson (1907) provides a biographical sketch.

² Gawthorp was Rector at Ripley from 1736 until his death in 1759. Annotations in his copy of Wilson's *Synopsis* are dated up to 1773, so a member of his family presumably continued to make records after his death: see Cundall (1986).

³ <http://linnean-online.org/63836/>

Robert Pierson (1742 - 1805), Archdeacon of Cleveland and rector of Coxwold⁴, was a contemporary of Brunton and Dalton. Brunton, Dalton and Pierson's records were cited in many subsequent works, both regional and national in scope.

A lesser number of records from the 1790s are attributable to William Pilkington, a naturalist originally from Hatfield (South Yorkshire) who married a Knaresborough woman (Skidmore, 1980). Robert Teesdale's important *Catalogue of the flora of the Howardian Hills* (Teesdale, 1794) includes a reference to Tower Mustard *Turritis glabra* growing "in lanes near Thirsk".

Several botanists worked in the Washlands during the early 19th century, with *Robinson's Guide to Richmond* (1833) including records from Bolton-on-Swale and other locations. Henry Baines's *Flora of Yorkshire* (1840) collated many earlier records as well as the author's own with important later works including J.G. Baker's *North Yorkshire: studies of its botany, geology, climate and physical geography* (first published in 1863) and F.A. Lees's *Flora of West Yorkshire* (1888)⁵. Calvert's *History of Knaresborough* (1844) and Thorpe's *Illustrated guide to Harrogate* (1886) both include plant lists referring to some locations within our study area. Rev Henry Slater's detailed 1883 paper on the flora of the Ripon area is an important source, especially for Sharow Mires.

John Gilbert Baker lived in Thirsk from 1851 to 1866 and was instrumental in putting Yorkshire botany on a more scientific footing, seeking to explain the distributions of plants rather than simply compiling records. In 1866, Baker was appointed Assistant Keeper of the Herbarium at Kew. He became Keeper in 1890 and held that position until 1899, reflecting his status as one of the country's foremost botanists of the late Victorian era. Two genera of Bromeliaceae, *Bakeria* and *Bakerantha*, were named in honour of his studies of the family. The second edition of Baker's *North Yorkshire* was initially published as a series of chapters in the *Transactions of the Yorkshire Naturalists' Union* between 1879 and 1906. Importantly, Baker collated many records from the Vale of Mowbray including localities such as Carthorpe Moor for which there are no prior (or subsequent) records. Baker's chapter on botany in the *Victoria County History for Yorkshire* (1907) contains little or no new material and relies on many records which were already very dated at the time of publication.

Under Baker's influence, the Thirsk Natural History Society assumed an important role in British botany: its botanical exchange club enabled naturalists around the country to swap plant specimens and have them checked by specialist referees, making it a precursor of the Botanical Society of Britain and Ireland (BSBI)⁶.

When Baker moved to Kew, another Thirsk botanist, William Foggitt (1835-1917) remained active in the area, contributing accounts of the local flora to several guide books including those by the prolific author Edmund Bogg.

⁴ Nichols (1817) gives brief details of Pierson's clerical career.

⁵ At that time, the West Riding boundary followed the River Ure upstream to Tanfield, thus including Ripon, Knaresborough and Boroughbridge.

⁶ <https://www.references.net/societies/history/1836bsbi.html>

Another important source of records is the excursion reports of the Yorkshire Naturalists' Union, published in *The Naturalist* or as supplements. Some 29 excursions visited the study area between 1880 and 1994.

C.M. Rob of Catton was a very active recorder of the flora of the Vale of Mowbray from the 1930s to the 1960s, documenting the demise of Leckby Carr and the decline of Pilmoor as botanical sites. Her articles (Rob, 1948 & 1959), contributions to YNU Annual Reports and excursion accounts provide an important record of vegetation changes in the mid-20th Century. The C.M. Rob Herbarium, deposited at the Yorkshire Museum, contains a good number of specimens from Pilmoor and the Catton / Topcliffe / Thirsk area. These are mainly Rob's own collections from 1937 to 1949 with some additional specimens collected by E.C. Wallace (mainly from Copgrove / Foster Flatts) and Foggitt.

Harrogate and District Naturalists' Society has been active in studying the wildlife of a large part of the study area for many years, including the production of a botanical Atlas (Jowsey, 1979). Most recently, Phyll Abbott's botanical *Atlas* for mid-west Yorkshire (Abbott, 2005) brings recording of the area south of Ure up-to-date.

In recent decades, nationally-important sites have been surveyed during the designation and monitoring of SSSIs, with data held on file at the York and Leyburn offices of English Nature. Between 1999 and 2005, many non-statutory sites of known wildlife interest have been surveyed under the auspices of North Yorkshire County Council and Harrogate Borough Council. Regular reports are also produced for a number of Nature Reserves such as High Batts NR and Staveley NR.

4. Study method

Records from an earlier study (Hammond, 2006) were checked and entered onto an Excel spreadsheet along with data from other sources identified more recently (e.g. Brunton, 1806; Miall & Carrington, 1862; Robinson, 1833; Winch, 1814). Herbarium datasets were accessed on www.herbariaunited.org along with paper catalogues for the Yorkshire Philosophical Society herbarium and the C.M. Rob herbarium held at the Yorkshire Museum. A full run of YNU excursion reports has been examined along with a substantial but not complete run of *The Naturalist*.

Species have been categorised as locally-extinct where the national BSBI database contains no record within the Washlands since 1990. In a few instances, the most recent record has been imprecisely dated and enquiries have been made of local naturalists. For a very small number of species, post-1990 records exist but the sites are known to have been degraded to the point where it is very unlikely the species survives.

The plant species covered by this study are natives or archaeophytes (ancient introductions); neophytes (more recent introductions) have been excluded.

Casuals

Historically, casual species were frequently introduced as seed contaminants. Where these are neophytes or were never part of the established arable flora of Yorkshire, they have been ignored, e.g. two records of Larkspur *Consolida ajacis* referred only to a handful of individual plants (Baker & Nowell, 1854) while Greater Bur-parsley *Turgenia latifolia*, Pheasant's-eye *Adonis annua*, Weasel-snout *Misopates orontium* and Greater Venus's Looking-glass *Legousia speculum-veneris* were recorded just on single occasions (Foggitt, 1909b; Brunton, 1806; Baker & Nowell, 1854). Toothed Medick *Medicago polymorpha* is represented by scattered 19th century records and may have been either casual or an edge-of-range native. Species which evidently became established members of the local flora for prolonged periods have been included, however, including Small Bur-parsley *Caucalis platycarpos*.

A few species are problematic in this respect: Lees (1888) referred to Yellow Vetchling *Lathyrus aphaca* as "a fugitive waif" this far north though it has occurred in at least four locations in the study area between about 1800 and 1971. Annual Vernal-grass *Anthoxanthum aristatum* has been treated as a casual although it was established for several years at one location near Thirsk in the 1890s (Foggitt, 1909a).

Downstream colonisation of upland species occurs occasionally in river valleys: Lees (1888) mentioned the brief establishment of a small population of Spring Sandwort *Sabulina verna* on a "shifting bank" below Hackfall in 1871, while sporadic records of *Cochlearia* by the Ure probably refer to ephemeral populations of Pyrenean Scurvy-grass *C. pyrenaica* washed down from the Dales. Lees also noted how Northern Dock *Rumex longifolius*⁷ would occasionally establish on the banks of the Ure, washed down from Wensleydale, and this process probably accounts for sporadic records today. Although not associated with flooding, Lees reported the brief appearance of Perennial Flax *Linum perenne* on broken ground on Whitcliffe Lane, Ripon, in 1869; the plant was not present the following year. While interesting, such occurrences have been disregarded in this study.

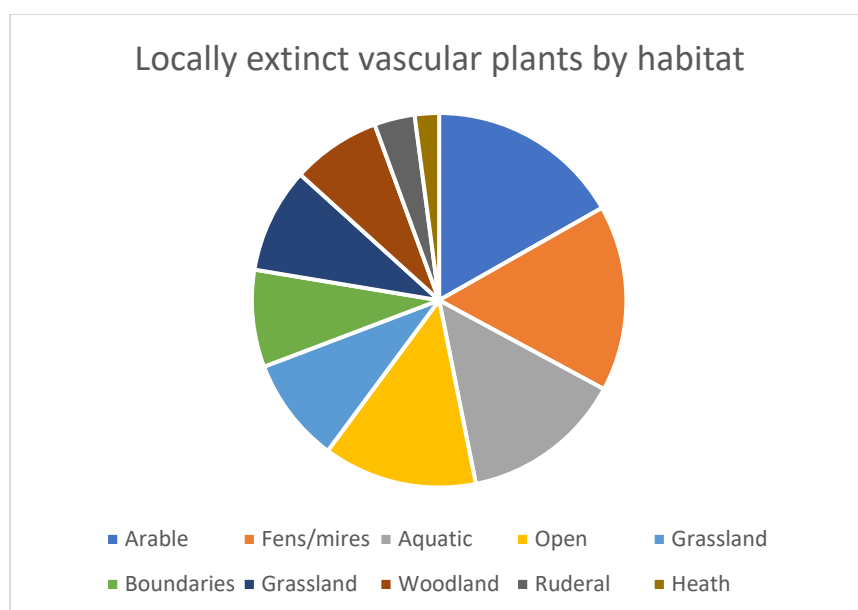
Columbine *Aquilegia vulgaris* occurred as a presumably native species at Tanfield and Masham in the late 19th century. It's possible these native populations have disappeared, only to be replaced by numerous casual records of garden escapes of the same plant.

Sowing of 'wildflower' mixtures, often in incongruous locations or including cultivated taxa, causes considerable problems for understanding botanical change, not least among arable flowers. Here it has been presumed that recent records of Cornflower *Centaurea cyanus* and Corncockle *Agrostemma githago* result from deliberate sowing and do not represent wild populations.

⁷ As *R. aquaticus*

5. Local extinctions by habitat

In the following section, species have been divided into broad habitat-based groups. This is not straightforward but grouping has been informed, where possible, by information from contemporary recorders. The general characteristics of each group are discussed. Reference is made to Ellenberg moisture (F), reaction (R) and nitrogen (N) values. These scores were originally devised by the German plant ecologist H. Ellenberg but have been revised using British data by Hill *et al* (1999). Revised Ellenberg values give a useful indication of the water level, base-status and nutrient requirements of vascular plants and can be used to assess the attributes of locally-extinct species.



Arable plants

Annual 'weeds' of cultivation are among the most declining elements of the British flora (Robinson & Sutherland, 2002). Many once widespread cornfield plants such as Corncockle, Cornflower, Corn Buttercup, Field Gromwell, Venus's Looking-glass and Darnel have disappeared from the Washlands as wild plants. While often originating as ancient introductions (21 out of 24 are classed as archaeophytes), these were certainly self-sustaining species 150 years ago. However, deciding quite which species should be counted as 'wild' is problematic: we could include as many as 36 but around a dozen of these were only recorded once or appear to have been ephemeral introductions⁸. A total of 24 formerly established species seems a reasonable figure, making arable plants the largest group of locally-extinct species.

⁸ There is also a possibility of taxonomic confusion with *Fumaria*, *Galeopsis* and *Valerianella* species – more a question of nomenclature rather than misidentification when outstanding botanists as Baker and Foggitt were the source of records. This only applies to taxa recorded just once, so does not affect the figures.

<i>Agrostemma githago</i>	Corncockle
<i>Apera spica-venti</i>	Loose Silky-bent
<i>Buglossoides arvensis</i>	Corn Gromwell
<i>Bupleurum rotundifolium</i>	Thorow-wax
<i>Caucalis platycarpos</i>	Small Bur-parsley
<i>Centaurea cyanus</i>	Cornflower
<i>Cuscuta epithymum</i>	Dodder
<i>Galeopsis angustifolia</i>	Red Hemp-nettle
<i>Galeopsis segetum</i>	Downy Hemp-nettle
<i>Galium tricornutum</i>	Corn Cleavers
<i>Kickxia elatine</i>	Sharp-leaved Fluellen
<i>Lamium confertum</i>	Northern Deadnettle
<i>Legousia hybrida</i>	Venus's Looking-glass
<i>Lolium temulentum</i>	Darnel
<i>Orobanche minor</i>	Common Broomrape
<i>Ranunculus arvensis</i>	Corn Buttercup
<i>Rhinanthus angustifolius</i>	Greater Yellow Rattle
<i>Roemeria argemone</i>	Prickly Poppy
<i>Roemeria hispida</i>	Rough Poppy
<i>Scandix pecten-veneris</i>	Shepherd's Needle
<i>Silene gallica</i>	Small-flowered Catchfly
<i>Torilis arvensis</i>	Spreading Hedge-parsley
<i>Valerianella carinata</i>	Keeled-fruited Cornsalad
<i>Valerianella dentata</i>	Narrow-fruited Cornsalad

Included within this category are two species recorded primarily as parasites of clover leys in the 19th and early 20th centuries: Common Broomrape and Common Dodder. The latter was also reported from cornfields (Baker, 1907; Foggitt, 1909a) while Lees (1888) described it in semi-natural habitat, from a “Furzy bank above the Yore, near Little Nunwick”.

It’s important to remember that arable land in the Georgian and Victorian period was not only untouched by herbicides but may have inherited features of the preceding, early modern open-fields such as baulks and wide field margins which may have persisted for some decades after enclosure. Some plants like Red Hemp-nettle have been placed in the arable category based on contemporary statements (in 1882, Henry Slater described this species as found not uncommonly “in dry fields”) while other such as Basil Thyme *Calamintha acinos*, Annual Knawel *Scleranthus annuus* and Tower Mustard sometimes occurred on arable land but more often in other open habitats.

Changes in the arable flora were observed during the 19th century. Lees (1888) considered that Field Woundwort *Stachys arvensis* had increased since the early decades of the century, perhaps being regularly introduced with imported seed-corn; on the other hand, he regarded Red Hemp-nettle as much rarer than suggested by earlier accounts. William Brunton (died 1805) had considered Darnel as frequent around Ripon while Rev James Dalton described it as “too common” at Copgrove in 1790; in 1863, Baker could still describe Darnel as “not infrequent” on arable land but in 1881, Rev Slater searched for it around Ripon and could only find a single plant. Once a serious and persistent nuisance weed (fungal-infected Darnel seeds are poisonous), it is now an extremely rare casual in Britain. Foggitt (1909) described Corncockle as “less frequent than formerly”. Henry Slater found Corn Buttercup “So plentiful in some cornfields near Markington in 1881 as to give them a bright yellow colour” (Slater, 1882). It is now listed as Critically Endangered in Great Britain.

A number of other plants which were once locally-frequent on arable land are represented by modern records but are much rarer and may be teetering on the brink of local extinction. Night-flowering Catchfly *Silene noctiflora* is a classic example: known historically from at least 15 distinct locations, the only recent records are from two adjoining quarried sites.

Collectively, locally-extinct arable plants were associated with soils of moderate fertility, with a mean Ellenberg N score of 4.3. While it’s difficult to calibrate this against modern arable weed assemblages, the mean N score for the constant components of the *Papaver rhoeas-Viola arvensis* community (NVC OV3) is 6; this is a widespread community of light arable soils in lowland England. Most of this group are associated with base-rich soils but Downy Hemp-nettle and Dodder have low Ellenberg R scores.

This group is dominated by species of high conservation concern in Great Britain: three-quarters have a status of Near Threatened or above, with two-thirds being of conservation concern in England. Small Bur-parsley and Downy Hemp Nettle are extinct in the wild. Ten others are listed as either Endangered or Critically Endangered in Great Britain; this rises to 12 species in an English context, i.e. half of locally-extinct arable plants are in danger of extinction in the wild in England.

Conservation implications

These findings support an increased focus on arable plants in the Swale and Ure Washlands.

In addition to locally-extinct species, others such as Night-flowering Catchfly and Bur Parsley *Anthriscus caucalis* should be considered on the brink, very small numbers of plants germinating sporadically from a dwindling soil seed bank. Organic/low input cropping and arable options for Environmental Land Management Schemes may offer some respite for arable plants but any vision for landscape-scale habitat restoration in the Washlands should include cultivated land on less fertile, stony or sandy soils where some of these plants could be reintroduced, following the work of the Cornfield Flowers Project in north-east Yorkshire. This might include areas where wildlife seed crops offer an alternative to commercial cereal production, or arable land annexed to nature reserves.

Fens and mires

This represents the second largest habitat group, containing 23 species. It can be divided into 18 species associated with base-poor wetlands (Ellenberg R ≤ 4) and six favouring rich fens (R ≥ 5); these are denoted *P* and *R* in the table below. Though Meadow Thistle arguably occupies an intermediate position, it was found in poor-fen at Pilmoor.

<i>Aristavena setacea</i>	Bog Hair-grass	<i>P</i>
<i>Blysmuss compressus</i>	Flat-sedge	<i>R</i>
<i>Carex canescens</i>	White Sedge	<i>P</i>
<i>Carex diandra</i>	Lesser Tussock Sedge	<i>R</i>
<i>Carex limosa</i>	Bog Sedge	<i>P</i>
<i>Cicuta virosa</i>	Cowbane	<i>R</i>
<i>Cirsium dissectum</i>	Meadow Thistle	<i>P</i>
<i>Drosera anglica</i>	Greater Sundew	<i>P</i>
<i>Drosera intermedia</i>	Oblong-leaved Sundew	<i>P</i>
<i>Drosera rotundifolia</i>	Round-leaved Sundew	<i>P</i>
<i>Gentiana pneumonanthe</i>	Marsh Gentian	<i>P</i>
<i>Hypericum elodes</i>	Marsh St John's-wort	<i>P</i>
<i>Lycopodiella inundata</i>	Marsh Clubmoss	<i>P</i>
<i>Lysimachia thysiflora</i>	Tufted Loosestrife	<i>P</i>
<i>Narthecium ossifragum</i>	Bog Asphodel	<i>P</i>
<i>Osmunda regalis</i>	Royal Fern	<i>R</i>
<i>Rhynchospora alba</i>	White Beak-sedge	<i>P</i>
<i>Scheuchzeria palustris</i>	Rannoch Rush	<i>P</i>
<i>Selaginella selaginoides</i>	Lesser Clubmoss	<i>R</i>
<i>Thelypteris palustris</i>	Marsh Fern	<i>R</i>
<i>Trichophorum germanicum</i>	Deer-grass	<i>P</i>
<i>Vaccinium oxycoccus</i>	Cranberry	<i>P</i>
<i>Viola palustris</i>	Marsh Violet	<i>P</i>

It is likely that Bog Sedge, White Beak-sedge, Rannoch Rush, Oblong-leaved Sundew and Cranberry were entirely dependent on raised mire in the Washlands, a habitat which no longer exists following the destruction of Leckby Carr, Marton-le-Moor Carr and Tanfield Hall Carr.

N values are low or very low with a mean score of 1.9, showing that locally-extinct fen and mire plants are strongly associated with nutrient poor wetlands. Only four of these species (17%) are of conservation concern in a GB context but fourteen (61%) are in England.

Several fen species survive in the Washlands only as small populations in one or two locations, and must be considered vulnerable. For example, Cow Myers SSSI is located at the edge of the study area, near Azerley; this site provides the sole recent records for Bird's-eye Primrose *Primula farinosa* and Grass-of-Parnassus *Parnassia palustris*. Species found at Cow Myers and just one other location each include Tawny Sedge *Carex hostiana*, Globeflower *Trollius europaeus*, Common Butterwort *Pinguicula vulgaris* and Marsh Lousewort *Pedicularis*

palustris. Broad-leaved Cotton-grass *Eriophorum latifolium* and Few-flowered Spike-rush *Eleocharis quinqueflora* survive only at Marfield Fen SSSI. Slender Sedge *Carex lasiocarpa*, formerly known from half a dozen sites, was last seen in a kettle hole by the A1 in 2004 but only as a few vegetative shoots in a wetland squeezed between the motorway and intensive arable farmland. Marsh Stitchwort *Stellaria palustris* has been found recently only at The Carr, Grafton. Small amounts of Hare’s-tail Cotton-grass *Eriophorum vaginatum* can still be found at Pilmoor but it may now be lost from Staveley Nature Reserve.

Conservation implications

Fen and mire species not only constitute the second largest group of locally-extinct vascular plants but several more are at risk, surviving only in one or two sites. The association of many locally-extinct wetland plants with low-nutrient conditions shows that remaining habitats need to be protected from nutrient pollution and hydrological disruption.

Experience suggests that natural recolonisation of fen plants on restored mineral sites is slow or non-existent, presumably due to lack of propagules and/or poor dispersal capabilities. Moreover, there are few prospects for species dependent on low-nutrient or acidic waters since the necessary physico-chemical conditions no longer exist. Prospects are brighter for the re-creation of more eutrophic fen types on mineral sites, e.g. communities based on Common Reed *Phragmites australis*, Great Fen Sedge *Cladium mariscus* and Tufted Sedge *Carex elata*. This is currently a focus of work by the Lower Ure Conservation Trust at Nosterfield Quarry. Cowbane is one species which might be reintroduced into such habitat.

Aquatic plants

Nineteen aquatic/semi-aquatic plant species are considered locally-extinct. Some of these losses are relatively recent: Fen Pondweed, for example, was found at a pond near Crakehall in 2004 but the site is now heavily eutrophicated as a result of changed fishery management. The historic status of Whorled Water-millfoil may be debatable due to past mis-identification.

<i>Alopecurus aequalis</i>	Orange Foxtail
<i>Eleogiton fluitans</i>	Floating Club-rush
<i>Helosciadium inundatum</i>	Lesser Marshwort
<i>Hydrocharis morsus-ranae</i>	Frogbit
<i>Littorella uniflora</i>	Shoreweed
<i>Luronium natans</i>	Floating Water-plantain
<i>Myriophyllum verticillatum</i>	Whorled Water-millfoil
<i>Persicaria minor</i>	Small Water-pepper
<i>Persicaria mitis</i>	Tasteless Water-pepper
<i>Pilularia globulifera</i>	Pillwort
<i>Potamogeton alpinus</i>	Reddish Pondweed
<i>Potamogeton coloratus</i>	Fen Pondweed
<i>Potamogeton gramineus</i>	Various-leaved Pondweed
<i>Rumex hydrolapathum</i>	Great Water Dock
<i>Sparganium natans</i>	Least Bur-reed
<i>Spirodela polyrhiza</i>	Greater Duckweed

<i>Teucrium scordium</i>	Water Germander
<i>Utricularia minor</i>	Lesser Bladderwort
<i>Utricularia vulgaris</i>	Greater Bladderwort

Lost aquatic plants can be divided roughly between 12 species of oligotrophic or mesotrophic waters (Ellenberg N score ≤ 5) and seven found in more eutrophic conditions. The former group include some favouring *moderately* base-poor water (Pillwort, Lesser Bladderwort, Shoreweed) and others associated with calcareous conditions (Fen Pondweed). The mean N score for all 19 is 4.8 but varies from 2 to 9; the highest scores are attributable to the two *Persicaria* species, annuals which grow on exposed mud in draw-down zones.

Only five of these species (25%) are of conservation concern in a GB context but this belies strong declines of several others in the agricultural lowlands of England: 12 (60%) are Red-listed or Near Threatened in an English context.

Conservation implications

As with poor-fen plants, the destruction of peatland habitats and pervasive eutrophication preclude the re-establishment of aquatic species dependent on low-nutrient and base-poor waters. The disappearance of other species reflects the loss of floodplain carrs with extensive, clean-water ditch systems such as at Newsham Carr, Newby Wiske Carr, Kirby Wiske Carr and Ainderby Bottoms. There also appears to have been an impoverishment of the aquatic flora of Ripon Canal and the dubs (natural gypsum sink-hole ponds) at Ripon Parks.

While mineral site restoration has often involved the creation of open water bodies, these are generally deep, steep-sided and grazed by large numbers of geese. The richest such site for aquatic plants is Staveley Yorkshire Wildlife Trust reserve, which supports Opposite-leaved Pondweed *Groenlandia densa*, Water Violet and Lesser Water-plantain *Baldellia ranunculoides*. Creation of ditch systems and backwaters within reedbeds at sites such as Ripon City Wetlands and Nosterfield Quarry may provide opportunities for re-introducing aquatic plants of more nutrient- and base- rich waters if natural regeneration does not occur; at these sites any in-situ seed bank has likely been removed by quarrying but Ripon City Wetlands is extensively flooded and monitoring of aquatic flora should be undertaken. The occurrence of the nationally-rare stonewort *Chara rudis* in foot-drain pools at Nosterfield Nature Reserve indicates the potential for occasional colonisation of aquatic plants from distant sources but this seems to be unusual.

Open habitats

Nineteen locally extinct plants are annuals, biennials or short-lived perennials associated with open vegetation in disturbed habitats. These are uncompetitive and small, sometimes tiny species favouring sandy or calcareous soils.

<i>Calamintha acinos</i>	Basil Thyme
<i>Fumaria purpurea</i>	Purple Fumitory
<i>Gnaphalium sylvaticum</i>	Heath Cudweed
<i>Hypochaeris glabra</i>	Smooth Cat's-ear
<i>Linum radiola</i>	Allseed
<i>Medicago minima</i>	Bur Medick
<i>Minuartia hybrida</i>	Toothed Medick
<i>Myosurus minimus</i>	Mousetail
<i>Ornithopus perpusillus</i>	Bird's-foot
<i>Plantago coronopus</i>	Buck's-horn Plantain
<i>Ranunculus parviflorus</i>	Small-flowered Buttercup
<i>Ranunculus sardous</i>	Hairy Buttercup
<i>Scleranthus annuus</i>	Annual Knawel
<i>Spergularia rubra</i>	Sand Spurrey
<i>Teesdalia nudicaulis</i>	Shepherd's-cress
<i>Torilis nodosa</i>	Knotted Hedge-parsley
<i>Trifolium scabrum</i>	Rough Clover
<i>Trifolium striatum</i>	Knotted Clover
<i>Turritis glabra</i>	Tower Mustard

Shepherd's-cress, for example, was found on dry, sandy ground at Pilmoor and Hutton Moor. Basil-thyme was variously reported from roadsides, arable fields, a former warren and a limestone quarry. Mousetail was found in 'fields', hedgebanks and a former common. Arguably the flagship species for this group is Tower Mustard, found in at least 27 distinct locations between 1792 and 1972; habitats included lanes, hedgebanks, cornfields and the banks of the River Ure.

There is some potential overlap between these plants and the arable, boundary and heathland groups but this is a meaningful cluster of species. Their mean Ellenberg N value is 3.3, so these are predominantly plants of low-nutrient habitats where taller and bulkier competitors are constrained by fertility. They grow in habitats of varying base-status: Shepherd's-cress, Bird's-foot, All-seed, Heath Cudweed and Smooth Cat's-ear are plants of base-poor sandy soils while others are calcioles. Ten (53%) are species of conservation concern (Near Threatened or Red Listed) in Great Britain; 11 (58%) are of concern in England. In contrast to the arable flora, in which 85% of locally-extinct species are archaeophytes, these are all native or probably native plants of sandy or gravelly soils; Toothed Medick *Medicago polymorpha* was excluded from the analysis as it is considered to be casual this far north, though there are records from four locations. Although the life-strategies of most of these species do not appear to have been published, it is likely most are stress-tolerators whereas most of the arable group are likely to be ruderals.

Conservation implications

This is a definite Cinderella habitat, not recognised as a conservation priority and barely featuring in current agri-environment prescriptions. Likely drivers of local extinction include:

loss of sandy commons with trackways and parched grassland; agricultural intensification and the disappearance of baulks and headlands left over from open field cultivation; a general ‘tidying up’ of the landscape; and the pervasive effects of nutrient-enrichment from atmospheric nitrogen deposition. As a group, these are probably plants which prefer occasional or intermittent disturbance rather than annual cultivation and some of them appear to have grown in the same locations over extended periods, suggesting poor dispersal.

It seems reasonable to speculate that loss of sunny, open habitats with short, patchy vegetation has been accompanied by loss of invertebrates sharing similar requirements.

Boundary habitats

A dozen species have been lost from boundary habitats. These are plants often described in the literature as growing on lanes, roadsides and hedgebanks. In general, these prefer habitats which are not regularly managed but where succession to scrub was probably controlled by intermittent hay cutting or grazing (pre-enclosure commons often extended along roadsides or lanes, providing drove routes between villages and commons).

<i>Carex muricata</i> ssp. <i>pairae</i>	Prickly Sedge
<i>Carex ornithopoda</i>	Bird's-foot Sedge
<i>Cuscuta europaea</i>	Greater Dodder
<i>Dipsacus pilosus</i>	Small Teasel
<i>Epipactis atrorubens</i>	Dark-red Helleborine
<i>Hylotelephium telephium</i>	Orpine
<i>Jasione montana</i>	Sheep's-bit
<i>Marrubium vulgare</i>	White Horehound
<i>Nepeta cataria</i>	Cat-mint
<i>Ophrys insectifera</i>	Fly Orchid
<i>Sambucus ebulus</i>	Dwarf Elder
<i>Viscum album</i>	Mistletoe

There is a subset of synanthropic archaeophytes once rather characteristic of country lanes in central North Yorkshire: Dwarf Elder, formerly planted as a source of blue dye and recorded from nine localities⁹; White Horehound, described as “Not unfrequent upon hedgebanks and by roadsides” by Baker (1895) and formerly known from at least 14 sites; while Cat-mint was recorded from at least nine distinct locations. Motherwort *Leonurus cardiaca* was described by Lees (1888) as “Formerly much used by herbalists and dames as an expectorant; obsolete now, seldom grown and so seldom escaping. In most of the old stations it has become extinct”¹⁰.

By contrast, three plants (Bird’s-foot Sedge, Fly Orchid and Dark-red Helleborine) are specialities of infertile, rocky limestone habitats but often in *saum* or open woodland rather

⁹ There is a single late 20th century record of Dwarf Elder but no details are available and the site has been well recorded since with no evidence.

¹⁰ As Motherwort is classed as a neophyte, it has not been included in the analysis. However, it’s likely that Lees’s comments would apply equally to the three archaeophytes mentioned.

than grazed pasture. Small Teasel is also associated with calcareous wood margins but prefers moist, more nutrient-rich soils.

Smith (1903) described “open thickets” forming on remnants of magnesian limestone grassland in Harrogate district where grazing was restricted. His list is reproduced below because it paints a vivid picture of *saum* (grassland-scrub mosaic) and *mantel* (shrubby woodland edge) zones on the limestone.

<i>Corylus Avellana</i> , L. Dominant.	<i>Scabiosa Columbaria</i> , L.
<i>Ranunculus Auricomus</i> , L.	<i>S. arvensis</i> , L.
<i>Helleborus viridis</i> , L. Local.	<i>Carduus nutans</i> , L.
<i>Arabis hirsuta</i> , Scop.	<i>C. Crispus</i> , L.
<i>Reseda lutea</i> , L.	<i>Centaurea scabiosa</i> , L.
<i>R. Luteola</i> , L.	<i>Hieracium Pilosella</i> , L.
<i>Helianthemum Chamæcistus</i> , Mill.	<i>Ligustrum vulgare</i> , L.
<i>Viola odorata</i> , L.	<i>Blackstonia perfoliata</i> , Huds.
<i>V. hirta</i> , L.	<i>Cynoglossum officinale</i> , L. Rare.
<i>Cerastium arvense</i> , L.	<i>Lithospermum officinale</i> , L. Local.
<i>Hypericum montanum</i> , L.	<i>Echium vulgare</i> , L.
<i>Geranium sanguineum</i> , L.	<i>Atropa Belladonna</i> , L.
<i>G. columbinum</i> , L.	<i>Verbascum Thapsus</i> , L.
<i>Euonymus europæus</i> , L.	<i>Origanum vulgare</i> , L.
<i>Rhamnus catharticus</i> , L.	<i>Calamintha officinalis</i> , Moench.
<i>Ononis spinosa</i> , L.	<i>Listera ovata</i> , R. Br.
<i>Anthyllis Vulneraria</i> , L.	<i>Orchis pyramidalis</i> , L.
<i>Astragalus glycyphyllos</i> , L.	<i>Ophrys apifera</i> , Huds.
<i>Rubus cæsius</i> , L.	<i>O. muscifera</i> , Huds.
<i>Rosa spinosissima</i> , L.	<i>Carex sylvatica</i> , Huds.
<i>R. mollis</i> , Sm.	<i>C. flacca</i> , Schreb.
<i>Crataegus Oxyacantha</i> , L.	<i>Bromus ramosus</i> , Huds.
<i>Saxifraga tridactylites</i> , L.	<i>B. erectus</i> , Huds.
<i>Galium Mollugo</i> , L.	<i>Brachypodium pinnatum</i> , Beauv.
<i>Asperula cynanchica</i> , L.	<i>Asplenium Ruta-muraria</i> , L.

It is rather difficult to characterise the collective attributes of this group of plants: their mean N value is 4.75 but the three *saum* species are plants of very low-nutrient habitats with an average score of just 2 while some of the archaeophytes are associated with more enriched soils (Dwarf Elder, White Horehound and Cat-mint have Ellenberg N scores of 6 to 8). Most are calcicoles favouring markedly base-rich soils though Sheep’s-bit *Jasione montana* is found in base-poor situations, often on the margins of heaths.

A number of other plants of boundary habitats retain only a tenuous hold in the Washlands including Deadly Nightshade *Atropa belladonna*, Common Calamint *Calamintha nepeta* and especially Hound’s-tongue *Cynoglossum officinale*¹¹.

¹¹ There are nine historic records Hound’s-tongue, three of which refer to roadsides, two to riverbanks and one to a limestone quarry. This is a species of disturbed habitats on base-rich, often gravelly soils and its decline is attributable to the replacement of open vegetation on less productive substrates by closed perennial vegetation, with eutrophication likely being a driver of this process. There is one recent record from Rocliffe.

Conservation implications

This is quite a ‘mixed bag’ of plants, some being native habitat specialists while others are ancient escapes from cultivation (or native plants which were brought into cultivation for their utility).

Fly Orchid and Dark-red Helleborine are scarce species of thin-soiled, open woodland or scrub on limestone which have periodically colonised ersatz habitats such as abandoned quarries and kiln sites. Burton Leonard Lime Kilns Yorkshire Wildlife Trust reserve is a historic site for both of these and continues to support several other rare calcicoles. While *saum* is understood and appreciated as a habitat of conservation value in mainland northern Europe, it doesn’t even have an English name and doesn’t feature in inventories of priority habitats. We tend to value woodland on the one hand and grazed limestone grassland on the other but not the interface between the two. Where limestone bedrock is exposed by quarrying, should we pay more attention to these transitional habitats?

There is, perhaps, a similar conundrum with road verges, which conservationists tend to value as remnant or potential meadow-like grasslands. The practicalities of verge management are thwart with problems but encouraging engineers to think about thin-soiled banks and rocky outcrops might restore some of the diversity of plant habitats which seems to have existed along rural lanes in the past.

Conservation interest in archaeophyte plants tends to be quite selective: while disappearing arable plants originating from the Near East and Mediterranean are often seen as worthy of conservation, little attention is paid to plants like Cat-mint or Dwarf Elder which were once widely naturalised from cottage gardens.

Grassland

Fourteen plant species associated with meadows and pastures have been lost.

<i>Anacamptis morio</i>	Green-winged Orchid
<i>Antennaria dioica</i>	Mountain Everlasting
<i>Astragalus danicus</i>	Purple Milk-vetch
<i>Botrychium lunaria</i>	Moonwort
<i>Cirsium eriophorum</i>	Woolly Thistle
<i>Colchicum autumnale</i>	Meadow Saffron
<i>Dactylorhiza viridis</i>	Frog Orchid
<i>Gentianella campestris</i>	Field Gentian
<i>Nardus stricta</i>	Mat-grass
<i>Neotinea ustulata</i>	Burnt Orchid
<i>Platanthera bifolia</i>	Lesser Butterfly Orchid
<i>Pulsatilla vulgaris</i>	Pasqueflower
<i>Vicia lathyroides</i>	Spring Vetchling

Two of these (Mountain Everlasting and Mountain Pansy) were known from single locations, the former at Copgrove ca. 1790 and the latter at Kirby Hill Moor pre-1823. These were

lowland outposts for these small plants, now confined to thin-soiled, low-nutrient grasslands in the uplands. Another acidic grassland species, Mat-grass, seems to have been reported only from Hutton Moor. Field Gentian, known from two sites, is also a species of infertile, usually base-poor soils.

Six flowers of nutrient-poor calcareous pastures have gone, reflecting the loss of magnesian limestone grassland. Frog Orchid was known from at least ten distinct locations and was described as “plentiful in several places near Ripon” by R. Clapham in the mid-19th century (per Miall, 1863). Burnt Orchid was similarly “abundant near Ripon” in the same period: although location details are vague, it was probably known from a dozen or more sites. A single spike was found at Ripon Parks in 2006 but to all intents and purposes Burnt Orchid has been lost from the Washlands. Lesser Butterfly Orchid was known from four locales; at Pilmoor and possibly on Carthorpe Moor it would have been associated with heathy rather than calcareous habitats.

Pasqueflower was well-known from North Stainley in the late 19th century, though described as rare there by Slater (1882). Almost at the northern edge of its historic range, this is an example of the broadly southern affinities of the magnesian limestone flora in Yorkshire. Slater’s reference to Purple Milk-vetch from Masham is puzzling given the lack of other records and would represent an isolated location but this species did occur on the magnesian limestone further south.

It is likely that commons such as Thornborough Moor and Thornton Watlass Moor contained extensive areas of calcareous grassland before they were enclosed and subsequently converted to arable. The gentle terrain and easily cultivated soils of the magnesian limestone ridge mean that very little semi-natural grassland now remains and this has been the case for at least a century: Smith (1903) observed that “Uncultivated places of small extent are to be found on steep banks and in numerous disused quarries from which at one time limestone was extensively quarried”. Wallace (1943) wrote that “Nearly all the fertile soil of the narrow magnesian limestone belt has long been under cultivation. This has resulted in the almost total disappearance of the aboriginal turf over the area, and very little ‘downland’ remains to show the character of the original flora”.

Of the neutral grassland species, Meadow Saffron was recorded from at least 14 separate locations between 1790 and 1971 but now appears to be extinct within the study area. Many of these records refer to broad locations or imply that it occurred in more than one site, so this was evidently a locally-frequent species. Around 1800, Rev James Dalton referred to Meadow Saffron as “much too common” around Copgrove while William Brunton found it “too abundant” in meadows around Ripon (Turner & Dillwyn, 1805). These comments reflect its toxicity to livestock and the species may have been deliberately eliminated by farmers; its bulbs were also harvested for colchicine. It’s likely, however, that conversion of old grassland to arable and replacement of semi-natural swards by improved pasture was the main factor in its demise. Green-winged Orchid was known from at least ten locales but was last seen in the Washlands in 1971.

Overall, locally-extinct grassland plants depend on unproductive swards, with a mean Ellenberg N score of 2.64. Eight (57%) are of conservation concern in a GB context, rising to 11 (79%) in England.

Conservation implications

Although magnesian limestone grassland is recognised as a distinct element of the lowland calcareous grassland priority habitat, there has been little strategic effort to maintain and restore the small, dwindling and fragmented resource in North Yorkshire. Several species such as Large Thyme *Thymus pulegioides* and Rare Spring Sedge *Carex ericetorum* survive only as very small, isolated populations in the Washlands. An important remnant at Thornborough Middle Henge is threatened by degradation and recent efforts to restore its conservation value have not reached fruition. This habitat is now so rare in North Yorkshire that it deserves far more attention.

Historically, the Swale and Ure Washlands probably contained more species-rich floodplain meadow than survives in the whole UK today. No intact examples remain, so this is another priority for restoration although, as with other semi-natural grasslands, it is likely to take decades before re-created sites become potentially suitable for rarer plants.

Woodland

Eleven woodland plants appear to have been lost from the Washlands, although it is conceivable that one or two of these may await rediscovery in the complex ancient woodlands of the Ure gorge at Hackfall.

<i>Actaea spicata</i>	Baneberry
<i>Convallaria majalis</i>	Lily of the Valley
<i>Equisetum hyemale</i>	Rough Horsetail
<i>Ervillea sylvatica</i>	Wood Vetch
<i>Geranium sylvaticum</i>	Wood Crane's-bill
<i>Melica nutans</i>	Mountain Melick
<i>Monotropa hypopitys</i>	Yellow Bird's-nest
<i>Neottia nidus-avis</i>	Bird's-nest Orchid
<i>Platanthera chlorantha</i>	Greater Butterfly Orchid
<i>Pyrola media</i>	Intermediate Wintergreen
<i>Rubus saxatilis</i>	Stone Bramble

Not all of these were inhabitants of ancient semi-natural woodland: Yellow Bird's-nest was found in a Larch *Larix* sp. plantation at Kirklington while Intermediate Wintergreen grew in "fir woods" at Breckenborough and on the former Hutton Moor.

Four of these eleven species (36%) are of conservation concern in a both GB and English context, though not the same four! Baneberry, Mountain Melick and Stone Bramble are associated with rocky limestone woodland, with Wood Crane's-bill being another northern species at the edge of its biogeographical range.

Conservation implications

The Ure gorge woodlands at Hackfall and Magdalene Woods, upstream of West Tanfield, remain an important locus for scarce woodland plants. Some which are extinct within the Washlands survive nearby in the Skell valley around Studley Royal or in the Nidd Gorge around Knaresborough. Given the specialist requirements of locally-extinct woodland plants, woodland creation *per se* does not appear to be a priority for biodiversity conservation in the lower Swale and Ure valleys.

Ruderal species

A small group of five ‘weed’ species once occurred sporadically in association with disturbed habitats such as waste ground, streets and middens in towns and villages; these have some commonality with Dwarf Elder, White Horehound and Catmint in boundary habitats.

<i>Descurainia sophia</i>	Flixweed
<i>Hyoscyamus niger</i>	Henbane
<i>Lipandra polysperma</i>	Many-seeded Goosefoot
<i>Oxybasis glauca</i>	Oak-leaved Goosefoot
<i>Oxybasis urtica</i>	Upright Goosefoot

Henbane was known from at least ten places, likely as an escape from cultivation by herbalists. Oak-leaved Goosefoot and Upright Goosefoot were each recorded from four or five locations and belong to a group of Chenopodiaceae which have disappeared from urban weed floras.

Houseleek *Sempervivum tectorum* is an interesting synanthropic plant, not included here due to its neophyte status. Although Lees (1888) questioned whether it was truly naturalised, this was once a familiar plant of thatched cottage roofs; in the late 18th century, Thomas Hird described how Houseleek grew “strong and bold” on villagers’ roofs in Snape.

Three of five species (60%) are of conservation concern in both a GB and English context. Upright Goosefoot is Critically Endangered in both lists.

Heath

Just three locally-extinct plants have been classed as heath species, though some of the ‘open habitat’ and mire species had an associated with heathland on Hutton Moor and Pilmoor. Given that there are several ling place names elsewhere within the Washlands, it’s likely that heathland was once more widespread. Crowberry *Empetrum nigrum* may have grown near Copgrove in the late 18th century but the location of Rev James Dalton’s record is vague and Lees (1888) thought it might even refer to the Nidderdale moors!

<i>Erica cinerea</i>	Bell Heather
<i>Genista anglica</i>	Petty Whin
<i>Vaccinium myrtillus</i>	Bilberry

Petty Whin was known historically from three locations: the wet heath and mire of Pilmoor and what were probably pockets of acidic peat in fens at Copgrove and Ainderby Bottoms.

Although treated in this analysis as a mire plant, the historic distribution of Marsh Gentian gives some indication of the former extent of wet heath on the eastern fringes of the Washlands: it was reported from at least six locations, some rather vague but five of these were in the Pilmoor/Catton/Elmire/Helperby area. With an additional record from Raskelf in the late 19th century, this suggests scattered remnants of wet heath east of the Swale, representing the last fragments of the large and contiguous tract of common which once extended from Easingwold to Elmire. Parts of this moor land were remnants of the former Royal Forest of Galtres, the current Pilmoor SSSI representing the last surviving (and now largely wooded) fragment.

One of the three heathland species is of conservation concern in a GB context, two in an English context. All are associated with base-poor substrates of very low fertility.

Conservation implications

Along with raised mire, poor-fen and low-nutrient aquatic habitats, there are few prospects for the restoration or re-creation of heathland within the Swale and Ure Washlands. Wet heath soils survive within Pilmoor SSSI but this site has largely succeeded to woodland.

6. Former wetland plant communities

There are obvious difficulties in attempting to relate archival botanical records to plant communities described in the National Vegetation Classification. Old publications tend to contain imprecisely-localised lists of species, though YNU excursion reports sometimes provide more coherent descriptions. Accounts of the bryophyte flora can be particularly useful, e.g. the dominance of *Sphagnum fallax* [*S. recurvum*] at Leckby Carr helps place former bog vegetation within the *S. recurvum* (NVC M2) rather than the *S. auriculatum* community (NVC M1); both of these share Rannoch Rush, White Beak-sedge, Cranberry and Mud Sedge among their associated flora.

Nonetheless, the rich archive of botanical records allows some inferences to be made about the characteristics of historic wetlands in the study area. This in turn may help identify opportunities to restore some of the wetland biodiversity of the Washlands.

Present-day wetland communities are predominantly associated with base-rich conditions, with the exception of Pilmoor SSSI. However, acidic mires were once an important feature. The classic example is Leckby Carr, a site which, had it survived intact, would now be considered of international conservation importance. This raised bog had developed in a shallow valley separated from the River Swale by a ridge of gravel hills. Leckby Carr had been cut-through with ditches by the mid-19th Century and was subsequently drained, planted with conifers then partly infilled. The wetter parts of Leckby Carr seem to have been characterised by *Sphagnum fallax* with all three sundew species, Cranberry, White Beak-sedge, Mud Sedge and Rannoch Rush. This assemblage provides a reasonable correspondence to the ***Sphagnum recurvum* bog pool community: *Rhynchospora alba* sub-community (M2a)**. Such vegetation is characteristic of saturated base-poor peats, particularly on lowland raised mires in the less Oceanic areas of Britain. Species lists also indicate the presence of more basiphilous fen vegetation in lagg areas.

The vegetation described from Marton-le-Moor Carr in 1945 also seems to refer to raised mire within a narrow valley on the sand and gravel. The account by A. Malins Smith and W.A. Sledge records that, "Peat formation in the carr itself had raised the ground level well above the water table..." The vegetation was dominated by Hare's-tail Cotton-grass, interspersed by Cranberry with associates including Wavy Hair-grass *Avenella flexuosa*, Purple Moor-grass *Molinia caerulea* and Slender Sedge.

The closest correspondence in the NVC appears to be ***Erica tetralix* - *Sphagnum papillosum* raised and blanket mire (M18)** fringed by heath vegetation. This community can be dominated by Hare's-tail Cotton-grass (as it is at Thorne Moors) and Cranberry is a characteristic associate. However, Purple Moor-grass usually makes only a small contribution to *Erica* - *Sphagnum* mires while Slender Sedge does not feature in the NVC floristic table for this community. The *Erica tetralix* - *Sphagnum papillosum* mire is a community of lowland peatlands, mostly typically ombrogenous raised mires but also occurring occasionally on acidic basin peats. It is associated with a soil pH of around 4 (Rodwell, 1991b).

Near to Marton-le-Moor Carr, a number of acidic mire species were reported from Hutton Moor in the 19th Century, some records specifying a site called Whitemere, probably a former turbary. Such species included Cranberry, White Beak-sedge and White Sedge. Hutton Moor was formerly a vast Common and in the absence of any more coherent description of the vegetation, it is impossible to infer which plant communities might have been present; the lists also include plants of base-rich flushes such as Grass-of-Parnassus and Bird's-eye Primrose.

It seems likely that Tanfield Hall Carr also supported raised mire, as suggested by 19th century records of Hare's-tail Cotton-grass, White Sedge, Bog Sedge and Cranberry: plants otherwise unlikely to occur in an area of calcareous geology.

Just to the south of the study area, Cranberry Carr is located near Hunsingore. Lees (1888) noted that Cranberry had disappeared from this site by 1850 but it was presumably once another example of lowland acidic mire.

When the YNU visited Ainderby Bottoms in 1946, they found in one area tussocky Purple Moor-grass with some Sphagna and an associated flora including Petty Whin, Marsh Cinquefoil *Comarum palustre*, Ling, Creeping Willow *Salix repens*, Heath Woodrush *Luzula multiflora*, Velvet Bent *Agrostis canina* and Common Reed. This mixture reads like a species-rich type of ***Molinia caerulea* - *Potentilla erecta* mire (M25)**, a community still present at Pilmoor SSSI and more extensively on the Vale of York Commons at Strensall and Skipwith. On these sites some amelioration of acidity from the underlying clay allows Common Reed to colonise quite extensively. The former occurrence of Meadow Thistle at Pilmoor suggests the historic presence of more mesotrophic ***Molinia caerulea* - *Cirsium dissectum* fen meadow (M24)**, a community still represented at Langthorne New Covert. In 1952, the YNU recorded Creeping Willow, Marsh Valerian *Valeriana dioica*, Tawny Sedge and Flea Sedge *Carex pulicaris* from fields near Arram Grange: a combination of species perhaps more suggestive of the *Cirsio-Molinietum* than of the more calcicolous and fertile Blunt-flowered Rush fen-meadow.

Elsewhere at Ainderby Bottoms, mixtures of Common Cotton-grass *Eriophorum angustifolium*, rushes, sedges, Common Reed and Yellow Flag *Iris pseudacorus* with abundant Marsh Cinquefoil correspond more readily to ***Carex rostrata* - *Potentilla palustris* tall-herb fen (S27)**.

***Carex rostrata* - *Calliergon* spp. mire (M9)** shares a similar flora to the latter community and is likewise transitional between 'rich' and 'poor' fens. It is an important locus for Lesser Tussock Sedge, a sedge formerly found at six sites in the project area. However, all the Lesser Tussock Sedge records are pre-1907 and, in the absence of more complete floristic descriptions, it would be unwise to infer whether it grew within this specific community.

Of the 'rich fen' communities, the distinctly 'East Anglian' ***Phragmites australis* - *Peucedanum palustre* tall-herb fen (S24)** probably occurred very locally in some valley fens. In the 19th Century, Greater Spearwort *Ranunculus lingua*, Marsh Stitchwort, Purple Loosestrife *Lythrum salicaria*, Great Water Dock, Black Bog-rush *Schoenus nigricans*, Tufted Sedge, Great Fen

Sedge and Marsh Fern occurred at Sharow Mires. This combination of species, growing together on a small site, is more readily related to this type of species-rich reed-fen than any other community. Such vegetation does occur in lowland Yorkshire, albeit rarely, at Askham Bog, Hornsea Mere and in the Lower Derwent valley.

The most prevalent fen community in the study area today is ***Juncus subnodulosus* - *Cirsium palustre* fen-meadow (M22)**, a variable community of base-rich fens of moderate fertility found in a range of hydrological conditions. Blunt-flowered Rush *Juncus subnodulosus* fen is an important component of wetland vegetation at several sites such as Bishop Monkton Ings, Marfield Fen, Aldburgh Marsh, Farnham Mires, Upper Dunsforth Carrs and Staveley NR. Similar types of wet meadow were evidently more widespread in the past; indeed, up to 50 years ago, such 'rushy meadows' only tended to merit passing comment in botanical excursion reports, perhaps implying that they were commonplace.

In a few places, as at Marfield, Bishop Monkton Ings, Ripon Parks and Cow Myers, ***Schoenus nigricans* - *Juncus subnodulosus* mire (M13)** marks distinct areas flushed by calcareous springs. Bryophyte-rich small sedge communities (***Carex dioica* - *Pinguicula vulgaris* mire: M10**) are often embedded with stands of *Schoenus* mire, although not always identified separately in survey reports. There are indications that both these calcareous flush communities were once more widespread and botanically richer than they are today. Several former Black Bog-rush sites are listed in archival records, including some away from the magnesian limestone. There are no less than 19 separate site records for Bird's-eye Primrose, a very distinctive component of the M10, now only present at Cow Myers SSSI.

Aquatic communities

Species-rich floating and submerged vegetation attributable to the ***Hydrocharis morsus-ranae* - *Spirodela polyrhiza* community (NVC A3)** or more convincingly the ***Hydrocharis morsus-ranae* - *Stratiotes aloides* community (NVC A4)** was once of local occurrence in the project area. These are now scarce communities of mesotrophic, base-rich standing or slow-flowing waters in the southern half of Britain, NVC A4 being most typical of Broadland and fen dykes in East Anglia (Rodwell, 1995). One of its key components, Water Soldier *Stratiotes aloides* has never occurred naturally this far north but the other typical species do. There is good evidence that NVC A4 also occurred in the southern Vale of York, e.g. in the former Walling Fen area. NVC A3 is a less structurally-complex community of managed, unshaded ditches.

Aquatic vegetation with mixtures of Frogbit, Greater Bladderwort, Greater Duckweed, Whorled Water-millfoil and Water Violet formerly occurred in the Swale corridor at Newby Wiske and Newsham Carrs and Ainderby Bottoms with indications of similar assemblages from Staveley Carrs and the Ripon dubs. At Ainderby and Newsham, Cowbane presumably occurred amongst more swampy emergent vegetation with Greater Spearwort and Great Water Dock.

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Appendix: Inventory of historic wetland sites based on botanical records

SE 27

Tanfield Carrs (SE 25- 77-)

Tanfield Hall Carr (SE 258 776?) was likely a raised mire, as indicated by the presence of Cranberry, Hare's-tail Cotton-grass, White Sedge and Bog Sedge in the 19th century: these calcifuge species are unlikely to occur in a groundwater-fed wetland at the edge of the magnesian limestone. There were also poor-fen elements such as Lesser Tussock Sedge and Slender Sedge, perhaps suggesting a basin mire with a cut-over peat surface providing a range of water chemistry within a relatively small area.

Baker (1906) gave 'Tanfield' as one of numerous locations for *Utricularia vulgaris*. The marsh orchid *Dactylorhiza traunsteinerioides* was listed for Tanfield (1906) on the Scarce Plants Project database: this rare species is associated with base-rich seepage fens but it is unclear whether the record has been authenticated.

Fen habitat survived into the first half of the 20th Century: the YNU excursion to Tanfield in 1935 documented Bird's-eye Primrose, Globeflower, Black Bog-rush and Meadow Saffron from 'the Carr' but it is unclear if this was the same site as Tanfield Hall Carr.

SE 28

Marfield (SE 22- 82-)

Slater (1882) listed Round-leaved Sundew, Greater Spearwort, Marsh Cinquefoil, Marsh Valerian, Marsh Violet, Bladder Sedge *Carex vesicaria* and Early Marsh Orchid *Dactylorhiza incarnata* for Marfield. He noted Shoreweed from a "pond near Marfield". Carter (1886) described Marfield Pond as:

"...a natural sheet of water of several acres, situated one mile north of Masham. Round the margin, in an average dry year, was open water for several yards, where sprung up in summer masses of *Persicaria*, *Ranunculus* and Water Plantain; beyond this grew a mass of thick reeds occupying the centre of the pond, and within which any ordinary number of birds could be perfectly concealed."

Unfortunately, the pond was then in the process of being drained by the land owner to make way for a Hare coursing enclosure. Carter noted that the single patches of Greater Sundew and Meadow-rue *Thalictrum flavum* were in danger along with a more extensive wetland flora including Marsh Cinquefoil, Bog Asphodel, Bog Pimpernel *Anagallis tenella*, Marsh Pennywort *Hydrocotyle vulgaris*, Grass-of-Parnassus, Marsh Helleborine *Epipactis palustris*, Globeflower, Bird's-eye Primrose and Common Butterwort.

Marfield Fen SSSI still supports an important fen flora characteristic of calcareous seepage mire and including Common Butterwort, Few-flowered Spike-rush, Black Bog-rush and Broad-leaved Cotton-grass. The nature of the pond referred to by Carter and its relationship to the present-day SSSI are unclear. There was clearly a considerable area of permanent standing water in the pre-drainage wetland, sufficient to support a range of breeding and visiting waterfowl. Many of the plants listed by Carter are characteristic of the seepage fen still represented today, though some have inevitably

disappeared; more curious is the presence of sundews and Bog Asphodel since these are associated with acidic *Sphagnum* mires.

Snape Mires area (SE 28- 84-)

The second edition of Baker's *North Riding* contains several records from the Snape area including Greater Bladderwort, Flowering Rush *Butomus umbellatus* (in ditches) and Brookweed *Samolus valerandi*, though only the latter is cited specifically from Snape Mires. Fragrant Orchid *Gymnadenia conopsea* agg., found in drier grassland as well as fens, was also at Exelby and Theakston, with Marsh Helleborine also at the former locality.

In the same account, Marsh Cinquefoil, Grass-of-Parnassus, Great Water Dock, Floating Water-plantain, Tufted Sedge, Floating Club-rush, Marsh Helleborine and Fragrant Orchid are amongst the species recorded from Carthorpe (in some cases Carthorpe Moor specifically). Floating Water-plantain was found "in a pond on Carthorp Moor". Other records for Carthorpe Moor include Bird's-eye Primrose and Lesser Butterfly Orchid.

Baker (1907) listed a number of mire species from the Carthorpe - Burneston - Kilvington area including Bird's-eye Primrose, Great Water Dock, Black Bog-rush, Floating Water-plantain and Pillwort. Harrison (1856) stated that Pillwort grew "In a pond near the Leeming Lane; it is quite full of it".

SE 29

Bolton-on-Swale (SE 28- 96-)

Notable wetland plants listed for Bolton Beck by Robinson (1833) include Nodding Bur-marigold *Bidens cernua*, Triffid Bur-marigold *B. tripartita*, Small Water-pepper *Persicaria minor*, Mudwort *Limosella aquatica* and Water Germander *Teucrium scordium*; commoner species included Gipsywort *Lycopus europaeus* and Creeping Jenny *Lysimachia nummularia*. Water Germander was well-known here, at its only station in northern England, and various specimens are preserved in herbaria. Although much re-iterated, first-hand records seem to date from shortly before 1830 up to 1837. Specific locations are variously given as "banks of Bolton Beck near its junction with the Swale", "by the village" and "in a marsh near mill yard"¹².

In 1864, the Richmond and North Riding Naturalists' Field Club recorded Marsh Speedwell *Veronica scutellata*, Marsh Pennywort, Nodding Bur-marigold and Mudwort in the area around Bolton-on-Swale¹³.

SE 35

Scriven (SE 35- 58-)¹⁴

Lees (1888) listed a site for Great Fen Sedge.

¹² Locations cited respectively by Baker (1863) based on a record by a Mr Ward; Baines (1840); and specimen label in Hooker herbarium, Kew. One sheet of Ward's specimens, now in the Manchester University Herbarium refers to Water Germander growing in "low wet meadows" by Bolton Beck.

¹³ Report in *The Naturalist*, 2 (1865): 155.

¹⁴ Lees cites "Scriven near Ripley", which is odd since it is close to Knaresborough.

SE 36

Copgrove (SE 34- 64-)

James Dalton made many records from the vicinity of Copgrove, presumably including the site now known as Bishop Monkton Ings (some later records specify a part of the Ings known as Foster Flatts). Rev. Dalton found Parsley Water-dropwort *Oenanthe lachenalii* and Bird's-eye Primrose to be plentiful in 1805. Baines (1840) listed Marsh Fern, Divided Sedge *Carex divisa* (probably an error), Tawny Sedge and Broad-leaved Cotton-grass. He described Globeflower as 'very common'.

Additional Copgrove species represented in the YPS Herbarium from 1790-1805 include Bog Pimpernel, Marsh Lousewort, Bilberry¹⁵, Dioecious Sedge *Carex dioica*, Lesser Tussock Sedge, Marsh Clubmoss and Lesser Clubmoss. A specimen of Orange Foxtail collected in 1944 is the C.M. Rob Herbarium. Flat-sedge was mapped by Jowsey (1978) from this vicinity.

Wetland habitat clearly included base-rich fen containing small-sedge flushes but perhaps also patches of oligotrophic, base-poor peat. Rich fen with some calcareous seepages and associated grassland communities survives within Bishop Monkton Ings SSSI. Recently recorded wetland plants include Parsley Water-dropwort, Marsh Lousewort, Marsh Valerian, Marsh Helleborine, Dioecious Sedge, Flea Sedge and Black Bog-rush. Both clubmosses, Marsh Fern, Bird's-eye Primrose, Broad-leaved Cotton-grass and Lesser Tussock Sedge are presumed extinct in this location.

Staveley Carrs (SE 37- 63-)

Staveley Carrs had evidently been drained by the mid-19th Century; according to Slater (1882), the site was "now completely destroyed". There is no indication of wetland on the first edition OS survey (ca. 1854), by which time enclosed fields were established. The current Staveley Nature Reserve overlaps the historic Staveley Carrs but is the result of 20th century aggregate extraction.

The earliest records from Staveley Carrs were made by William Gawthorp, the Rector of Ripley (see Cundall, 1986). He recorded Mare's-tail *Hippuris vulgaris*, Shining Pondweed *Potamogeton lucens*, Broad-leaved Pondweed *P. natans*, Perfoliate Pondweed *P. perfoliatus*, Opposite-leaved Pondweed *Groenlandia densa*, Fine-leaved Water-dropwort *Oenanthe aquatica*, Tubular Water-dropwort *O. fistulosa*, Lesser Marshwort, Brookweed, Purple Loosestrife and Yellow Water-lily *Nuphar lutea*.

Species cited by Victorian authors appear to be based on Rev. Dalton's records from the period ca. 1790-1810. These included Oblong-leaved Sundew, Lesser and Greater Bladderworts Frogbit, Water Violet, Great Fen Sedge, Mare's-tail and Least Bur-reed. These suggest some areas of oligotrophic standing water as well as base-rich fen, a contrast to the highly calcareous water which now feeds Staveley Nature Reserve.

Farnham Mires (SE 33- 60-)

There are few early records for this site but Rev. Dalton recorded Flat-sedge from Farnham Mires and Calvert (1844) reported Bird's-eye Primrose from "a marshy field near Cold Kale". Lees (1888) noted that the latter was still present in 1886 (indeed the last record was in 1986). Both species are

¹⁵ Lees (1888) was dismissive of Dalton's record of Crowberry *Empetrum nigrum* from "moors near Copgrove", noting that, " 'Near' must be elastically interpreted here as in so many of these old records." He suggested that Dalton was probably referring to Nidderdale! How we interpret records of other calcifuge species such as Bilberry and Marsh Club-moss is open to question: was Dalton so vague in his location details, or was there in fact an area of acidic peat within or adjoining the Copgrove fens?

characteristic of nutrient-poor calcareous flushes. Fen Pondweed was reported at Farnham in 1944-50, one record specifying in a roadside drain. More recent records indicated by Jowsey (1978) include Tawny Sedge and, to the south of the village, Creeping Willow.

Arkendale area (SE 36)

The Mar at Arkendale is a long-recorded site but this is presumably not the location from which Marsh Cinquefoil and Bladder Sedge were recorded “near Arkendale” in the HDNS Report for 1969. A record of Water Violet from a pond in grid square SE 38- 61- in 1992 may refer to the Mar, but this species has not been seen there more recently.

SE 37

Pilmore Carr, nr Hutton Conyers (SE 339 728)

Slater (1883) listed Fine-leaved Water-dropwort, Marsh Cinquefoil, Marsh Speedwell, Lesser Water-plantain, Bladder Sedge and Needle Spike-rush. Tufted Sedge was recorded in 1944¹⁶ and reportedly still occurs.

Hutton Moor (SE 35- 73-)

The pre-enclosure Hutton Moor was a large expanse of open land comprising the contiguous commons of several villages. Baker (1863) noted that “Hutton Moor was once a tract of low sandy heatherland but it is now cut through by the railway and almost entirely enclosed.”

Slater listed Marsh Violet, Marsh Cinquefoil, Grass-of-Parnassus, Cranberry, Cross-leaved Heath *Erica tetralix*, Bell Heather, Marsh Lousewort, Bird’s-eye Primrose, Needle Spike-rush, Common Cotton-grass *Eriophorum angustifolium*, White Beak-sedge, White Sedge, Flea Sedge and Lesser Tussock Sedge; he noted that Shoreweed had not been seen recently. Lees (1888) also listed Bog Pimpernel. Mat-grass was collected in 1800. Baker (1863) mentioned Intermediate Wintergreen amongst the more notable plants found in the vicinity of Hutton Conyers alongside a few species of dry, sandy habitats such as Sheep’s-bit, Sand Spurrey and Bird’s-foot. Baines (1840) noted that Shepherd’s-cress occurred at the southern edge of the moor. Gregson (1894) found Hound’s-tongue there.

Several of Slater’s records specify Whitemere on Hutton Moor. The first edition Ordnance Survey 6” map, surveyed in 1853, shows Whitemere Dyke as a concentric feature, perhaps a peat cutting?

The wetland plants listed for Hutton Moor suggest a peaty, acidic mire with elements of poor fen and oligotrophic pools but presumably with some base-rich flushes supporting Grass-of-Parnassus and Bird’s-eye Primrose.

¹⁶ Scarce Plants Project database. NB: Pilmore Carr near Hutton Conyers has been wrongly assumed to be the same place as Pilmoor SSSI near Fawdington.



This area has not been accessible to survey in recent years. One small remnant, a sink-hole type depression close to the A1 is named as Great Raygill Dyke on the 1st edition OS 6" map. This was already an isolated fragment in the mid-19th Century but still supports poor-fen with species such as Common Sedge *Carex nigra*, Marsh Cinquefoil and Marsh Pennywort amongst dense *Juncus* mire. A few shoots of Slender Sedge survived here in 2004.

Sharow Mires (SE 32- 71-)

Slater (1884) listed the following from Sharow Mires: Meadow-rue, Greater Spearwort, Marsh Stitchwort, Marsh Cinquefoil. Purple Loosestrife, Marsh Valerian, Marsh Speedwell, Great Water Dock, Early Marsh Orchid, Black Bog-rush, Blunt-flowered Rush, Great Fen Sedge, Greater Tussock Sedge *Carex paniculata*, Bottle Sedge *C. rostrata* and Bladder Sedge. Marsh Fern was present "in abundance". Tufted Sedge was collected by Dalton in 1820.

In Slater's time the Mires probably included a mosaic of swamp, calcareous seepage-fen and open water. The site today is of similar dimensions to that shown on the 1st edition OS map but is mostly *Alnus - Carex* carr with a central area of open water. Notable species still present include Great Fen Sedge, Tufted Sedge, Greater Tussock Sedge and Purple Small-reed *Calamagrostis canescens*.

Marion Carr (SE 362 711)

During the YNU excursion to Boroughbridge in 1945, the botanists visited Marion Carr which was described thus:

"The area of bog known as Marion Carr occupies a narrow depression with rising ground on both sides...Peat formation in the carr itself had raised the ground level well above the water table..."

The adjoining ridges supported birch woodland (beginning to encroach onto parts of the mire), bracken and acidic grassland dominated by Wavy Hair-grass.

Hare's-tail Cotton-grass dominated the mire surface. Purple Moor-grass and Slender Sedge were also abundant. In hollows between the tussocks grew Narrow Buckler-fern *Dryopteris carthusiana* and Cranberry ("in profusion in the moistest parts"). Other species present included White Sedge, Common Sedge *C. nigra*, Common Cotton-grass, Heath Woodrush, Heath Rush *Juncus squarrosus*, Marsh Violet, Skullcap *Scutellaria galericulata* and Cross-leaved Heath. The non-flowering state of Slender Sedge was considered evidence of the mire drying out, though this species is often shy-flowering.

The site, then called Lowmoor Carr, is indicated as wetland on the 1st edition OS map. It has not been surveyed recently but is reported to have been drained and now used for Pheasant rearing.

Ripon Parks (SE 30- 74- and surrounds)

The YNU excursion to Queen Mary's Dub in 1939 recorded Water Violet, Bottle Sedge and Water Whorl-grass *Catabrosa aquatica* in the vicinity, all of which still occur. Species not recorded recently included Bird's-eye Primrose, Grass-of-Parnassus and Common Butterwort. The stonewort *Chara hispida* was found in the ponds.

Tufted Sedge was reported in 1945, when Reddish Pondweed was also noted in a ditch (YNU report). Jowsey (1978) indicated records for Tawny Sedge, Flea Sedge, Needle Spike-rush, Grass-of-Parnassus and Great Water Dock in the vicinity.

A survey by Deborah Millward and Geoffery Wilmore in 2003 recorded a number of notable wetland species. These included Tawny Sedge and Bog Pimpernel in marshy grassland by the Lightwater Beck; Water Violet and Nodding Bur-marigold in the ponds; Saw-wort *Serratula tinctoria* and Black Bog-rush in the seepage fen at Fox Covert. Abbott (2005) refers to Flat-stalked Pondweed *Potamogeton friesii* occurring in ponds at Ripon Parks.

Ripon area (SE 37)

William Gawthorp noted a number of wetland plants around Ripon in the mid-18th century: Water Violet was common in ditches whilst Flowering Rush and Great Water Dock were in ditches adjoining Ripon Common. Many specimens in the YPS Herbarium collected by Rev. Dalton and W. Brunton between 1800 and 1830 are labelled 'Ripon' or 'Near Ripon' (Wilkinson, 1917). These include, *inter alia*, Reddish Pondweed, Flat-stalked Pondweed, Various-leaved Pondweed, Opposite-leaved Pondweed, Small Water-pepper, Floating Club-rush, Deer-grass and Slender Sedge. The lack of better location details makes it difficult to draw inferences about the habitats present since such plants could have been collected over a wide geographical radius. However, there is a mixture of aquatic or fen species typical of mesotrophic, base-rich conditions and plants of more oligotrophic, acidic mires.

Baker (1906) listed Frogbit amongst the plants found around Ripon. Lees (1888) listed Flat-sedge as frequent in boggy places near Ripon with Greater Bladderwort and Water Violet growing in ponds and dubs.

There are relatively recent records of both Reddish Pondweed and Flat-stalked Pondweed from the Ripon area (Abbott, 2005) but the former has not been seen in recent surveys and has likely disappeared.

Dishforth area (SE 37)

Baker (1906) listed Parsley Water-dropwort as occurring "in boggy ground" in the Dishforth area. This is a plant of moist, base-rich meadows. Baines (1840) mentioned Bird's-eye Primrose 'near Dishforth'.

SE 38

Newsham Carr and Kirby Wiske Carr (SE 36- 83- ?)

Located at the junction of the Wiske and the Swale, Baker (1907) described Newsham Carr as still undrained although Foggitt (1909) said it had been lost to drainage. Confusingly, the YNU Annual

Report for 1934 stated that this site had "...happily survived the drainage which has destroyed the marsh vegetation of so many carrs in the neighbourhood"¹⁷.

Species listed by Baker (1854, 1906 & 1907) and Foggitt include: Greater Spearwort, Great Water Dock, Cowbane, Greater Duckweed, Whorled Water-millfoil, Tufted Sedge and Lesser Tussock Sedge. Baines (1840) also reported Great Fen Sedge.

The second edition of Baker's *North Yorkshire*, as published in the *Transaction of the Yorkshire Naturalists' Union*, mentions Kirby Wiske Carr (or Kirby Wiske) as a location for Greater Bladderwort, Frogbit, Great Water Dock, Brookweed and Blunt-flowered Rush. Since Newsham Carr was also given as a location, we must presume that these were separate (though similar) sites.

Cowbane had gone by 1940 (Cheetham & Sledge, 1941). Species reported in 1934 included Flowering Rush, Arrowhead *Sagittaria sagittifolia*, Greater Bladderwort, Small Water-pepper and Tasteless Water-pepper.

There is no clear indication of where Newsham Carr or Kirby Wiske Carr lay on the 1st edition OS map. Most of the species recorded are aquatic and would have been found in ditches. Some wetland is indicated on the current OS 1:25,000 along the Wiske at Sion Hall.

Carlton Miniott Carr (SE 38?)

Baker (1906) described Tufted Loosestrife as "Plentiful in a willowy carr about midway between Carlton Miniott and Topcliffe railway station". He had also given this as a location for Marsh Cinquefoil (Baker, 1879). Records of Tufted Loosestrife were listed in the Scarce Plants Project database for Carlton Miniott Carr between 1863 and 1966. Rob (1959) described this species, along with Marsh Violet, as succumbing to silting and drying up.

A Carr Plantation is marked to the SW of Carlton Miniott village on the 1st edition OS map; this is now named Coronation Whin. A Carr Lane, Carr Plantation and Carr Stell to the north of the village also indicate an historic wetland site, though partly within Sand Hutton parish.

In the mid-18th century, Gawthorp found Marsh Gentian at "Charlton Moor near Thirsk", presumably a reference to Carlton Moor.

Kirklington Carr (SE 31- 81- ?)

Common Bladderwort, Bird's-eye Primrose and Black Bog-rush were listed by Baker (1906) for this site. Kirklington Carr is not indicated on maps; this was presumably a base-rich seepage fen.

Newby Carr / Newby Wiske Carr (SE 36- 86-)

Baker (1907) described Newby Wiske Carr as "...a piece of boggy, grassy ground intersected by ditches like a Cambridgeshire fen on a small scale..." and considered it to be one of the best sites for wetland plants in North Yorkshire.

Species listed by Baker (1906 & 1907) and Foggitt (1909) include: Greater Spearwort, Frogbit, Brookweed, Marsh Stitchwort, Small Water-pepper, Great Water Dock, Greater Bladderwort, Whorled Water-millfoil, Flowering Rush, Arrowhead and Saw-wort. Additional species listed from Newby Wiske (not specifically Newby Carr) in the second edition of Baker's *North Yorkshire* include Grass-of-

¹⁷ *The Naturalist*, 1935, p 67.

Parnassus and Bird's-eye Primrose. Many of these plants are aquatics and the ditches appear to have supported a similar flora to drains at Newsham Carr and Ainderby Bottoms.

A peaty basin remains adjoining Spudding Dyke, now an IDB-managed pumped drain. This has been much-disturbed by agriculture (including pig rearing) but drain banks still support small populations of a few wetland species including Purple Loosestrife, Great Burnet *Sanguisorba officinalis* and Meadow-rue; Water Violet grows locally in Spudding Dyke.

Pickhill (SE 34- 83-)

Pickhill was mentioned by Baker as a location for Frogbit, Flowering Rush and Marsh Dock *Rumex palustris* (the latter in a ditch).

Camphill (SE 30- 81-)

Species listed in the second edition of Baker's *North Yorkshire* include Nodding Bur-marigold, Triffid Bur-marigold, Water Whorl-grass and Bird's-eye Primrose.

Sandhutton (SE 38- 82-)

Species listed in the second edition of Baker's *North Yorkshire* include Grass-of-Parnassus, Globeflower and Tasteless Water-pepper.

SE 39

Ainderby Carr / Ainderby Bottoms (SE 33- 92-)

Baker (1906 & 1907) listed Greater Spearwort, Frogbit and Cowbane as growing in ditches at Ainderby Steeple. Tufted Sedge, Blunt-flowered Rush and Common Butterwort were also recorded from Ainderby Carr. This is presumably the same area visited in 1946 by the YNU and described as follows:

“Ainderby Bottoms or Carr, consists of a considerable swampy area of sedges and reeds with some birch-willow-alder carr wood, separated by ditches from low-lying marshy fields the vegetation of which is subject to grazing by cattle. The central fenced-off and ungrazed area is ecologically the most interesting region and the existence of communities similar to those on developing peat mosses of the North-west is particularly interesting in view of the statement that the present conditions date back to little more than 40 years ago.”

What is interesting here is the apparent reversion to mire of former pastureland, perhaps associated with agricultural neglect or intractable drainage problems. The “typical” plants of the mire included Purple Moor-grass, Petty Whin, Ling *Calluna vulgaris*, Marsh Cinquefoil, Creeping Willow, Heath Woodrush, Velvet Bent *Agrostis canina*, Common Reed and Common Cotton-grass with patchy Sphagna. Other species present in the general area included Tufted Sedge, Star Sedge *Carex echinata*, Common Sedge, Bottle Sedge, Tubular Water-dropwort, Marsh Lousewort and Marsh Valerian. The bryologists noted that *Calliargon cuspidatum* was the most abundant moss with “a fair amount” of *C. cordifolium* and some *C. giganteum*. Sphagna included *S. fimbriatum*, *S. subnitens* (recorded as *S. plumulosum*) and *S. palustre*.

The surrounding rushy pastures contained Marsh Stitchwort and extensive stands of Brown Sedge *Carex disticha*. Redshank, Snipe, Lapwing, Reed Bunting and Sedge Warbler were breeding in the area. As Baker had recorded 40 years earlier, the dykes were floristically rich containing Greater Spearwort,

Lesser Marshwort, Frogbit, Water Whorl-grass, Water Violet and Bogbean *Menyanthes trifoliata*; Cowbane was not recorded and was stated to have gone from this site by Cheetham & Sledge (1941).

Ainderby Bottoms was the area north of the village of Ainderby Steeple but on the same excursion the YNU also visited a "similar area of low-lying marshy and swampy fields on the other [south] side of the village". This supported a similar flora with additional species including Opposite-leaved Pondweed, Greater Pond Sedge *Carex riparia*, False Fox Sedge *C. otrubae*, Oval Sedge *C. leporina* and Slender Tufted Sedge *C. acuta*. The sedges specified are amongst the more common species of damp meadows.

Northallerton area (SE 39)

Baker (1907) listed Greater Spearwort, Whorled Water-millfoil and Frogbit from the vicinity of Northallerton. Robinson (1833) referred to Greater Spearwort growing in the River Wiske near Northallerton.

SE 46

Helperby (SE 43- 69- ?)

A specimen of Marsh Gentian in the YPS Herbarium was collected "near Helperby" in 1798 by Rev. Dalton. This would doubtless have been from a remnant of the huge 'moor' which extended from Fawdington to Tholthorpe in the mid-18th Century, perhaps in the vicinity of Pilmoor (where *Gentiana* grew into the 1930s - Rob, 1959).

SE 47

Leckby Carr (SE 41- 74-)

"This remarkable Carr is situate on the west bank of the river Swale, and in close proximity to the Asenby gravel pits, Topcliffe and Baldersby, North Yorkshire. The Carr is separated from the river Swale by a low ridge of hills, composed of gravel, shingle &c, that may have been brought by a glacier in the form of a moraine, and thus a hollow or lake may have formed, which probably had a natural drainage into the Swale."

This lake soon became tenanted by aquatic plants and animals. Among other interesting plants of the Carr may be mentioned *Lysimachia thyrsiflora* L. and *Carex limosa* L." (Wilkinson, 1907)

Foggitt (1909) described Leckby Carr as an "ericetal Sphagnum bog" with the interesting note that, fifty years earlier, it was:

"...a tremulous and treacherous morass, covered over with the long trailing wiry stems, tiny bonny leaves, and dainty rich red crane-necked flowers of *Vaccinium oxycoccos*, the true Cranberry, the fruit of which was at one time a source of revenue for bordering farms"

According to Foggitt, Tufted Loosestrife and White Beak-sedge were still abundant.

The YNU visited Leckby Carr in 1882, by which time its most famous plant, Rannoch Rush, had apparently disappeared. Nonetheless, Cranberry, Tufted Loosestrife, White Beak-sedge, Greater Sundew and Round-leaved Sundew were still present. A return visit in 1891 found the Carr "unprecedentedly dry" although with the exception of White Beak-sedge, all the specialities recorded nine years previously still survived. It was commented that,

“This location is so greatly altered by drainage, and also by the planting of large numbers of conifers, that the sphagnous peat ditches which afforded so congenial a home to that floral treasure *Scheuchzeria palustris* have well-nigh disappeared.”

Baker (1906) called the site “a boggy, moory piece of ground” but the following year noted that the Carr was “now much altered by drainage”. Wilkinson (1907) made it clear that drainage and afforestation had largely destroyed the habitat and brought about the extinction of Rannoch Rush and Mud Sedge.

When the YNU visited in 1908 it was noted that, “Numerous Sphagna or bog mosses grew on the Carr, but they have not such a plentiful supply of water as they had in past years, and are consequently of shorter growth”. *Sphagnum fallax* [recurvum] was the most abundant species with *S. palustre* co-dominant in the wettest spots. *Aulacomnium palustre* was also mixed amongst the Sphagna. Amongst the lower plants, the liverwort *Cephalozia fluitans* and the moss *Plagithecium latebricola* were considered particularly noteworthy.

By the time the YNU revisited Leckby Carr in 1952, C.M. Rob recorded that,

“...only one of the many rare plants that once flourished in Leckby Carr now survives. This can no longer be considered carr, except for a very small area at the southern end which is rapidly becoming ordinary birch woodland”.

The surviving rarity, Tufted Loosestrife, was “very much less abundant than in 1936”. Most of the site was dry woodland invaded by *Rhododendron*. A small amount of White Sedge and Common Cotton-grass clung on in a wet spot.

Rob (1959) summarised the recent condition of Leckby Carr as follows:

“By the first war the change from carr to planted woodland was complete, but during that war the trees were felled, and since then bracken and rosebay are the dominant plants, with a heavy growth of *Rhododendron ponticum*, the last remaining plant of interest being *Lysimachia thyrsoiflora*, which persists in gradually lessening quantity in the only remaining pool of open water.”

When the British Bryological Society visited in 1967, they found “an almost impenetrable jungle of overgrown carr...”

Records collated from Baines (1840), Slater (1883), Baker (1906 & 1907) and Wilkinson (1917) include: Alder Buckthorn *Frangula alnus*, all three sundews, Lesser Bladderwort, Cross-leaved Heath, Cranberry, Tufted Loosestrife, Bird’s-eye Primrose, Marsh Cinquefoil, Marsh Gentian, Common Cotton-grass, Hare’s-tail Cotton-grass, Purple Small-reed, White Beak-sedge, White Sedge, Bog Sedge, Slender Sedge, Pale Sedge *Carex pallescens* and Rannoch Rush.

Amongst the rarer species, Rannoch Rush was found by Rev. Dalton in 1798. Baines (1840) stated that he had searched for it several times unsuccessfully but it was subsequently rediscovered (Lees, 1888). Indeed, it must have been quite abundant in the mid-19th Century because Foggitt wrote that, at one time, “...a local gentleman used to collect annually hundreds of specimens for the Edinburgh Botanical Exchange Club and other distributors.” Baines (1840) listed Cranberry as growing “in the greatest abundance” at Leckby Carr, corroborating Foggitt’s account of the berry harvest in the mid-19th Century.

Slater (1882) described Oblong-leaved Sundew as “plentiful”; Baines remarked that it could be found there “...in abundance, specimens ten inches high”. Baker (1906) listed Tufted Loosestrife as occurring “in the great ditch, and a pond at the north-west edge of the swamp.” Wilkinson (1907) stated that in 1891, hundreds of plants could be observed, though few in flower. Rob’s comments (see above) chart its subsequent demise.

Leckby Carr formed in a shallow valley inland of a ridge of gravel hills (since partly quarried) alongside the River Swale and must have developed into raised mire. From the late 19th century, concerted attempts were made to drain it and establish conifer plantations. Drainage works were renewed in the mid to late 20th century and the valley partly filled with spoil.

Arram Grange near Leckby (SE 40- 74-)

During the YNU excursion to Topcliffe in 1952, the botanists recorded Creeping Willow, Marsh Valerian, Tawny Sedge, Flea Sedge and Long-stalked Yellow Sedge from swampy fields near Arram Grange. This assemblage is clearly indicative of fen meadow (NVC M24?). The fields are now in arable cultivation, though still peaty.

Pilmoor (SE 460 730)

Foggitt (1908) wrote of Pilmoor thus: “Scattered over the moor among abundance of ling, and the two beautiful heaths – *Erica cinerea* and *tetralix*, are many choice plants of which we can mention but a few...” These included Petty Whin, All-seed, Marsh Gentian, Creeping Willow, Bog Asphodel, Fragrant Orchid, Twayblade *Neottia ovata*, Lesser Butterfly Orchid, Rough Horsetail and Marsh Clubmoss. He reported that Royal Fern had grown sparingly in the past “but has long been extinct”.

In the south-west corner of the moor, Meadow Thistle grew in very boggy conditions (“...here you have, almost always, to wade for it...”), intermingled with Lesser Bladderwort. In and around ponds grew Marsh St John’s-wort, Marsh Cinquefoil, Purple Loosestrife, Lesser Marshwort, Bogbean, Marsh Stitchwort, Skullcap, Great Water Dock, Greater Duckweed, Lesser Water-plantain, Floating Club-rush, Common Club-rush *Schoenoplectus lacustris*, Bog Hair-grass and Pillwort.

Rob (1959) described Pilmoor in the 1930s as having areas of open water in old brick workings with open grassland grazed by goats still containing Marsh Gentian “In some abundance” amongst other species. Twenty years later, these areas had become overgrown with brambles and the ponds were drying out. All-seed and Pillwort had benefited from ruts created by timber extraction during the 1920s but these areas had become smothered by willows by the late 1930s.

Rob (1948 & 1959) documented many plants no longer found at this site with an indication of the last recorded date. These included Meadow Thistle (1914), Bog Hair-grass (late 1940s), Oblong-leaved Sundew (1898), Marsh Gentian (1945), Marsh Clubmoss (1898), Royal Fern (1888), Pillwort (to ca. 1939), All-seed (to ca. 1939), Various-leaved Pondweed (1930) and Lesser Bladderwort (1898). Other records include Needle Spike-rush (Baker, 1863).

Sledge (1964) noted that Bog Hair-grass “...survived at Pilmoor until comparatively recently but ecological changes leading to progressive drying out make it improbable that it survives there...”

Pilmoor SSSI, although heavily wooded in the most part, still supports a number of locally-rare plants including Hare’s-tail Cotton-grass.

Topcliffe area (SE 47)

Baker (1907) listed Parsley Water-dropwort, Marsh Gentian, Bird's-eye Primrose, Black Bog-rush and Royal Fern from the Topcliffe area. Baker (1906) described Black Bog-rush as growing in ditches near Topcliffe.

Baines (1840) listed Marsh Gentian from "Catton and Eelmire Woods near Thirsk": presumably the latter refers to Eldmire Moor (a kilometer SE of Dalton), shown as an area of unimproved common on Jeffries' map.

SE 48

Thirsk area (SE 48)

Baker (1906) mentioned Flat-sedge as growing on The Holmes at Thirsk with both the rarer water-peppers, *Persicaria minor* and *P. mitis* [*laxiflora*], in the local area. At Woodend occurred Trifid Bur-marigold, Bird's-eye Primrose and Blunt-flowered Rush.

Notable sites close outside the Washlands:

Halnaby Carr (NZ 273 081?)

According to Baker (1907), Halnaby Carrs supported Greater Spearwort, Round-leaved Wintergreen *Pyrola rotundifolia*, Lesser Twayblade *Neottia cordata*, Lesser Tussock Sedge, Tufted Sedge and Slender Cotton-grass *Eriophorum gracile*. He commented that, "This latter plant is now unfortunately destroyed by the land being drained". Cheetham & Sledge (1941) also described Slender Cotton-grass as "Long since extinct at Halnaby near Croft, its only Yorkshire station". A specimen in the Manchester University Herbarium was collected by W. Brown in June 1835 and bears the note, "Near Halnaby, on the Yorkshire side of the Tees, in a small pool on the small boggy slip of ground on the left-hand of the road for Croft."

Fibrous Tussock-sedge *Carex appropinquata* was also recorded at Halnaby, if the synonym *C. paradoxa* can be trusted (Luxford, 1844).

The rare Boreal relict moss *Helodium blandowii* (now extinct in Britain) was recorded from Halnaby Carr in the 19th century (Porley & Hodgetts, 2005). Its other sites were Malham Moss, Halnaby Carr and Terrington Carr in North Yorkshire and Knutsford Moss in Cheshire.

Preston et al (2002) describe Slender Cotton-grass as "...found in the wettest parts of bogs, transitional mires, poor fens and on the edge of *Alnus* carr, typically over liquid peats. Its sites are calcareous or moderately acidic and have some water movement." This plant is rare and declining in Europe; in Britain it is now known only from Surrey, Hampshire and a few Welsh coastal sites. Halnaby Carr was always a very isolated northerly outpost.

Halnaby Carr was in the Tees rather than the Swale catchment. The site has been dug out to form an angling pond with some peaty ground remaining at the margins.

Skeebby Marsh (NZ 20- 02- ?)

Robinson (1833) listed a range of wetland plants for Skeebby, for some of these specifying "marsh near Skeebby Mill". These included Marsh Helleborine, Marsh Pennywort *Hydrocotyle vulgaris*, Grass-of-Parnassus, Common Butterwort and Black Bog-rush as well as Bottle sedge and Pale Sedge. The list is

indicative of seepage fen supporting NVC M10 small sedge mire or M13 Black Bog-rush mire. Some of these records were re-iterated by Baines (1840).

Baker (1907) gave Skeeby as a location for Marsh Helleborine, Black Bog-rush, Blunt-flowered Rush and two northern willows, Dark-leaved Willow *Salix myrsinifolia* and Tea-leaved Willow *S. phyllicifolia*.

Thornton-le-Street Stud lake (SE 39- 85-)

Reddish Pondweed was recorded from Thornton-le-Street Hall in 1882 and 1947. This presumably refers to the lake at the Stud, where Shining Pondweed *Potamogeton lucens* was present in 1996 (YNU).