



## TheInetham New Fen – colonisation of willows on surrounding fen

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For Little Ouse Headwaters Project



## **A. Introduction**

1. Thelnetham New Fen is a recent acquisition by the Little Ouse Headwaters Project (LOHP), and abuts two units of the Blo’Norton and Thelnetham Fens SSSI. These are Parker’s Piece (LOHP) and Thelnetham Middle Fen (managed by Suffolk Wildlife Trust).
2. On behalf of LOHP, Norfolk FWAG have instructed OHES Environmental Ltd to undertake an assessment of the vegetation of New Fen and the potential impact of willow colonization into Parker’s Piece and Thelnetham Fen from New Fen and other nearby sources.

## **B. Findings**

1. New Fen is composed of two distinct wooded blocks, separated by a catch drain following the margin of the valley floodplain. A number of distinguished ecologists and geologists, including Francis Rose and David Bellamy, have recorded the character of the distinctive open fen vegetation of the valley and its margins in the locale and investigated its relation to the hydrogeological conditions produced along the margin of the valley floodplain. As emphasised by the work of Bryan Wheeler and Sue Shaw in recent years, New Fen is located in the same landscape position as neighbouring sites, which comprise the Waveney & Little Ouse Valley Fens SAC.
2. The development of the wooded appearance of New Fen can be traced using the sequence of historical aerials on ‘Google Earth’. These are reproduced in Appendix 1. In 1945, no woodland was present, and the homogeneous shading of this aerial suggests that all of New Fen was in productive agriculture at this time. The aerial shows a number of boundary trees – which may still be present today – and the apparently neglected condition of part of the adjacent ‘Middle Fen’ to its east.
3. A 1986 aerial provided by Suffolk County Council is included in LOHP’s ‘Conservation Statement for Thelnetham New Fen’ (version 2 August 2014). This useful vignette clearly shows the strong separation in landuse along what appears to be the recently excavated catch dyke, which marks the floodplain edge separating the drier western side (the margin of the so-called ‘Lopham Terrace’) from the peat fen. In 1986, the eastern half of New Fen appears to be at a similar stage of scrub development to Middle Fen, and emphasises that the two areas are part of the same landscape unit. It should be noted that recent scrub clearance in Middle Fen along its boundary with New Fen has formed part of the conservation programme for this site in restoring similar fen vegetation to the target communities promoted by the SAC Citation.
4. By 1999, as shown in the second aerial of the sequence uploaded by Google Earth, the aerial clearly shows blocks of plantation woodland on the terrace, and the more developed free growth of what are most likely sallows on the fen. It is notable that sallow growth is not ubiquitous, and there is an obvious glade separating scrub development along the catch dyke and marginal drain.

5. By the most recent image given on Google Earth, taken to be 2015, the terrace woodland is now dominated by a tall stand of poplars with a scattered understorey of Elder and a patchy ground flora often dominated by Nettle. As described by the National Vegetation Classification, this block of woodland lacks fen plants and can be only loosely accommodated within the *Alnus glutinosa-Urtica dioica* community as an example of a dry form of the *Salix fragilis* sub-community (W6b).
6. There is a marked break in the structure of the wood bounded by the catch dyke; the multiple-stemmed sallows (Photo 1) overstand patches of mixed Nettle and Hemp Agrimony, Common Reed, Lesser Pond-sedge or mixed fen vegetation, including large tussocks of Tufted-sedge *Carex elata* in small hollows (Photo 2). The stand can be assigned to the *Alnus glutinosa-Filipendula ulmaria* sub-community of the *Salix-Betula-Phragmites* woodland (W2a).

**Photo 1. Sallow scrub – note over-mature condition**



**Photo 2. Mature Tufted Sedge *Carex elata* tussock marking a peat hollow**



7. In comparison to nearby Alder-dominated woodlands, the block of terrace woodland is clearly not a 'wet woodland' in the strict sense, and does not extend onto the floodplain. A similar fringing 'wet' woodland occurs above the modern floodplain that flanks Fen Road to the north in Blo'Norton, giving way to the nearest example of alder wood in the valley at Blo'Norton Fen, which is referred to the *Phragmites australis* sub-community of *Alnus glutinosa-Carex paniculata* woodland (W5a).
8. The willow scrub occurs within the floodplain on an appropriate substrate, but has self-generated within living memory on the moist peats of the valley floor in an area of former fen. As such, its structure and species composition is very similar to the areas of scrub that have been cleared elsewhere in the Little Ouse headwaters to restore fen vegetation. The differences between the alder woodlands and willow scrub are described in Stone (2012)<sup>1</sup>. It is worth noting that the short-lived willows are over-mature and beginning to collapse.
9. As has been noted above, New Fen lies on the margin of the same landscape unit as supports the group of SSSIs that make up the Waveney and Little Ouse Valley Fens SAC, described as "the East Anglian centre of distribution of calcareous fens". The habitat type "occurs in a spring-fed valley fen", dependent upon the upwelling of groundwater between the Lopham Terrace and the consolidated organic sediments beside the historical course of the rivers. This is a restricted area associated with the headwaters of the two rivers, recognised as being of international significance by the European Commission.
10. The habitat supports two vegetation communities recognised as conservation features, small sedge mires and great fen-sedge beds. These are both managed herbaceous fens, whose species-richness is typically affected by sustained high watertable during the growing season and by the intensity of management.
11. The recent publication of Natural England's European Site Conservation Objectives for the Waveney and Little Ouse Valley Fens SAC (June 2014 under the Improvement programme for England's Natura 2000 sites (IPENS)) emphasizes the significance of ensuring that the "integrity of the site is maintained or restored as appropriate". Two of the published objectives have a bearing on the role that Thelnetham New Fen may have in affecting the Favourable Condition Status of the adjacent SAC site:

**12. The extent and distribution of qualifying natural habitats and habitats of qualifying species**

As part of the same landscape unit, the eastern side of New Fen presents an opportunity to restore an area of open fen in a similar landscape position supporting the 'qualifying habitat features' recognised the SAC designation. As the record of aerial photographs demonstrates, the block of willow scrub is a relatively recent feature occurring immediately adjacent to the restored area in Middle Fen.

**13. The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely**

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<sup>1</sup> National Vegetation Classification survey of Blo' Norton Fen SSSI, including Betty's Fen. Internal report to Little Ouse Headwaters Project by OHES Environmental.

New Fen contributes to the seed rain affecting the species composition of Middle Fen and Parker's Piece. The successful retention of moisture in the upper part of the root zone favours germination of both tree and shrub willows from New Fen and other local sources.

14. A simple estimate of the number of saplings and seedlings was undertaken on the 7<sup>th</sup> August 2015 using transects set out across Parker's Piece and Middle Fen. Their location and count results are reported in Appendix 2. Examination of both sites recorded seedling and young sapling densities of 0.5-5 plants per square metre. Although very few specimens exceeded 0.7 m in height, and the majority were shorter than 0.2 m, about 1 in 12 were found to be multiple-stemmed, indicating that they had survived routine management. No pattern in distribution in relation to New Fen was observed, though at Parker's Piece taller saplings were markedly concentrated in taller, thicker stands of sedge.
15. It is concluded that existing management effort here may be insufficient to prevent continued successful colonization by woody plants, though it has been successful in re-establishing appropriate vegetation on the disturbed peat soils. Similarly, on Middle Fen, continual management effort is evidently required and sapling growth is most persistent in the areas not managed annually.

### **C. Conclusions**

1. Thelnetham New Fen comprises a block of broadleaf plantings above the floodplain on the sandy Lopham Terrace, alongside willow scrub that has colonized the peatland margin of the valley beside Middle Fen.
2. Neither area bears comparison to the wet woodlands which form an important ancillary habitat to the herbaceous calcareous fens that characterize the Little Ouse headwaters, and form a significant part of the Waveney and Little Ouse valley fens SAC.
3. The block of willow scrub is adjacent to Parker's Piece and Middle Fen, which are units of the Thelnetham and Blo'Norton Fen SSSI; its clearance provides an opportunity to increase the area of open fen habitat.
4. The willow scrub contributes to the willow seed rain onto existing areas of open fen within the Waveney and Little Ouse Valley Fens SAC, requiring sufficiently intense annual management to prevent reversion to scrub. The degree of management intensity is recognised as a key factor affecting species-richness<sup>2</sup> of the qualifying habitats under the Natura 2000 sites programme, part of the European Habitats Directive (Council Directive 92/43/EEC). It is implicit in Natural England's European Site Conservation Objectives for the Waveney and Little Ouse Valley Fens SAC (June 2014 under the Improvement programme for England's Natura 2000 sites (IPENS)).

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<sup>2</sup> Many publications confirm this principle, first demonstrated in Al-Mufti M.M., Sydes C.L., Furness S.B., Grime J.P. and Band S.R. (1977) A quantitative analysis of shoot phenology and dominance in herbaceous vegetation. *Journal of Ecology* 65, 759-792.

**Appendix 1 Aerial images on Thelnetham New Fen, clipped from Google Earth<sup>3</sup>**

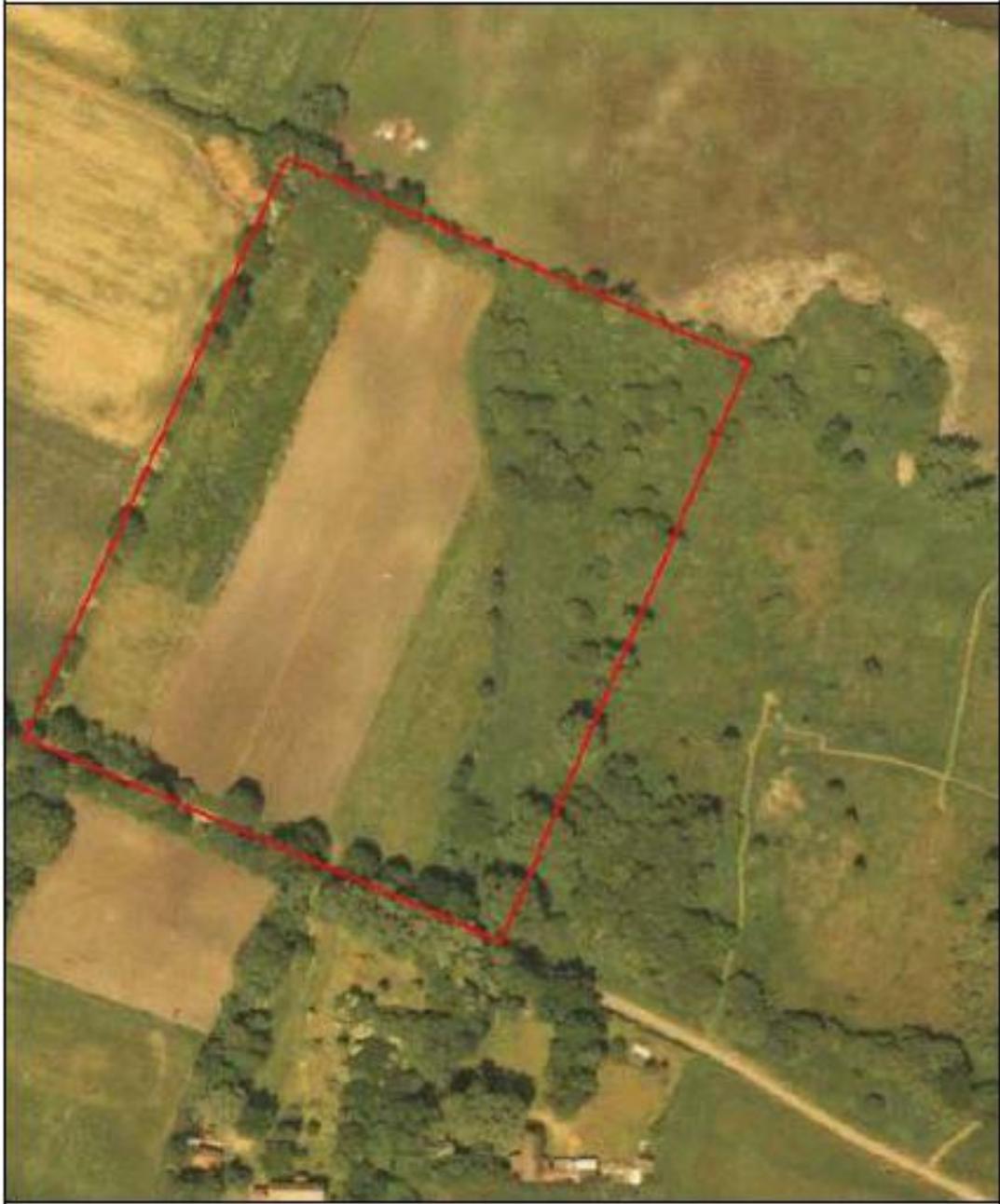
1945. Reproduced from Google Earth



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<sup>3</sup> Google Earth. Accessed 28<sup>th</sup> September 2015

1986. Reproduced from LOHP's 'Conservation Statement for Thelnetham New Fen'. Original from Suffolk County Council



1999. Reproduced from Google Earth



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2015. Reproduced from Google Earth



## Appendix 2. Willow sapling and seedling counts across Parker's Piece and Middle Fen

A simple estimate of the distribution of willow saplings and seedlings across Parker's Piece and Middle Fen was undertaken on the 7th August 2015, using transects set out in the locations shown in Figure 1. The width of each transect was 1 metre.

Figure 1. Location of sapling/seedling counts



Combined totals for Tree willows (*Salix fragilis* and *S. alba*) and Grey Willow (*Salix cinerea*) are given in Table 1. This is a summary of the field assessment, which recorded specimens per metre. At that fine level of definition, seedling and young sapling densities varied from 0-8 plants per square metre, demonstrating the very patchy distribution typical of natural seeding success, which can be very sensitive to slight variations in surface moisture and water retention.

The totalled values given in Table 1 for 10 metre sections of each transect indicate three important features of willow colonisation in both fen areas:

1. Unlike the distribution of Ash seedlings, which were found in clusters close to a parent tree, the progeny of the willow species group was found to be widely distributed. This is likely to reflect the predominantly wind-blown mechanism of dispersal on the one hand, and the typically suitable substrate for germination

on the other. It would appear that the very lightweight willow 'seed rain' is not localised, and may derive from specimens encompassed within a downdraught during the seeding season.

2. The willow seed-rain appears to be sufficiently intense to enable successful germination and establishment across the range of herbaceous fen structures in the sampled areas of Parker's Piece and Middle Fen. This suggests that willows are establishing whatever the condition of the fen vegetation, irrespective of the current timing or frequency of grazing or cutting. At the intensities of management employed, willow is establishing in the areas of fen irrespective of its condition during seed-fall and the establishment phase.
3. In addition to the simple presence of willow seedlings (typically shorter than 0.2 m high), it is apparent that a proportion are not only surviving through their first season of management to form young saplings, but that some - about 1 in 12 - were found to be multiple-stemmed, indicating that they had survived routine management for a number of seasons. No pattern in distribution in relation to New Fen was observed; at Parker's Piece the sapling classes were found to be up to 0.7 m in height and taller saplings were markedly concentrated in taller, thicker stands of sedge.

These three features of willow colonisation indicate that it is a general issue in the open areas of this part of the Little Ouse-Waveney complex of herbaceous fens, and cannot be attributed to one particular wooded stand.

Table 1. Number of willow seedlings and saplings recorded in the transects

<b>Parker's Piece</b> South: TM 01345 78898 North: TM 01375 78981 Length: 90 metres Start: South	Metres	<b>Middle Fen</b> West: TM 01389 78800 East: TM 01538 78765 Length: 150 metres Start West
9	00 – 10	12
16	10 - 20	16
27	20 – 30	24
35	30 – 40	13
31	40 – 50	17
26	50 – 60	20
18	60 – 70	11
24	70 – 80	15
15	80 – 90	19
	90 – 100	21
	100 – 110	16
	110 – 120	12
	120 – 130	17
	130 – 140	22
	140 - 150	16