LOHP Conservation Sites

Management Plan

2012

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A.1 Little Ouse Headwaters Project

Brief organisation details.

A.2 Land Holdings

The following two tables summarise LOHPs land holdings. Note that none of the leases are due for renewals. The total area under LOHP management in 111.4 hectares, 275.2 acres.

Leased	Site Area		Ownership	Contact	Rent due	Lease period	Start date
	hectares	acres					
Hinderclay Fen	12.1	30.0	Hinderclay Fen Trustees	Martin Forge, Reg Langston	21st September	12	21/09/2011
Blo'Norton Fen	6.0	14.8	Blo Norton Poors Allotment	Tim Stevenson Nick Woods	1st February	12	01/02/2011
Little Fen	4.1	10.2	"	"	1st February	12	01/02/2011
Broomscot Common	8.9	22.0	Garboldisham Parish Charities	Mary Feakes	22 yrs paid up front in Yr 1.	22	16/09/11
The Frith	10.7	26.4	South Lopham Estates Charity	Sarah Frizzell	1st May	21	01/05/2010
The Lows	4.5	11.0	Blo Norton Church lands	Tim Stevenson	1st June	12	01/06/2011
TOTAL	**46.3**	**114.4**					

Owned	Area		Purchased
	hectares	acres	
Betty's Fen	2.2	5.3	2004
Parkers Piece	4.3	10.7	2007
Bleyswycks Bank	0.9	2.3	2007
Scarfe Meadows	5.7	14.0	2010
Webbs Fen	5.7	14.0	2011
Total area	65.1	160.8	

A.3 Statement of Significance

Overview of significance for the land holdings as a group.

A.4 Main Contacts

Table of contacts and roles

B. SITE MANAGEMENT PLANS

LIST

B1. The Frith

B1.1 Summary Information

Grid Reference	TM 037 791
Parish	South Lopham
District	Breckland
Size	10.7 ha
Warden	Helen Smith
Designations	Proposed County Geodiversity Site
Tenure	Owned by Trustees of the South Lopham Estates Charity. Leased for 21 years from 01/05/10
Access Details	Open at all times.
Rights excluded	None
Public rights of way	None
Third party easements/wayleaves etc	Wayleave for electricity cables.
Principal habitats	Semi-improved neutral grassland. Re-establishing acid grassland. Fen. Woodland. Hedgerows with veteran trees. Headwater ditch of the Little Ouse.

Figure B1-1: Compartments

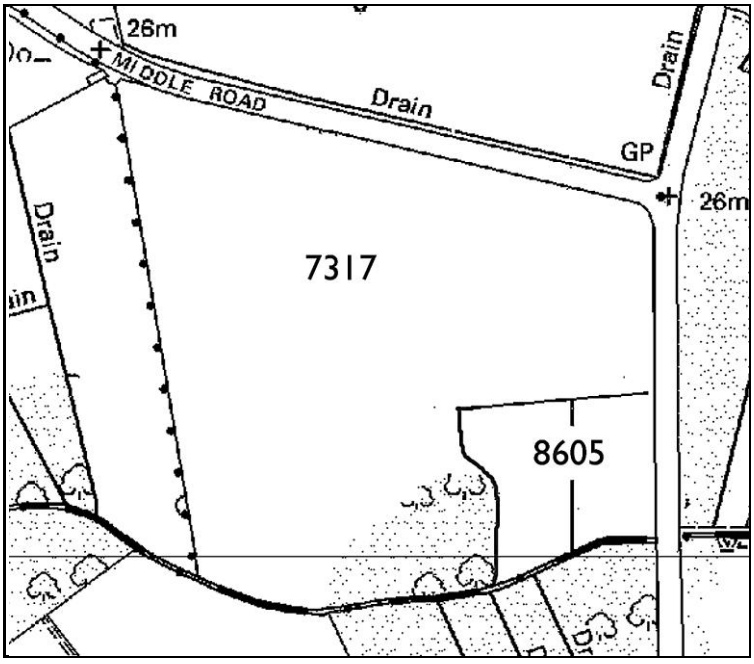


Figure B1-2: July 2008 aerial photograph

B1.2 Significant Features and Their Importance

FEATURE	ATTRIBUTES	IMPORTANCE			
		Europe	BAP	SSSI	Local
Habitats					
Species-rich hedgerows	Standard and pollarded trees, mostly oaks with some alders and field maple, with under-hedge of varying density. There are 92 mature trees with 49 of substantial age including some veteran. There is a rich association of hedgerow trees. The hedges are not stockproof.				*
Acid grassland	Increasing areas of re-establishing acid grassland.				*

Neutral grassland	Diminishing area as acid grassland recovers.				*
Fen	The wetland area is developing toward fen meadow.				*
Ponds	A linear pond in the fen area, created from a shallow, old drainage ditch, is relatively new and still developing. The original field pond in the acid grassland has been re-excavated but is still ephemeral.				*
Woodland	Self-sown birch woodland with some pine, oak and sycamore. Poor understorey of hawthorn and elder with willow nearer to the river.				*
Head of the Little Ouse	Traditionally considered the source of the Little Ouse, although an artificial channel. Much large woody debris. Shallow and unvegetated, mostly heavily shaded.				*
SPECIES					
Plants	*Rumex acetosella*, *Luzula campestre, Galium verum, Pilosella hieraciodes, Campanula rotundifolia, Anthoxanthum odoratum, Carex flacca, Stellaria graminea*, *Erodium cicutarium* and *Myosotis discolor* occur.				
Mammals	Otters are known to use the Frith as part of their territory in the upper Little Ouse. Water voles colonised the ponds in 2011. Weasels and stoats recorded regularly.		*		*
Birds	Song thrush, turtle dove, spotted flycatcher, whitethroat, blackcap, willow warbler and chiffchaff,				*

	green and great spotted woodpeckers, kestrel, little and tawny owls. Marsh tit in wet woodland. Siskins.				
Reptiles and amphibians	Adder, frog and toad listed in 2001 Management Plan. Grass snake now frequent.				
Butterflies	15 species listed in the 2001 management plan including Speckled wood and good colony of Purple hairstreak.				*
Other Invertebrates	Ebrehart (2010) describes a moderate mollusc fauna with no species of conservation concern. Glow worms present.				*
HISTORIC ENVIRONMENT					
Parish Boundary	The river and the west boundary are Parish boundaries. The river is the County boundary.				*
Historic landscape	Marginal land – "unimproved rough pasture", which may include Breck heath.				*
LANDSCAPE					
Wooded Valley Meadowlands and Fen Landscape Character Area (Farmer 2011).	Part of the Frith-Blo' Norton River Corridor Character Area. Components in good condition with mature trees and hedges currently restored. Old permanent pasture improving in condition.				*
EARTH SCIENCE AND GEOLOGY					
Type location of Lopham Sands	Proposed County Geodiversity Site. The Frith plays an important role in Richard West's hypothesis about the environmental				*

	development of the Little Ouse valley.				

B1.3 Stewardship Details

Details	Agreement reference: AG00357439 Date commenced : 01 October 2011	
Field Numbers	**Option**	**HLS Targets and Indicators**
7317 (ELS only)	EK3 Permanent grassland with very low inputs.	
	A13 Non-Payment Option – permanent grassland for Article 13	
	HQ2 Maintenance of one pond of high wildlife value >100m^2	The ponds should maintain 25-100% cover of marginal and emergent species between May and mid-September with at least 10cm of water between 15th August and 15th May
8605 (1.36ha, HLS)	HQ2 Maintenance of two ponds of high wildlife value >100m^2	The ponds should maintain 25-100% cover of marginal and emergent species between May and mid-September with at least 10cm of water between 15th August and 15th May
	HQ6 Maintenance of fen (reed-dominated)	Water levels in the ditches should be 20-45cm below field level throughout the year (although our target will be 10cm). The whole surface of the field should be wet from October to May, with cover of scrub less than 10%. At least two of reed, angelica, water mint, valerian and hemp agrimony should be at least occasional.
	HQ11 Wetland cutting supplement	Reed warbler, sedge warbler and reed bunting should be seen or heard regularly during the breeding season.
Capital Works (by September 2014)		
7317	PR/PRP Pond Restoration	total 375m^2
	SSB Bird/Bat boxes	10, in riverside copse.
	TS2 Tree surgery including pollarding,	5 trees
8605	PR/PRP Pond Restoration	total 520m^2

B1.4 Management Issues

- The soils of much of the Frith, derived from fluvioglacial sands, would naturally support acid grassland (perhaps with heather) or a kind of dry neutral grassland. This semi-natural vegetation was largely destroyed by a combination of ploughing and reseeding in the 1950's and applications of pig slurry and other nutrients more recently, until the previous tenant gave up the land.
- Despite this harsh treatment, the habitats are recovering. There are small areas of true acid grassland, dominated by indicators such as sheep's sorrel, although even these are on the eutrophic end of the acid grassland spectrum. Much of the grassland is transitional between acid grassland and species-poor improved grassland. There has been a remarkable shift from rank eutrophic neutral grassland to this transitional grassland in the time LOHP have managed the site. These changes suggest a good prognosis for long term recovery of the original habitats.
- The legacy of extreme nutrient enrichment is clear in the dense infestations of nettle and creeping thistle. However, because of mowing and latterly removal of the arisings (LOHP currently cuts nettles 2-3 times/year), the nettle and thistle beds have declined so that they are now only scattered with localised persistent stands of dense nettles.
- Nutrient depletion to the levels which will support the original vegetation requires either extreme stripping techniques (e.g. arable cropping or turf stripping) or a very long time horizon. Lying at the head of the catchment, the soil nutrient load is likely to leach into the groundwater and/or in the Little Ouse, although rates of export are likely to be low with the current management regime.
- The cost, disturbance to the site and likelihood of triggering significant nutrient flushing mean that nutrient stripping techniques are unfeasible on this site. A long term approach will be continued, using grazing and/or cutting to remove standing crop (which is more effective than grazing to remove nutrients), together with direct control of nettle and thistle. The thin, dry soils and the density of nettle and thistle currently mean hay cutting would not be commercial.
- Regular non-commercial cutting of the grassland and fen may raise problems with disposal of the arisings. This will need a long term disposal solution if it is to be sustainable.
- Sheep grazing is best for the acid grassland restoration.
- Under the ELS scheme, this area of grassland is to be managed with low inputs – consistent with LOHP's wish to manage the grassland without any inputs at all.
- Stewardship will also fund restoration of the old pond on the west side of the field. This pond was completely infilled in the `60s. LOHP re-excavated it in autumn 2006, locating it by old maps and photos. The location was accurate because the original mud was re-found during excavation and the original flora reappeared in months. With so many dry years it keeps drying out and filling with grass. Because of the sandy substrate the pond would need to be clay-lined but the cost would be excessive. The aim will be to maintain a winter- and spring-wet shallow pond by occasional digging out of the pond base.
- The rush pasture at the foot of the slope is peat-capped and can experience high groundwater levels, especially in winter. This has been particularly so since the closure

of the Redgrave borehole in 1999, which has provided an uplift in groundwater levels in the upper Little Ouse. The pre-existing pasture appeared to be killed off following prolonged flooding from autumn 2000 to July 2001, but has since returned. It is dominated by soft rush, suggesting slightly acid conditions, but there are scatterings of blunt flowered, hard and jointed rush all suggesting neutral-calcareous conditions at least locally.

- Under Option HQ6 *Maintenance of Fen*, the area is assigned to be reed dominated fen. Under this Option, water levels in the ditches should be 20-45cm below field level throughout the year, although our target will be 10cm. The whole surface of the field should be wet from October to May.
- The reed fen is also under Option HQ11 *Wetland cutting*. The fen should be mown in winter on a four year rotation.
- However, the LOHP's preferred objective for this area is the development of species-rich fen meadow. This requires mowing at least every other year, or annual grazing with cattle, or a combination. There is therefore an inconsistency with the Stewardship agreement. This Plan includes LOHP's aspiration.
- The possibility of creating a fen pool on the peat is an intriguing one. The vegetation indicates mostly acid conditions, suggesting the usual calcareous pool may not develop. This could provide an interesting contrast to the other fen pools in the valley. Of concern would be summer drops in groundwater levels, production of ochre (there is some evidence of this in the current pond) and the leaching of nutrients.
- One pond in the wetland area (8605) and one on the ELS grassland (7317, discussed above) are under Higher Level Stewardship Option HQ2 *Maintenance of ponds of high wildlife value*. Under this Option, the ponds should maintain 25-100% cover of marginal and emergent species between May and mid-September with at least 10cm of water between 15th August and 15th May.
- One small pond will be restored in the wetland area under Stewardship capital works. This will be an expansion of the existing pond, created by excavating a linear pond with a bell end. As part of the restoration work, the raised banks need to be graded or scraped off. Its development may give clues as to how a larger fen pool may fare.
- Much work has been undertaken to thicken up the previously gappy boundary hedges. Thickening up of the associated hedging will be completed, but shade from the standards will be limiting and the hedge is unlikely to ever be stockproof.
- The dry boundaries are formed of standard trees with comparatively sparse hedges between. Some of the standards are very old and have been pollarded in the past. Some have been re-pollarded (or part re-pollarded in a three-stage process) in the last 10 years. They are one of the most valuable features in landscape and wildlife terms. They will be managed to maintain longevity by pollarding or other tree surgery. A further five pollards will be funded under Stewardship. In order to ensure a succession of veteran trees, two new standards will be selected for new pollarding during this plan period. If there are no suitable young maidens established, new ones will be planted. Ideally, they will be grown from acorns of major oaks growing nearby.
- Stewardship capital works also provides for 10 bird or bat boxes.

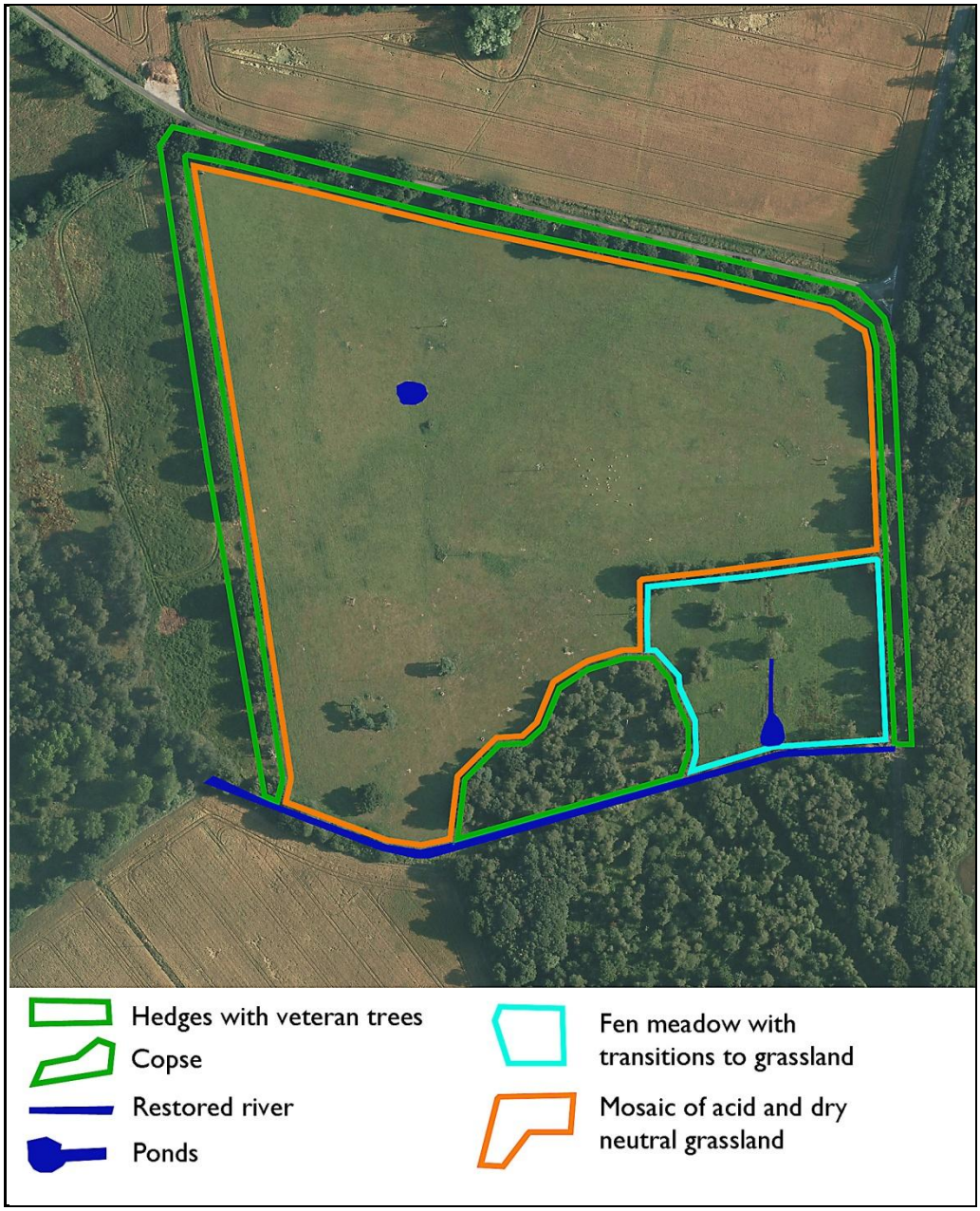
- The small copse of trees dominated by birch will be maintained with occasional new planting, as there is no natural regeneration. Sycamore will be removed, but the pines, some of which are thought to be the remains of a Victorian commemorative circle (Farmer, 2011, LCA for the valley), will be retained.
- The "river" at the foot of the slope is the source of the Little Ouse and flows intermittently. It is in relatively poor condition and may be restored as opportunity allows as part of any broader Little Ouse restoration scheme.
- The "source" of the Little Ouse is potentially of significant interest to visitors but is unmarked and uncelebrated. Consideration should be given to celebrating this local landmark with a sculpture, some interpretation and making it more accessible.
- There is currently little monitoring taking place. Repeat condition assessment survey, using NE's methodology, have been undertaken twice. Further monitoring would be helpful when revising the Plan.
- Regular surveillance of the condition of the site infrastructure (fence, the main sculpture, gates and stiles, and interpretation) should be undertaken. There should also be regular checks on the safety of trees where collapse or shedding of branches could form a health and safety hazard. This is especially so at entrance points, along the roads and at features of interest such as the Source. Professional advice on both aspects may be needed from time to time, but the warden will make the checks annually in the first instance.

B1.5 Condition and Aspirations

Twenty Year Vision

The Frith will be managed to restore a habitat complex of acid and dry grassland with heather, grading down the gentle slope to fen meadow adjacent to the river. The hedges will be a mix of veteran pollards, standards and sprawling hedgerow, and there will be a copse of birch, oak, sallow and alder near the river. The river corridor will be restored as part of a wider river restoration programme. The Frith will in the long term be reconnected with fens and valley margin habitats further downstream.

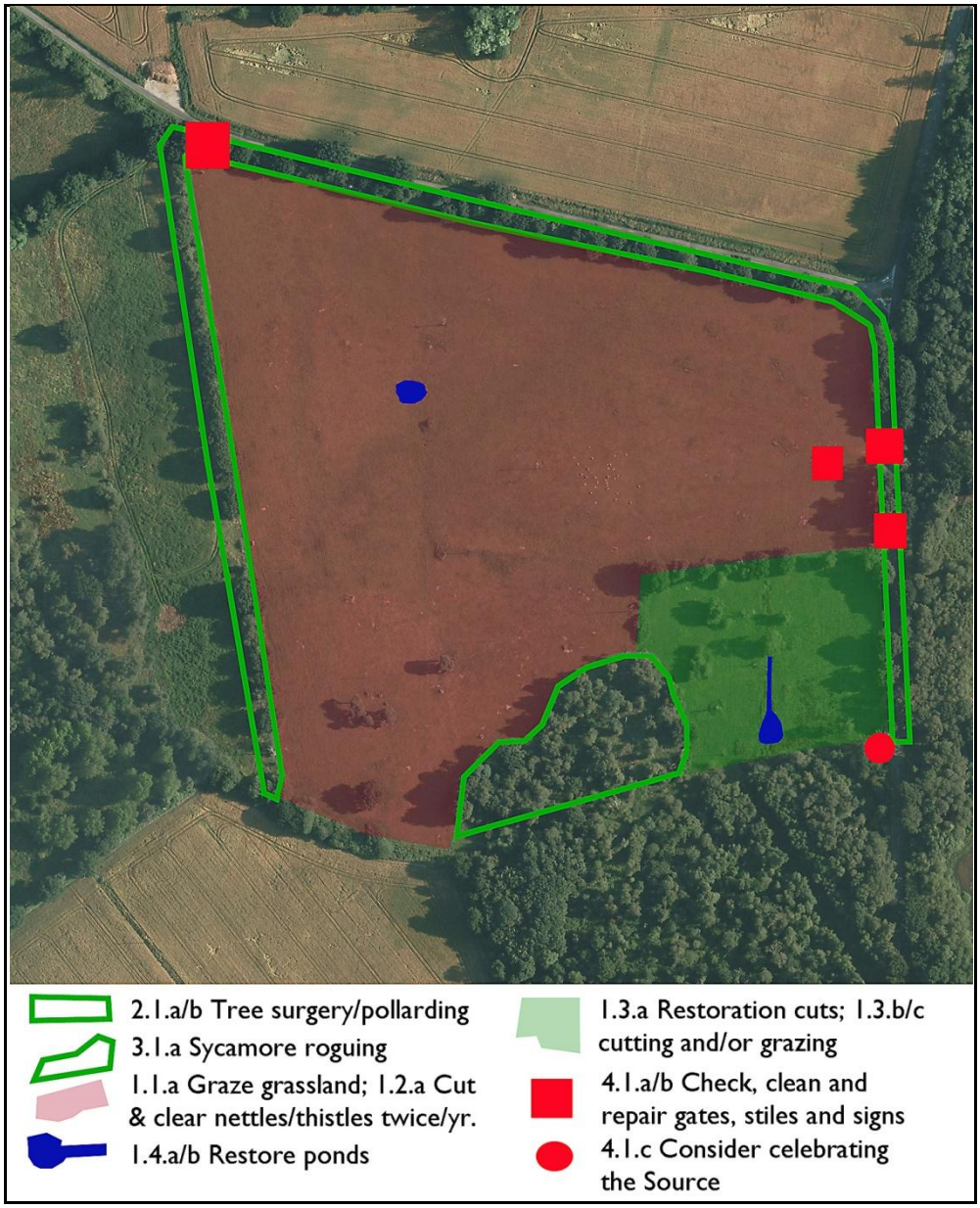
Figure B1-3 : Ideal Condition: The Vision



B1.6 Management Objectives

1. To restore species-rich semi-natural acid and neutral grassland with a transition to fen meadow at the foot of the slope.
2. To maintain dense, structurally diverse species-rich hedgerows with veteran trees, some pollarded.
3. To maintain the riverside woodland without intervention, other than sycamore control.
4. Promote understanding and appreciation of the site through physical access and interpretation.

Figure B1-4 Summary of Management



Not shown on Map:

1.1.b Remove standing crop whenever feasible to help to reduce nutrients
2.2.a Complete thickening up of hedges.
2.3.a Erect 10 bird or bat boxes (in riverside copse).
4.2.a Check safety of trees twice annually. Obtain professional advice where needed.

B2. Blo' Norton Little Fen

B2.1 Summary Information

Grid Reference	TM 034 792
Parish	Blo' Norton
District	Breckland
Size	6 ha
Warden	Jo-Anne Pitt
Designations	None
Tenure	Leased for 12 years from the Blo' Norton Poors Allotment starting 01/02/11. Leased with Blo' Norton Fen.
Access Details	Open at all times but the site is hazardous and access is not encouraged.
Rights excluded	None
Public rights of way	None
Third party easements/wayleaves etc	None
Principal habitats	Fen with carr woodland

Figure B2-1: Compartments

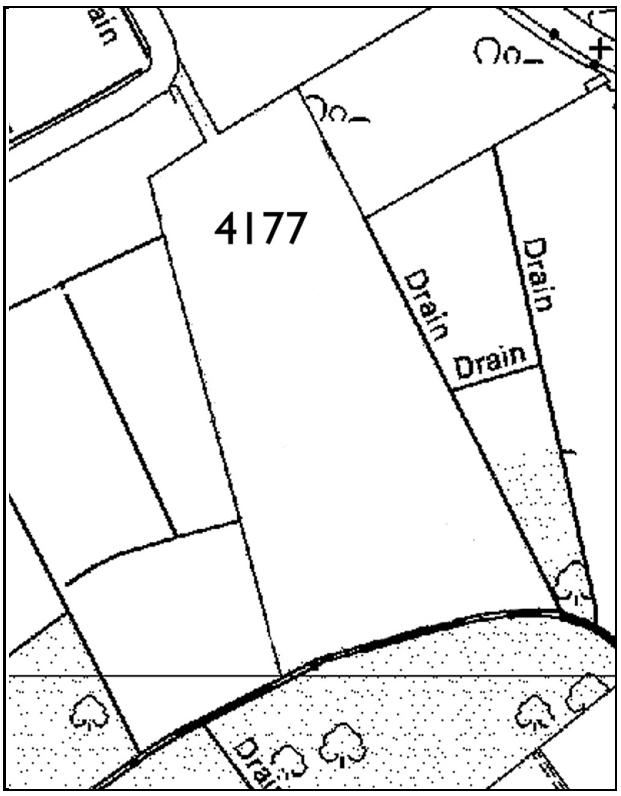


Figure B2-2: Aerial photograph: July 2008

B2.2 Significant Features and Their Importance

This Site is under-recorded. We have little information about most groups.

FEATURE	ATTRIBUTES	IMPORTANCE			
		Europe	BAP	SSSI	Local
Habitats					
Fen	Mixed reed fen, unmanaged other than periodic and patchy scrub clearance. Composition not surveyed.				*
Wet woodland	Young alder with willow. Self-sown when the site dried out in				*

	1960's and 1970's. Now appears to be dying back as the site becomes wetter following the closure of the borehole.				
Oak-birch woodland	On dry east margin, some large mature birch present.				*
Little Ouse River	Forms the southern boundary. Shallow ditch with very little flow. Channel features not documented.				*
SPECIES					
Invertebrates	Ebrehart (2010) describes a moderate mollusc fauna with no species of conservation concern. Glow worms have been recorded.				*
HISTORIC ENVIRONMENT					
Parish Boundary	The river is the parish boundary and the County boundary.				*
Historic Landscape	Regenerated alder carr woodland				*
LANDSCAPE					
Wooded Valley Meadowlands and Fen Landscape Character Area (Farmer 2011).	Part of the Frith-Blo' Norton River Corridor Character Area. Significant area of carr woodland contributing to the matrix of fen/marsh/woodland/pasture characteristic of the RCCA.				*
EARTH SCIENCE AND GEOLOGY					
Late and Post Glacial Lake	Tallentire has identified Little Fen and the Lows as a possible site of late and post glacial lakes. See work of West for further information.				*

B2.3 Stewardship Details

The following is taken from Part 2A of the Agreement, Parcel Based Options Summary.

Details	Agreement Reference: AG00357439 Higher and Entry on all land. Date Commenced: 01 October 2012	4.18ha
Field Numbers	**Options**	**Agreement Targets and Indicators**
4177	HC7 Maintenance of woodland.	The tree canopy should be 50-100% cover, with under-shrubs forming at least 20% cover. Desirable woodland ground flora species should be at least occasional. Undesirable species such as sycamore should be no more than 5% cover. Livestock should be excluded and falling and standing deadwood retained.

B2.4 Management Issues

- The site has little survey work. The nature and condition of the wet woodland and the fen communities has not been assessed through survey work. Only the molluscs have been surveyed in the species groups. Our understanding of their relative importance is not sufficient to specify management. Further survey work is needed in all ecological groups, but especially invertebrates, as the undisturbed habitat could support interesting communities.
- The site has been undergoing a great deal of change in the last fifty years. Originally, it was open fen. Then, subsequent to dredging of the river and the opening of the Redgrave borehole, both in the 1960's, the site became much drier. This, combined with lack of management, promoted scrub and woodland growth. Since the closure of the borehole, rising groundwater levels and reduced river maintenance have caused the site once again to become much wetter. This appears to be causing die-back of the colonising trees and the re-establishment of open fen.
- The very uneven terrain and the presence of deep and treacherous holes in the fen mean that management work is especially difficult. Mowing would need to be by hand and therefore arduous and expensive. Grazing may not be feasible with stock available to LOHP. Extensive and frequent fen management would therefore be challenging.
- In summer 2012, buzzards may have nested. At the time of writing this plan, the nest was being located and breeding success assessed. If breeding is proven, and sustained in following years, buzzards would be the primary known interest of the fen.
- Because of the lack of survey information and the highly dynamic nature of the habitat, it is too early to take long-term strategic decisions about the habitat. Deciding on full restoration or non-intervention may not be appropriate. In addition, it is

perhaps the only site in the valley exhibiting the dynamic shifts between woodland and fen. This in itself is worth conserving without interference, at least for the time being.

- Hence the strategy for the site is to allow natural processes to continue without intervention for this plan period. This should be accompanied by monitoring of the habitat. This strategy will be reviewed at the end of this Plan period.
- Because of the treacherous nature of the terrain, the possible presence of breeding buzzards and the history of lack of disturbance, access by members of the public will not be encouraged. No footpaths will be maintained in the site and no interpretation will be produced.
- The production of ochre may be an issue on this site, as it has been on the Lows and at the Frith. Ochre is produced by oxidation of iron-bearing sediments previously waterlogged but recently drained. Ochre is a fine, iron-rich sediment and is associated with iron compounds which can under certain concentrations be toxic to aquatic life. Management works which potentially cause release of ochre should be avoided or carefully managed to mitigate impacts.
- The site is entered under Higher Level Stewardship HC7 *Maintenance of woodland*. The feature is semi-natural broadleaved woodland. The tree canopy should be 50-100% cover, with under-shrubs forming at least 20% cover. Desirable woodland ground flora species should be at least occasional. Undesirable species such as sycamore should be no more than 5% cover. Livestock should be excluded and falling and standing deadwood retained. Management work for this parcel should "focus on clearing access to the woodland", although the Stewardship agreement does not specify further what is required. Perhaps surprisingly, the Agreement stipulates that encroaching willow should be removed. Most of the provisions of the HLS agreement are compatible with the current strategy for the site, except clearance of willow. If in the long-term, non-intervention wet woodland is the selected strategy, willow will be an important part of the woodland community. If woodland continues to die-back in favour of fen, the Stewardship option will need to be reviewed in its entirety.
- Options for future management include:
    1. Scrub removal and restoration to early successional fen through creation of a turf pond.
    2. Scrub removal and maintenance of mid-late succession fen through mowing/grazing.
    3. Maintenance of natural fen-woodland-fen dynamic cycling, if the current processes persist.
    4. Progression to mature wet woodland if the succession stabilises.
    5. A combination of two or more of the above, although the small size of the parcel suggests not all could be accommodated.

  In order to select the best option and design any restoration works if required, further survey work is needed, including:
    - Vegetation survey.
    - Breeding birds.
    - Invertebrates in key wetland groups.
    - Levels.

- Peat survey.

To support revision of this Plan, most of these studies should be undertaken in Year 5, although a vegetation survey in Years 1 and 5 would be helpful in assessing the direction of change.

- Regular surveillance of the condition of the site infrastructure (gates and interpretation) should be undertaken. There should also be regular checks on the safety of trees where collapse or shedding of branches could form a health and safety hazard. Professional advice on both aspects may be needed from time to time, but the warden will make the checks annually in the first instance. As public access is not encouraged issues are likely to be few, but particular attention should be paid to trees along the road margin.

B2.5 Condition and Aspirations

Because of the open nature of the "wait-and-see" nature of the current strategy, defining a Vision for this site would not be appropriate, nor would presenting a map of desired state. The current condition is best represented by the aerial photograph, as there is no habitat survey.

B2.6 Management Objectives

1. Maintain without intervention the process of dynamic change.
2. Monitor change in habitats.
3. Improve ecological understanding of the site through survey.
4. Maintain access for management and survey only.

B3. The Lows

B3.1 Summary Information

Grid Reference	TM 032 789
Parish	Blo' Norton
District	Breckland
Size	4.5 ha
Warden	None
Designations	County Wildlife Site (no. 595)
Tenure	Leased for 12 years from Blo' Norton Church Lands, starting 01/06/11
Date of acquisition and funders	First leased in 2003.
Access Details	Open at all times.
Rights excluded	None
Public rights of way	None
Third party easements/wayleaves etc	None known
Principal habitats	Wet grassland Fen Freshwater ditches Dry improved grassland Hedgerows Little Ouse River

Figure 3-1: Compartments

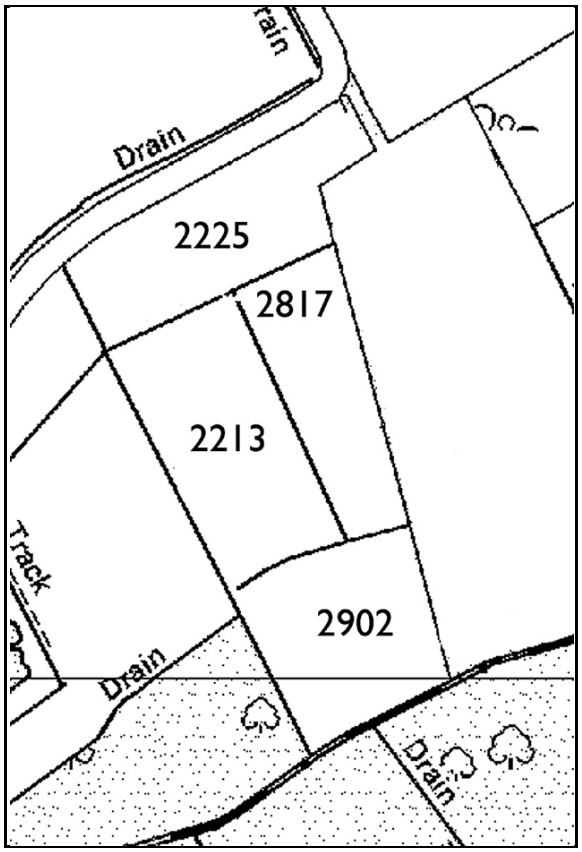


Figure 3-2: Aerial photograph: July 2008

B3.2 Significant Features and Their Importance

FEATURE	ATTRIBUTES	IMPORTANCE			
		Europe	BAP	SSSI	Local
Habitats					
Ditches	Silted up and colonised by swamp dominants. Species-poor – no submerged aquatic plants recorded by Nick Stewart.				*

Hedges	Mixed hedges including field maple, hawthorn, crab apple, blackthorn, dog rose and elder. Old ditch line now developed into alder standards.				*
Dry Improved grassland	Grass species of improved pastures with stands of nettle and creeping thistle. On the dry margin some remnant species of dry calcareous grassland including knapweed and *Carex spicata*.				*
Wet Grassland	Central areas of the middle fields. An improved grass sward has been invaded by swamp sedges and grasses, and tussock grasses, with mosaic of fen communities.				*
Fen	A mix of swamp and fen meadow communities. The swamp communities (pond sedges, reed, reed canary grass and reed sweet grass) are species-poor but structurally diverse. They include patches of meadow rue. The fen meadows are dominated by a mix of rushes (including blunt-flowered rush) small sedges and grasses. There is a range of remnant fen meadow species such as fen bedstraw, water mint, brown sedge, meadow vetchling and marsh thistle. In the wetter field by the river, there are patches of carnation sedge, long stalked yellow sedge, early marsh orchid and one-glumed spike rush. Intergrades with wet grassland. The structure of the wetland communities is very dynamic mediated by grazing pressure.				*

Little Ouse River	Forms the southern boundary. Shallow ditch with little flow. Ochre deposition is a known problem.				*
SPECIES					
Mammals	The ditches support a very dense water vole population. Brown hares recorded.		*		*
Birds	Breeding sedge warblers and reed buntings in the fen, black cap and whitethroat in the hedges. Overwintering snipe occasional.				*
Reptiles	Adder recorded 23/03/03				*
Amphibians	Frogs and toads				*
Invertebrates	Abrehart (2010) recorded *Vertigo angustior*, RDB1 and Annexe II species, in a significant population in the southern and eastern fields, especially the latter.	*			
HISTORIC ENVIRONMENT					
Parish Boundary	The river is a parish boundary and the County boundary.				*
Historic Landscape	18-19th Century enclosure (dry land). Otherwise, managed wetland.				*
LANDSCAPE					
Wooded Valley Meadowlands and Fen Landscape Character Area (Farmer 2011).	Part of the Frith-Blo' Norton River Corridor Character Area. Mixed habitats contributing to the matrix of fen/marsh/woodland/pasture characteristic of the RCCA.				*

EARTH SCIENCE AND GEOLOGY					
Late and Post Glacial Lake	Tallentire has identified Little Fen and the Lows as a possible site of late and post glacial lakes. See also the work of West.				*

B3.3 Stewardship Details

The following is taken from Part 2A of the Agreement, Parcel Based Options Summary.

Details	Higher and Entry on all land. Agreement Reference: AG00357439 Commenced: 01 October 2011	
Field Numbers	**Options**	**Agreement Targets and Indicators**
2225	A13 Non-payment option – permanent grassland for Article 13	
	HK15 Maintenance of grassland for target features (dry calcareous grassland).	By Year 10 of the Agreement at least 2 high value indicators of calcareous grassland should be frequent with 2 further species occasional. From September to February at least 10% of the field should have grasses allowed to go to seed. Between April and August, flowering heads of all species should be frequent. Invasive woody species should be less than 5%. The sward should be managed by grazing to achieve a sward height of 5-15cm in November (although ideally for lapwing breeding, the sward should be 5cm or less in early spring).
	HR2 Supplement for native breeds at risk	None.
2213, 2817 and 2902	A13 Non-payment option – permanent grassland for Article 13	
	HQ6 Maintenance of Fen : Reed fen	The ditches should have 25-75% of the water area covered by aquatic species, with less than 5% filamentous algae, and duckweeds contributing less than three quarters of the aquatic plants. The ditches should be between 20 and 45cm below marsh level (although our target will be 10cm). The whole surface should be wet from October to May (we have adopted the additional target that the surface should be squelchy underfoot all year round). At least two desirable species such as reed, hemp agrimony, angelica, water mint and valerian should be

		common and scrub should be less than 10%. **NB: The target habitat (reed fen) is not appropriate (fen meadow is preferred), so these targets may also need amendment.**
	HQ12 Wetland grazing supplement (target feature Coastal and floodplain grazing marsh)	30% of the sward should be in patches or tussocks over 50cm high, and the vegetation should be in a mosaic of taller and shorter species. **NB: The target habitat is not appropriate, so these targets may also need amendment.**
Capital Works (by September 2014)		
	WGC Creation of gutters, 130m parcel 2817, 390m parcel 2213, 210m parcel 2902	
	DR Ditch Restoration: 150m, parcel 2213. 115m parcel 2902.	
	SSB Bird/Bat Boxes, 5, parcel 2213	

B3.4 Management Issues

- Prior to LOHP taking on the lease, the floodplain portion of the Lows had become progressively wetter, partly due to the increase in groundwater levels associated with the closure of the Redgrave borehole, and partly due to short term flooding associated with heavy rainfall. The riverside field was ungrazed, causing expansion of swamp dominants and the development of a deep litter layer.
- The more elevated northern field (2225) is semi-improved with some remnant species of dry calcareous grassland. The top field was bulldozed in the 1950s, for reasons unknown. The top soil is in two heaps either side of it. It must have been calcareous grassland like to verges leading down to it – knapweed, agrimony, bladder campion, restharrow – but these species are no longer present. It has been placed under Stewardship Option HK15 *Maintenance of grassland for target features*, in this case dry calcareous grassland. The target is that by Year 10 of the Agreement at least 2 high value indicators of calcareous grassland should be frequent with 2 further species occasional. Also under this option, from September to February at least 10% of the field should have grasses allowed to go to seed. Between April and August, flowering heads of all species should be frequent. Invasive woody species should be less than 5%. The sward should be managed by grazing to achieve a sward height of 5-15cm in November. Ideally for lapwing breeding, the sward should be 5cm or less in early spring.
- This field is also under Option HR2 *Supplement for native breeds at risk.* Under this option, 3 traceable-pedigree redpoll cattle should be grazed on the field. These animals will account for 70% of the livestock grazing between April and October.
- The habitat of *V. angustior* is described by Abrehart (2010) as "…moist places which are affected neither by periodic desiccation nor by flooding. It requires open conditions quickly warmed by the sun, inhabiting short vegetation of grasses, mosses or low herbs, such as

damp meadows." Stability is a key factor. The population of snails is very large and is probably the most significant species on the site. The excessive development of tall swamp communities at the expense of open fen meadow is probably to the detriment of the snail. The snail population was re-surveyed in late summer 2012 – the results were not available for this plan.

- The likely expansion of swamp communities following lack of management may also be at the expense of the fen meadow flora. Many of the uncommon species are small, low growing plants which cannot survive in dense and tall communities. Re-establishment of open fen meadow communities, pushing back the swamps to ditch and river margins, is desirable.
- The structure of the sward in summer 2012 was almost ideal for the botanic and invertebrate interest. The southern field may have a little too much lodged blunt-flowered rush which is not being grazed adequately. Occasional mowing followed by aftermath grazing would cure this problem. The other wet fields also have much tussock rush (hard and soft). Although this currently provides welcome habitat structure, over-dominance of rush would be detrimental and occasional cutting helpful. Regular and extensive cutting raises problems of disposal of arisings which requires a strategic valley-wide solution.
- All three of the low lying wet fields are under Stewardship Option HQ6 *Maintenance of Fen* according to Part 2A and the options map attached to the Agreement (although only parcel 2902 is listed under that option on part 3 page 10). The feature under this option is reed-dominated fen, but bearing in mind the above discussion, fen meadow may be more appropriate. Under this option, the ditches should have 25-75% of the water area covered by aquatic species (which they currently do not), with less than 5% filamentous algae and duckweeds contributing less than three quarters of the aquatic plants. The ditches should be between 20 and 45cm below marsh level although our target will be 10cm. The whole surface should be wet from October to May (we have adopted the additional target that the surface should be squelchy underfoot all year round). At least two desirable species such as reed, hemp agrimony, angelica, water mint and valerian should be common and scrub should be less than 10%.
- All three of these fields are also under Option HQ12 *Wetland Grazing Supplement*, although again only 2902 is listed under the option (part 3, page 15 of the Agreement), and then the feature is coastal and floodplain grazing marsh. This option specifies that 30% of the sward should be in patches or tussocks over 50cm high, and the vegetation should be in a mosaic of taller and shorter species.
- All three of these fields will benefit from the creation of footdrains (or "gutters") by September 2014. The footdrains will create linear wet fen and will encourage breeding waders. Location of the gutters and disposal of the peat will need careful consideration to avoid rare species and colonies of *V. angustior.* A repeat survey of the distribution and abundance of this species is being undertaken in 2012 to inform management. According to the Stewardship Agreement the gutters should be at least 30cm deep and 20cm wide. Proposals for gutters should be agreed with NE beforehand. There is a risk that the gutters will simply fill with rush and would then be detrimental. There is also a risk of ochre contamination, although this is likely to be a lower risk than with ditch dredging. It may be sensible to undertake half the quota, review the results and the need for further drains.

- Water levels are controlled by a sluice at the west end of the lower (southern) east-west ditch. It should be used to maintain ditch levels at brim full from April to September inclusive. This sluice is regularly interfered with. The pipe upstand is removed, lowering the ditch levels. If the problem persists a lockable structure should be considered.
- One of the most important existing features is the population of water voles in the marsh ditches. Extreme caution will be used for maintenance works, with best practice management carried out and a minimal approach. All physical work should be undertaken in October (or possibly November) when the voles will be neither breeding nor hibernating in their burrows. Water voles were not recorded along the river bank. Although that could be achieved with suitable management, LOHP do not have sufficient management control of both banks for the necessary tree work.
- The ditches have become silted up and dominated by swamp species. This very late successional stage is ubiquitous on the marsh. The condition is not acceptable under Option HQ6. A programme of ditch reinstatement is required. Ochre has been noted in the ditches. This may reflect a history of ground water lowering, causing oxidation of reduced iron in the peat, with subsequent flushing of the ochre as groundwater levels increased. There may always be residual ochre, but the density of the material will reduce over time. A similar effect was observed in the scrapes of Redgrave Fen after closure of the borehole. The ditches will be restored under Stewardship capital works grant before September 2014. A requirement for ditch restoration is that the ditches are surveyed for rare species (especially water voles) before work starts and the ditch restoration plan should be agreed with NE. The re-profiling work should be planned to minimise release of ochre. Deposition of spoil needs to be carefully considered to avoid rare species.
- Breeding birds and bats will be improved on the site by the installation of five bird or bat boxes by September 2014. This is a HLS capital item, due for the alders in the cross-ditch.
- There is no formal monitoring undertaken on the site. A monitoring programme which provides surveillance of the key features and abiotic factors should be drawn up subject to resourcing.
- Regular surveillance of the condition of the site infrastructure (the sluice, gates, fencing and interpretation) should be undertaken. There should also be regular checks on the safety of trees where collapse or shedding of branches could form a health and safety hazard. Professional advice on both aspects may be needed from time to time, but the warden will make the checks annually in the first instance.

B3.5 Condition and Aspirations

Over the course of the next twenty years, The Lows will support a range of valley margin and valley bottom habitats from dry calcareous grassland to a damp transition zone and then to species-rich fen meadow, swamp and reed communities on the valley floor. The ditches will support a diverse aquatic flora and fauna. The site will be part of an integrated headwater hydrological and ecological unit with a fully restored river corridor.

B3.6 Management Objectives

1. Restore the following wetland habitats; freshwater ditches; species-rich fens (centred around M22); swamp habitats along ditch margins and in hollows.
2. Restore dry, calcareous grassland to the elevated slopes, with transition to wetland below.
3. Conserve and enhance the populations of rare or protected species; *V. angustior* in the fen areas and water voles in the ditches.
4. Promote understanding and appreciation of the site through physical access and interpretation.

B3-3 Summary of Management.

Not Shown:

1.1.b Mow undergrazed areas
1.1.c Maintain taller pond sedge and reed swamps along dyke margins and in hollows.
2.1.a Cut thistles and nettles (on dry grassland) in summer to reduce vigour.
3.1.a Ensure any work on river and ditches does not impact water voles. Provide enhancements where possible.
3.1.b Undertake survey of all ditches prior to work.
3.2.a Undertake new survey (*V. angustior*) in 2012 or 2013.
3.2.b Ensure ditch/footdrain work does not impact populations.
3.2.c Ensure grazing maintains right vegetation structure.
3.3.a Provide 5 nest boxes in alders in ditch (HLS SSB).
4.1.a Mow the footpaths.
4.1.b Maintain gates and signs.
4.2.a Check safety of trees twice annually. Obtain professional advice where needed.

B4. Hinderclay Fen

B4.1 Summary Information

Grid Reference	TM 026 787
Parish	Hinderclay
District	Mid-Suffolk
Size	11.75 ha
Wardens	Reg and Rowena Langston, Nigel Clark
Designations	County Wildlife Site, SSSI until 1983 (denotified due to drainage and loss of interest features). Registered Common
Tenure	LOHP have a lease of 12 years from the Hinderclay Fen Trustees starting 21/09/11.
Access Details	Open at all times. Open Access land under the Crow Act.
Rights excluded	Shooting rights
Public rights of way	Angles Way public footpath runs east- west through the site (not LOHP responsibility). Access by road is via a public byway running north from Fen Street opposite Holiday Farm.
Third party easements/wayleaves etc	Overhead electricity powerlines, plus vehicle access across bridge and over fen. Both are payable to the Fen Trustees.
Principal habitats	Valley fen Heathland Neutral and calcareous species-rich grassland. Alder and willow wet woodland Dry woodland – oak and young birch.

Figure B4-1: Compartments

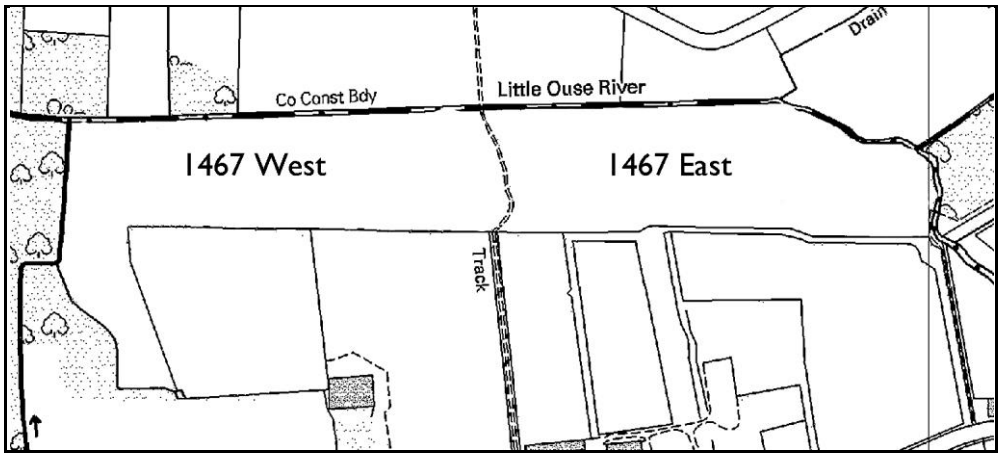


Figure B4-2: Habitats and Plant Communities

Jonny's NVC Map

Figure B4-3: Aerial photograph: July 2008 Note that the boundary is illustrative only. There has been some encroachment on the southern boundary in two places

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B4.2 Significant Features and Their Importance

The site is not designated SSSI. However, the range of habitats (particularly the valley fen sequence from dry heath margin to river) merit scheduling, hence the status below.

FEATURE	ATTRIBUTES	IMPORTANCE			
		Europe	BAP	SSSI	Local
Habitats					
Heathland	Mosaic of acid grassland (four sub-communities of U1) with rich associated flora including many lichens. Some areas heather dominated.			*	
Neutral and calcareous grassland	On the margins of the heath and on sandy tongues. Adders tongue fern, thyme, gromwell.				
Transition slope	Remnant fen meadow (possibly formerly seepage mire?) with purple moor grass.			*	
Valley fen	Mix of pond sedge and reed swamp with species-rich tall herb fen and fen meadows dominated			*	

	by blunt flowered rush.				
Wet woodland	Alder dominated wet woodland (W5-W7) to the west. Some sallow/willow scrub woodland particularly along the river margin.			*	
Dry Woodland	Oak (some planted) and birch woodland, mostly young with poor understorey and ground layer.				*
SPECIES					
Plants	Two charophytes, none scarce. Twayblade, adder's tongue, betony, thyme. Very rich former fen flora, including fen orchid (last record 1967). Little persisted after 1980.				*
Mammals	Otters and water voles reported along the river (Gibson 2003). Harvest mouse.	*	*		
Birds	Reed and sedge warbler, reed bunting in the fen. Willow and marsh tit, water rail and cuckoo also confirmed breeding. Linnets breed in gorse. Spotted flycatcher bred in 2011 and 2012.				*
Reptiles and amphibians	Common lizard, slow worms, grass snake, smooth newt, toad		*		
Invertebrates	Nobes (2010) examined a range of fen pools. Recent pools with *Chara* were best, one ("site 12") recording 33 species of water beetle including the RDB3 *Hydrochus elongates* plus three Notable species. The RDB3 water cricket *Microvelia pygmaea* also recorded.				*

HISTORIC ENVIRONMENT					
Parish Boundary	The river is an old parish boundary and the current County boundary.				*
Historic landscape	Managed meadow and wetland. Registered Common				*
LANDSCAPE					
Wooded Valley Meadowlands and Fen Landscape Character Area (Farmer 2011).	Part of the Frith-Blo' Norton River Corridor Character Area. Significant for representation of heath and acid grassland, unique in the RCCA.				*

B4.3 Stewardship Details

The following is taken from Part 2A of the Agreement, Parcel Based Options Summary.

Details	Higher Level, Agreement Ref AG00376755 Commenced 9th September 2011	11.75 ha in agreement. 6.66ha (c. half the site) under payment options. A13 Non-payment option on further 2.53 ha.
Fields Numbers	**Options**	**Agreement Targets and Indicators**
1467	A13 Non-payment option – permanent grassland for Article 13. 2.53 ha.	None given
	HC7 Maintenance of natural woodland. 2.0 ha. NB This HLS option only applies to the dense woodland at the west end of the western compartment.	Canopy should provide 50-100% cover, understorey 10-100% and open ground in rides and glades 10-30%. By the end of the 2016, sycamore should be no more than occasional.
	HK6 Maintenance of species-rich semi-natural grassland. 2.53ha in 2 parcels.	The soil phosphate index should be 0-1. At least two indicators, plus heather, for lowland acid grassland should be frequent and four occasional. Cover of wildflowers should be 20-90%. Scrub cover should be 5% or less with bare ground 15%, excluding around rabbit

		burrows. The sward should be at 2-10cm by November.
	HQ6 Maintenance of fen.1.6ha	Cover of undesirable species less than 5%. Water table above ground at least once per year with the ground damp for the rest of the year. Two reed fen indicators (reed, angelica, water mint, hemp agrimony, and valerian) occasional across the area. Scrub scattered and no more than 10% of the area.
	HQ11 Wetland cutting supplement. 0.53 ha	As above plus reed and sedge warblers and reed buntings should be regularly heard or seen
Capital works (by Sept 2014)	PC Pond creation – first 100m^2	6 ponds totalling 36m^2
	PH Hedgerow planting	955m.
	SA Scrub Management, <25% cover	1.04ha.
	SS Scrub control – base payment	1ha
	SB Scrub management 25-75% cover	0.6ha
	SC Scrub cover >75% cover	0.32 ha

B4.4 Management Issues

- The site was formerly of very high conservation value as a valley fen with calcareous and mixed mire similar to that described for Redgrave Fen. It was one of Bellamy's PhD sites and botanically on a par with Redgrave, Thelnetham and Market Weston Fens. It is very similar in character to Market Weston Fen, with a wide flat heath grading down into fen via species-rich and calcareous sandy tongues. Much of the natural patterning in the vegetation has been lost to scrub growth.
- It suffered from river dredging, groundwater abstraction and dereliction more than any of the other sites in the Waveney-Ouse complex, which led to it not being re-notified as an SSSI in 1985. Its very narrow strip of fen directly abutting the river has made it especially vulnerable to drainage. Being closer to Redgrave Fen than the Thelnetham Fens, it is likely to have benefitted from the closure of the borehole. The Thelnetham Fens have had proven increases in chalk and surface water levels following this closure, so we might expect the same for Hinderclay.
- In addition, there have been pollution issues from the adjacent poultry unit. The worst of this ended with the last AI outbreak in 2007 and the end of out-door birds but issues with the slurry lagoon and enrichment of land uphill from the fen remain problematic. Downward percolation and the transport by lateral groundwater flow to the fen is promoted by the sandy soils on which the poultry unit lies. Substantial eutrophication of the fens may be attributed to this source.

- The river was straightened and deepened, with particularly heavy engineering works in the 1960s. The increased channel capacity and the greater draw from the fen have significantly damaged the wetland interest. Ecological interest in the river corridor has also been damaged by the engineering work.
- Without significant raising of the river levels, it is unlikely that groundwater fed spring and seepage fen of the kind recorded by Bellamy can ever be restored. This remains a primary aspiration for the site, although water quality needs improving before any water is encouraged on-site. Changes to river management would require significant local consultation.
- Drying out and the cessation of regular management until the 1990's meant that much of the surviving habitats were overcome with scrub. The transitions, open fen and dry grassland were particularly badly affected with only small enclaves of each remaining. The heath fared better, being maintained by intense rabbit grazing. Desiccation of the peat is also likely to have led to the release of nutrients in the fen. Together with lack of management and drying out, this will have promoted change toward species-poor reed and pond sedge fen, and the loss of calcareous saw-sedge fen.
- The fen has benefited from recent restoration and management work by LOHP, together with earlier work by local volunteers, including scrub clearance, mowing and excavation of some peat pits.
- The 2006 and 2012 NVC Surveys indicated a range of wetland habitats with high potential for restoration. These include transition areas between heath and fen dominated by purple moor grass. These *may* be former locations of Bellamy's plots, and with suitable restoration work might see the recovery of significant mire vegetation. The 2012 survey showed that many of the communities are still surprisingly species-rich, especially the fen meadows and margins with a more recent history of mowing management. Some stands, especially the *Molinia* meadows and some of the neutral grassland, are rather rank and would benefit from increased mowing or grazing.
- The potential for restoration is substantial, even without raising river levels. Clearance of scrub could reveal many areas of high value and more comprehensive restoration could reveal the full sequence of heath-grassland-mire-fen habitats. Improving the fen requires more extensive and in places more frequent mowing. Increased mowing may lead to problems with disposal of arisings. A valley-wide solution to this problem is needed. The ideal management for the transitional areas, sandy tongues and grassland is light grazing, but until that can be secured, mowing is the required management. The heath is well maintained by rabbits. An extensive sward of lichen heath has developed to the east. Grazing may be detrimental to the lichen if stocking is too heavy.
- Currently in the plan there are three areas of scrub removal indicated. The first is the small areas included in Stewardship capital works which must be done by September 2014, shown as priority 1 on the map. The second and third are Priority 2 and 3 scrub clearance aimed at linking up open areas or revealing areas of greatest habitat potential/.
- Although grazing may be the ideal and most sustainable management option for the site, it will not be pursued on the site because of practical issues and the way it would be received locally.

- Until hydrological restoration and grazing can be achieved, species-rich, calcareous sedge and reed fen, and rush dominated fen meadow, are the primary objectives for the open wetland equating to S25 *Phragmites-Eupatorium* fen and M22 *Juncus subnodulosus* fen meadow respectively. Purple moor grass fen meadows (equating to M24) are the target along the marginal transitions. Early successional and semi-aquatic fen habitats will be re-created through digging of small scale peat pools.
- Nobes (2010) suggests that grassy, mossy margins to the pools would benefit the invertebrate fauna, noting the encroachment of reed and reedmace to most pools.
- The main open fen to the west of the site, 1.6 ha, is under Stewardship Option HQ6 *Maintenance of fen*. Under this option the water table should be above ground at least once per year with the ground damp for the rest of the year. Our target would be for a water table at ground level in March and reducing to no more than 10cm below ground level in summer. This is suitable to restore wet tall herb fen, fen meadow and groundwater fed fen, although it is unlikely to be achieved with the current river levels. The Stewardship target is to have two reed fen indicators (reed, angelica, water mint, hemp agrimony, and valerian) occasional across the area. Scrub should be scattered and no more than 10% of the area.
- A smaller area (0.53ha) is under Option HQ11 *Wetland cutting supplement*. Under this option, measures of success are the same as for HQ6 above, with the addition that reed and sedge warblers and reed buntings should be regularly heard or seen. Reed dominated areas should be mown every 4 years in September and October, although to promote species-richness, an earlier cut (mid-July to August) would be beneficial. According to the Stewardship Agreement, *Cladium*-rich areas should be mown in summer, but currently there is no *Cladium* on site.
- Management of the purple moor grass transitions around the eastern heath is problematic. These habitats would normally benefit from annual light grazing or mowing, essential to arrest the succession, prevent accumulation of surface nutrients and to promote species richness. However, the stands at Hinderclay are currently species-poor and quite dry. They have not been managed for some years and have accumulated in places a thick litter layer. The ideal would be gentle grazing following re-wetting, but the re-introduction of comprehensive and intensive mowing management may not produce the expected increase in species-richness and may “open” the sward to incursion by ruderals typical of dry ground. It may also be detrimental to any invertebrate interest that has accumulated in the stable environment. Because of the uncertainty, management will only be re-introduced after careful evaluation of the most appropriate methods.
- The 2006 and 2012 NVC survey shows that the communities are mixed fens without *Cladium.* The Stewardship prescription would not maintain the mire and fen meadow communities which require 1-2 year mowing regimes, some of which are already mown annually. The rush and Molinia fen meadows should ideally be mown annually, with some areas perhaps mown every two years, while the fen should be mown on a four-year cycle.
- The west of the site supports some mixed mature woodland, covered by Stewardship Option HC7 *Maintenance of Woodland.* Under this Option, the broadleaved canopy should provide 50-100% cover with the understorey being 10-100% and open ground in rides and glades 10-30%. Sycamore has colonised the dry woodland and regenerates freely. By the end of the 2016 it should be no more than occasional. Deadwood should be retained and scrub

management restricted to 10% of the area, but otherwise there are no management requirements and this area approaches non-intervention.

- Scrub woodland has developed over much of the rest of the site. A significant area of this should be cleared to recover more open habitat. Areas retained will be unmanaged other than sycamore rouging, following the guidelines of Stewardship Option HC7.
- The heath is still of considerable interest, having been maintained by rabbits and latterly management work by LOHP. They include four sub-communities of U1 acid grassland and there are significant areas dominated by heather. The flora is rich and includes a wide range of lichens. Much of the area has been lost to colonisation by scrub and woodland. The grassland may have suffered aerial and groundwater nutrient enrichment from the adjacent poultry unit until 2007.
- Within this grassland there are stands of neutral-calcareous vegetation with plants such as thyme and quaking grass recorded. They are mostly located on the heath margin, above the fen meadow transitions. This grassland has similarities to the species-rich grassland at Wortham Ling and especially to the sandy tongues at Market Weston.
- The heath grassland is entered into Stewardship Option HK6 *Maintenance of species-rich semi-natural grassland*. Rabbit grazing maintains the heath in condition. Should rabbit numbers fall, mowing may be needed . Grazing is the ideal management for the neutral and calcareous grasslands but is not currently feasible.
- There is considerable potential to join up the two areas of heathland, and to open up further the transitions between heathland and wetland. Priorities for scrub clearance are shown on the management map.
- Planting of a hedgerow along the southern margin would restore an old boundary, reduce nutrient drift from the adjacent fields, and increase the sense of intimacy of the site. It also provides some compensation for the trees lost during scrub clearance.
- Capital works included in the Stewardship Agreement are:
    - PC Pond creation – first 100m^2 , six turf ponds totalling 36m^2 located in the fen at the west end.
    - PH Hedgerow planting, 955m along the southern boundary with the agricultural land. Plants 6/m in double staggered row, 30cm apart. Two year transplants, 45-60cm, native species suitable for dryer sites. Mulch to control weeds. Agree planting plan with NE beforehand.
    - SA Scrub Management, <25% cover, 1.04ha and SS Scrub control – base payment, 1ha. This refers to the main fen area to control encroachment of scrub.
    - SS Base payment scrub control, SB Scrub management 25-75% cover, 0.6ha, and SC Scrub cover >75% cover, 0.32 ha. All relate to the margins of the main western fen area, intended to expand the open area. Note the second area of SC work is not marked on the Stewardship map.
- The above review suggests a two stage $_{approach}$ to restoring the site:
    1. Recovery of wetland, transitions and heathland through scrub clearance with improvement in quality of this and existing areas of habitat.
    2. Securing raised river levels and establishing grazing rights with subsequent comprehensive restoration of the whole site. Restoration of contiguity with the Thelnetham Fens to the west through habitat restoration. Restoration of ecological condition in the Little Ouse river corridor.

Stage 1 is achievable within the 5-year time frame of the current Plan. Stage 2 may be achievable toward the end of the 20-year vision.

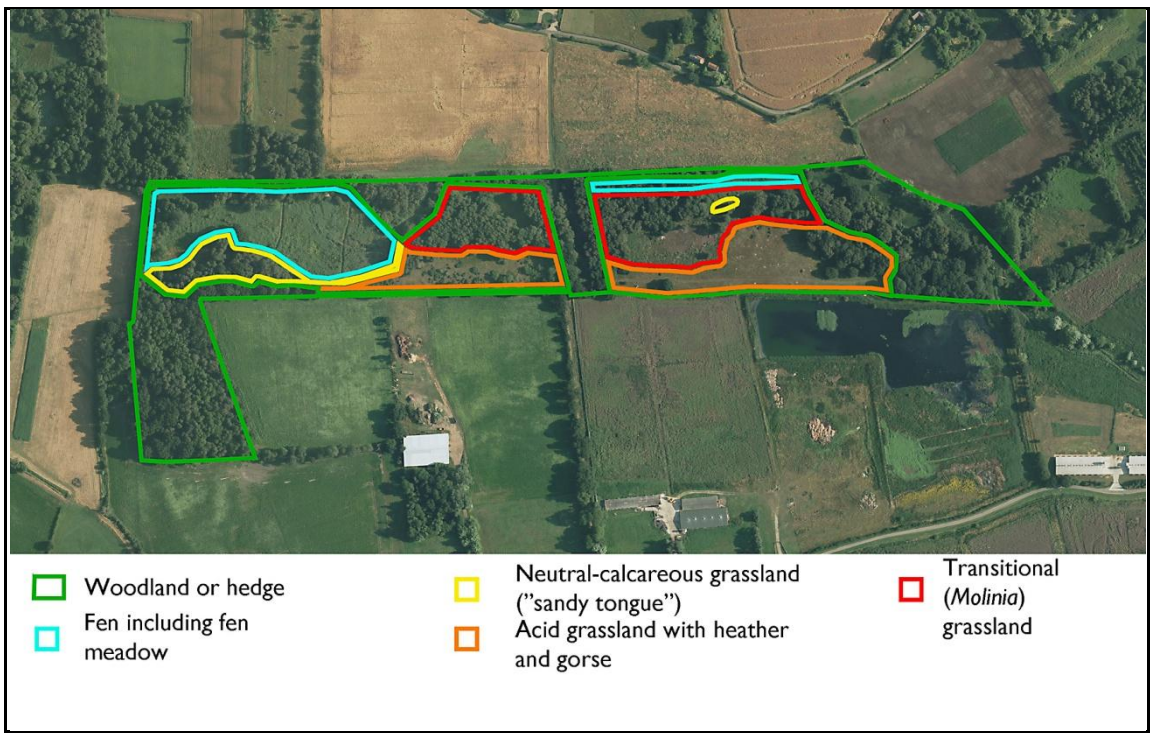
- There is no formal monitoring undertaken on the site, although there is a constant effort ringing station maintained on the fen margin. A monitoring programme which provides surveillance of the key features and abiotic factors should be drawn up subject to resourcing.
- Regular surveillance of the condition of the site infrastructure (gates, the sculpture-bench and interpretation) should be undertaken. There is an immediate need to replace the sculpture-bench. There should also be regular checks on the safety of trees where collapse or shedding of branches could form a health and safety hazard. This is a priority along the main track and informal paths through the site. Professional advice on both aspects may be needed from time to time, but the warden will make the checks annually in the first instance.

B4.5 Condition and Aspirations

Twenty Year Vision

Over the course of the next twenty years, Hinderclay Fen will support the full range of valley fen and valley margin habitats from heathland through to a damp transition zone and then to species-rich fen meadow, mire, swamp and reed communities on the peat. Early succession fen will be represented by peat pools of different ages. The site will be integrated hydrologically and ecologically with the Thelnetham fens to the west, with a fully restored river corridor.

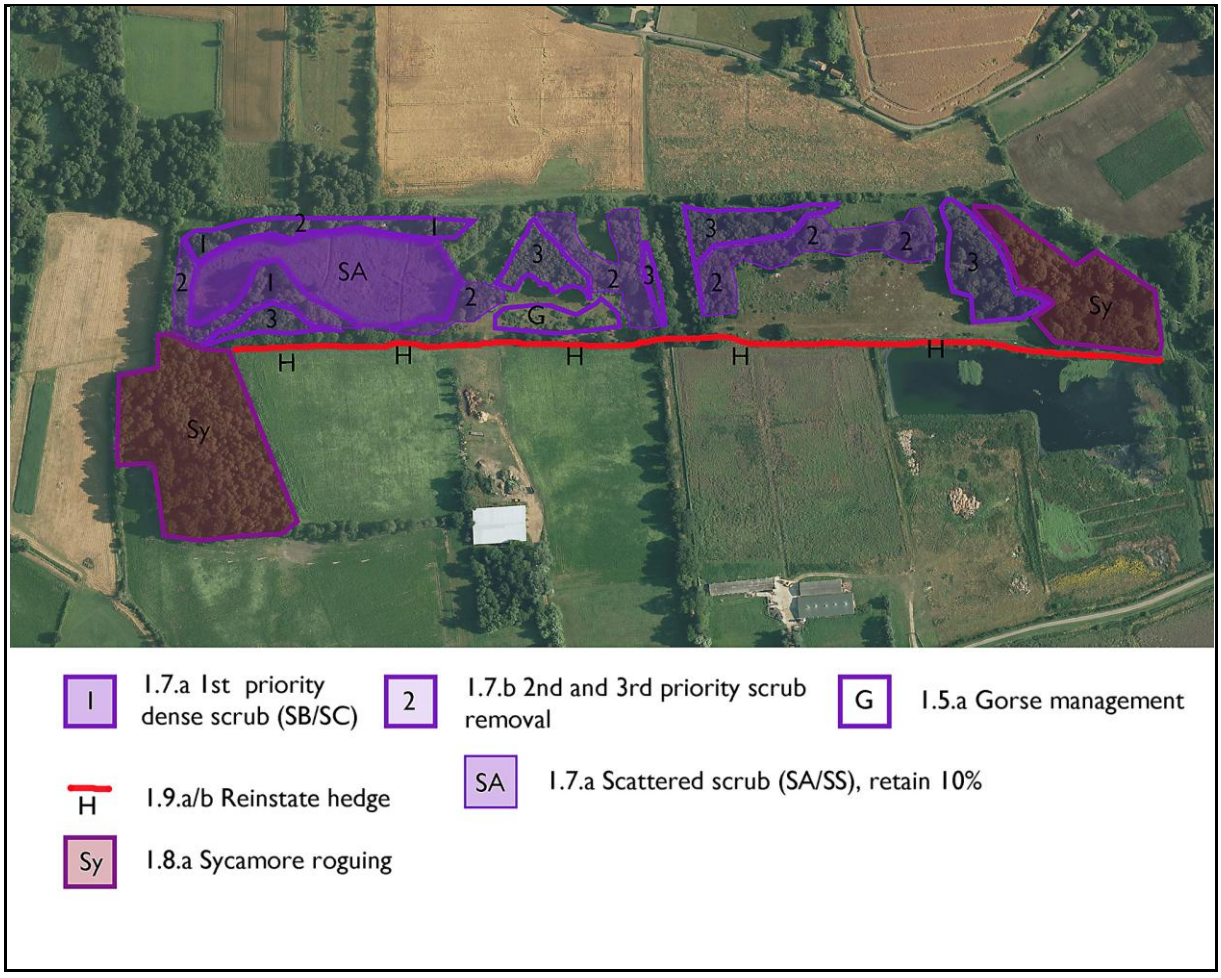
Figure B4-4 Ideal Condition



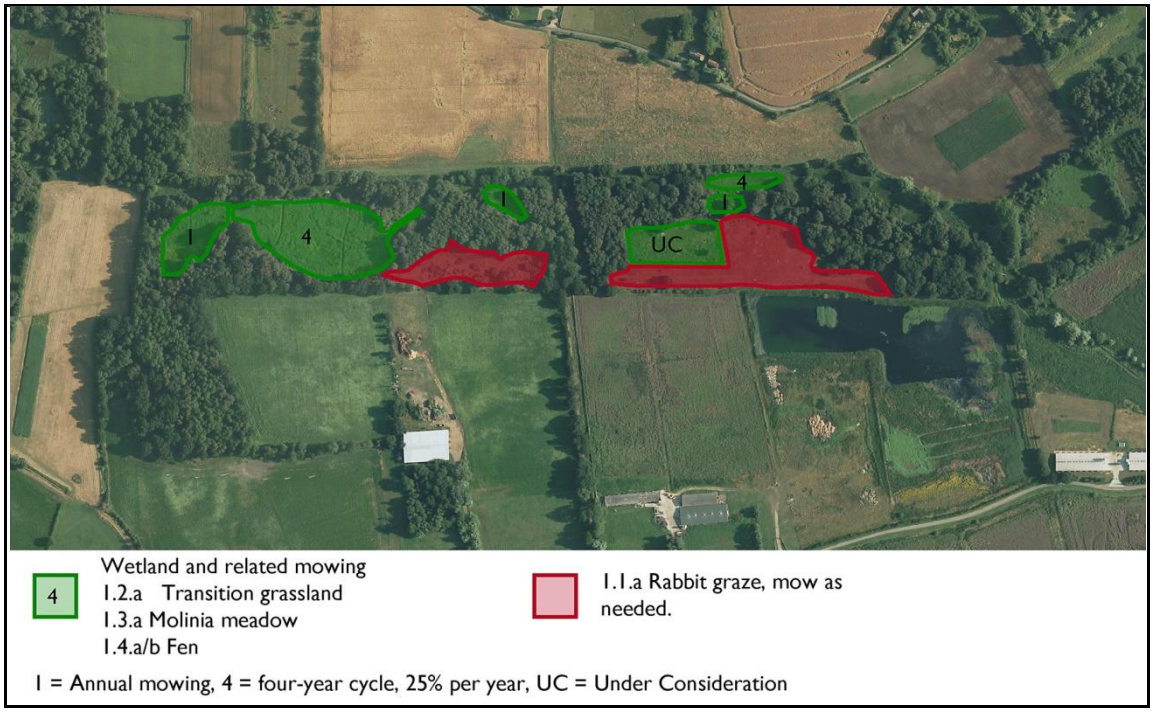
B4.6 Management Objectives

1. Restoration of the full sequence of valley fen habitats: dry heath, heath-fen transition, mire, fen meadow, species-rich tall herb fen, swamp and semi-aquatic communities, wet and dry woodland.
2. Restore hydrological and ecological continuity with the Thelnetham Fens.
3. Promote understanding and appreciation of the site through physical access and interpretation.

B4-5a Summary of Management: Scrub and woodland. Figure shows indicative areas for scrub clearance, Priority 1 within HLS (SB/SC), Priority 2 and 3 for future consideration. Scrub clearance on the open fen is also an HLS Capital project (SA/SC). Areas cleared of scrub should be mown annually for 3 years (1.7.c) and then mowed as appropriate for the habitat that develops (1.7.d). Until scrub is removed it should be managed as non-intervention other than roguing of sycamore (1.8.a)



B5-5.b Summary of Management : Mowing and Grazing.



Not shown in above maps:

1.1.b Ensure ragwort and scrub do not encroach

1.6.a Excavation of new peat pits (HLS Capital).

1.7.c Mow annually for 3 years all areas cleared of scrub.

1.7.d Thereafter include cleared areas in one of the above maintenance mowing regimes.

2.1.a Ensure a single contiguous hydrological regime through management of the river, tributary and ditch levels.

2.2.a Promote fen restoration in the land between Hinderclay and Old Fen.

3.1.a Replace bench

3.1.b Maintain and clean interpretation

3.2.a Check safety of trees twice annually. Obtain professional advice where needed.

B5. Blo' Norton and Betty's Fens

B5.1 Summary Information

Grid Reference	TM 018 790
Parish	Blo' Norton
District	Breckland
Size	Blo' Norton Fen (8797) 6 ha Betty's Fen (6006) 2.2 ha
Warden	Jo-Anne Pitt
Designations	All of the site is part of Blo' Norton and Thelnetham Fen SSSI. (Betty's Fen is Unit 4, Blo' Norton Fen is Unit 5) and Waveney-Little Ouse Fen SAC
Tenure	Blo' Norton Fen leased from the Blo' Norton Poors Allotment for 12 years from 01/02/11. Betty's Fen owned freehold since 2004.
Access Details	Free access, including boardwalk.
Rights excluded	None
Public rights of way	None
Third party easements/wayleaves etc	None known
Principal habitats	Fen meadow with purple moor grass. Species rich saw-sedge fen Mixed reed fen Early successional fen pools Fen scrub Alder woodland

Figure 5-1: Compartments

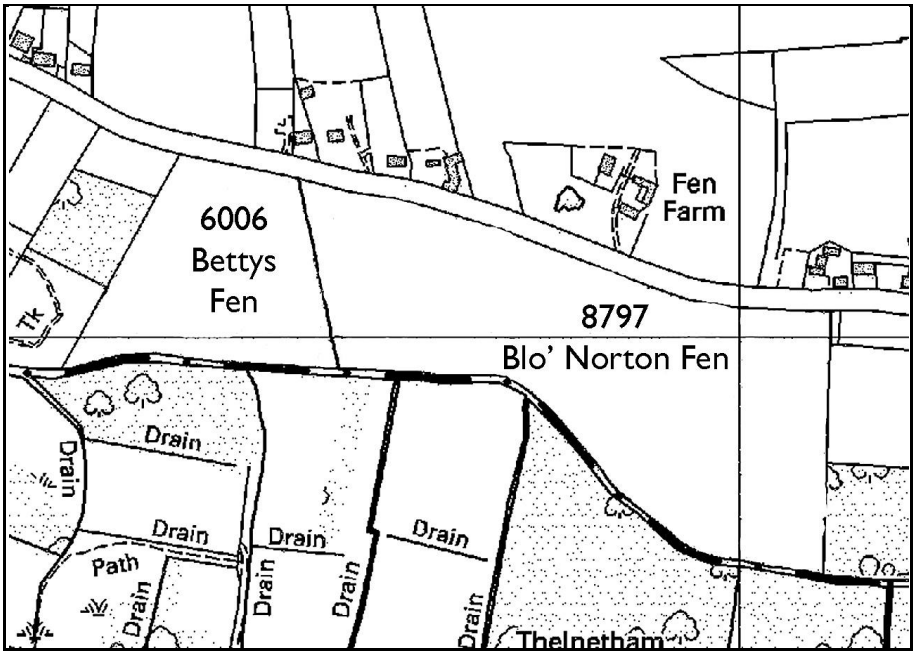


Figure 5-2: Habitats and Plant Communities

Awaiting NVC Survey

Figure 5-3: Aerial photograph : July 2008

B5.2 Significant Features and Their Importance

The principal interest of the site is the sequence of valley fen habitats. Formerly of outstanding value, much of the lost interest could be recovered.

FEATURE	ATTRIBUTES	IMPORTANCE			
		Europe	BAP	SSSI	Local
Habitats					
Fen Meadow with purple moor grass	Comparatively degraded and succeeding to woodland. Located on a lower transition slopes. May represent former seepages.	*			
Saw-sedge fen	Species-rich, open mire dominated by saw sedge with black bog rush, small pools and semi-aquatic element. Two stands: short rotation very species rich mire and long	*			

	rotation dense sedge bed.				
Mixed reed fen	In some places, around the fringes of the saw sedge, this is species-rich reed fen. Nearer to the river, it is poorer and eutrophic.			*	
Early successional fen pools	Species-rich aquatic flora with *Charas*. Early stage of calcareous mire development.	*			
Fen scrub	Alder and willow scrub at various successional stages. Grown over fen habitats.				*
Wet alder woodland	Species-rich wet valley woodland, dominated by alder with ash and some birch. **NB**: Although this feature is an EU Habitats Directive feature it has not been identified as a features of the Waveney-Ouse Valley Fens SAC.	*			
Species-poor transition grassland.	Rough grass along the road margin. Increasingly damp downslope towards the fen, with increasing proportion of fen plants.				*
SPECIES					
Plants	The site has five charophytes including the Nationally Scarce *Toylpella glomerata* (in the large scrape on Betty's Fen) and *Chara aculeolata* at Blo' Norton Fen. Fen pondweed is occasional in many pools.		*		
Invertebrates	Nobes (2010) recorded 28 spp of water beetle including the RDB3 *Hydrochus crenatus* and *H. elongatus* and four Notable spp. in the northern pool on Betty's Fen. The southern pool recorded				*

	Agobus striolatus (RDB2) in 2007 but not 2010. At Blo' Norton *Agobus striolatusand, Laccornis oblongis* (RDB3), *Encohrus nigritus* (RDB3) and four RDB notables, were found in a cluster of four small pools. Abrehart (2010) recorded *Vertigo moulinsiana* in the eastern part of the scrape at Betty's Fen, RDB3 and Annexe II species, and in greater numbers in 2008. Other molluscs were typical and unexceptional.	*			
HISTORIC ENVIRONMENT					
Parish Boundary	The river is the parish and County boundary				*
Historic Landscape	Regenerated alder carr woodland		*?		
LANDSCAPE					
Wooded Valley Meadowlands and Fen Landscape Character Area (Farmer 2011).	Part of the Frith-Blo' Norton River Corridor Character Area. The fen, wet woodland and turf ponds provide important components of the RCCA.				*

B5.3 Stewardship Details

Details	Higher Level Agreement Ref : AG00357439 Commenced : 01 October 2011	8.20 ha in Agreement, 6.01 ha Blo' Norton Fen, 2.19ha Betty's Fen.
Field Numbers	**Options**	**Agreement Targets and Indicators**
8797 (Blo' Norton Fen)	HC7 Maintenance of natural woodland. 4.05 ha	A mixed canopy of native species with a total cover of 50-100% should be present, with a shrub layer of 20% cover. Desirable ground flora species should be at least occasional and

		sycamore no more than 5% cover. Livestock should be excluded and all deadwood retained.
	HQ6 Maintenance of fen. The feature is **Cladium-dominated fen.** 1.96ha in three parcels.	The SSSI should be in favourable or recovering condition. The Stewardship target for water levels is 20-45cm below ground level throughout the year, with the fen surface wet from October to May. This is too low in summer for the target communities: our target is at mean ground level with hollows full of water throughout the year. At least two desirable species should be at least occasional: e.g. saw sedge plus common reed, hemp agrimony, angelica, water mint and valerian. Cover of undesirable species should be less than 5% and scrub 10%. Sedge and reed warblers, and reed buntings, should be regularly seen.
	HQ11 Wetland cutting supplement. 1.96ha in three parcels.	
6006 (Betty's Fen)	HC7 Maintenance of natural woodland. 1.32 ha	A mixed canopy of native species with a total cover of 50-100% should be present, with a shrub layer of 20% cover. Desirable ground flora species should be at least occasional and sycamore no more than 5% cover. Livestock should be excluded and all deadwood retained.
	HQ2 Maintenance of ponds of high wildlife value >100m^2. 2 ponds.	There should be 25-100% cover of marginal vegetation from May to mid-September. There should be at least 10cm of water between 15th August and 15th September at least one year in two
	HQ6 Maintenance of fen. 0.81ha in three parcels.	The SSSI should be in favourable or recovering condition. The Stewardship target for water levels is 20-45cm below ground level throughout the year, with the fen surface wet from October to May. This is too low in summer for the target communities: our target is at mean ground level with hollows full of water throughout the year. At least two desirable species should be at least occasional: e.g. for the reed fen this could include common reed, hemp agrimony, angelica, water mint and valerian. Cover of undesirable species should be less than 5% and scrub 10%. Sedge and reed warblers, and reed buntings, should be regularly seen.
	HQ11 Wetland cutting supplement. 0.81 ha in three parcels.	
Capital works (by Sept 2014)		
8797	ACI Boardwalk	
	PR Pond Restoration 1st 100m^2	Total of 22m^{2,}

	SC Scrub management >75% cover	0.53 ha
	TRE: Tree removal	25m^3
	TS2 Tree surgery	18
6006	PR Pond restoration – first 100m^2	30m^2 (Location not shown on HLS Map)
	PR Pond restoration – first 100m^2	Total of 100m^2 (Location not shown on HLS Map)
	PRP Pond restoration – first 100m^2	Total of 410m^2 (Location not shown on HLS Map)
	SBB Bird and bat boxes	6
	TS2 Tree surgery	1
	SB Scrub management 25-75% cover	0.16ha

B5.4 Management Issues

- The site is a classic valley fen with a clear progression from dry valley margin, to a transition zone formerly with seepages and springs carrying fen meadow and groundwater fed vegetation, to a valley bottom which supports *Cladium* vegetation on low nutrient peat near the transition zone, to reed fen on more fertile peat near the river.
- Historically this site was as rich as any in the valley, with floating rafts of species-rich fen colonising old turf ponds. Fen orchid was recorded here until the 1950's. A combination of the Redgrave borehole and deep dredging of the Little Ouse damaged the hydrology of the site. Drying-out and lack of management combined to cause significant decline in the quality of the vegetation, and loss of the open fen to enclosure by woodland. Closure of the borehole, woodland clearance and the restoration of mowing have done much to halt the decline and recover rich vegetation types. However, the condition of the river still compromises the hydrology, and there remains much potentially valuable fen overgrown by trees.
- Much can be done by LOHP to further site restoration, but delivering the full Vision will require changes to the way the river is managed and therefore the co-operation of agencies and the community. Water quality in the river may need to be improved and the impact of increased wetness on site management operations needs to be considered.
- The central block between Betty's and Blo' Norton Fen is mature floodplain woodland which should be retained with minimal management. It is managed under Stewardship Option HC7 *Maintenance of natural woodland*. The Option states that a mixed canopy of native species with a total cover of 50-100% should be present, with a shrub layer of 20% cover. Desirable ground flora species should be at least occasional and sycamore no more than 5% cover. Livestock should be excluded and all deadwood retained. The Stewardship woodland extends around the perimeter of the site in a narrow band, although the narrow band of young willow/alder along the road margin of Blo' Norton is excluded.

- Scrub and young woodland has encroached onto the open fen. Much has already been cleared but more could be, in order to push the trees back to their mature woodland edge or the site margin. The Stewardship agreement includes provision for more scrub clearance on Betty's and Blo' Norton Fens totalling 0.69ha. This is first priority clearance. Second priority clearance is the final removal to fully restore the open fen. Retained wet woodland will be managed minimally, only controlling sycamore invasion.
- The transition zones along the north and east margin are also covered by trees and could be reduced to reveal transition zone vegetation. This may have been purple moor grass and seepage fen in the past. There is remnant purple moor grass meadow on the east margin of Blo' Norton Fen. The exact nature of the fen prior to hydrological change and dereliction remains unknown, except for some species records. At the eastern end of Blo' Norton fen, the transitions grades through to damp and dry neutral grassland on the road margin and to heathy vegetation to the east.
- Scrub removal along the northern road margin needs sensitive treatment. The aim is to restore the full gradation from fen to dry grassland, but retain a porous screen of trees to retain the intimate nature of the fen and restrict views out of the site. While scrub removal on most of the fen can be undertaken wholesale by contractors the more sensitive roadside work should be achieved by progressive "nibbling" until the right effect is achieved. Mature trees need to be surveyed for bats before removal. The boundary screen around the west, east and south (river) should be retained. These are often mature trees with significant intrinsic ecological and landscape value, and include pollard willows.
- Areas cleared of scrub should be mown annually for up to three years. When the emerging vegetation has taken on the character of the surrounding stand, the mowing of the cleared areas should be integrated with that stand.
- Development of species-rich black bog rush and calcareous saw sedge mires may be encouraged by shallow (10-20cm) turf stripping along the margins of the fen where surface peat has become degraded by drying and succession to woodland. Such management would be subject to finding a suitable way to dispose of the arisings and is only likely to be practical for later iterations of this Plan.
- Most of the fen on this site does not lend itself to grazing management. It is especially wet, the areas of fen are relatively small and would not sustain many livestock, and as far as we know has no tradition of grazing. The retained mature woodland would need to be excluded from grazing. Grazing is not ideal for *V. moulinsiana*. The fencing required for grazing may also be unpopular locally. Similar vegetation types have been grazed elsewhere, but they are usually much larger sites with significant areas of dryer habitat. While technically possible, grazing is impractical for the time being. For all these reasons, the preferred management is mowing.
- All of the open fen is under Stewardship Options *HQ6 Maintenance of fen* and *HQ11 Wetland cutting supplement*, split into four parcels on Betty's and Blo' Norton Fens. A key indicator of success is that the SSSI should be in favourable or recovering condition. On Betty's fen (6006) the feature is reed-dominated fen (S24 or S25); the feature on Blo Norton Fen (8797) is *Cladium*-dominated fen meadow. The Stewardship target for water levels is 20-45cm below ground level throughout the year, with the fen surface wet from October to May. This is too low in summer for the target communities: our target is at mean ground level with hollows full of water throughout the year. At least two desirable species should be

at least occasional: e.g. for the reed fen this could include common reed, hemp agrimony, angelica, water mint and valerian, for the *Cladium* fen, then with saw sedge. Cover of undesirable species should be less than 5% and scrub 10%. Sedge and reed warblers, and reed buntings, should be regularly seen.

- Under the Stewardship options, reed fen should be mown every 4 years in winter but this is not appropriate for mixed, species-rich reed fen which should be mown in summer. The *Cladium* fen should be mown in summer "…as required...".
- The early successional, semi-aquatic phase of fen development, historically created by peat digging, has been restored through excavation of scrapes on Betty's Fen and small scale diggings on Blo' Norton. The two open pools on Betty's Fen (6006) are managed under Stewardship Option HQ2 *Maintenance of ponds of high wildlife value.* Under this option there should be 25-100% cover of marginal vegetation from May to mid-September. There should be at least 10cm of water between 15th August and 15th September at least one year in two.
- Nobes (2010) suggests that grassy, mossy margins to the pools would benefit the invertebrate fauna, noting the encroachment of reed and reedmace to the northern pool. The southern pool was quite overgrown by 2010 such that the RDB2 beetle *Agobus striolatus* could not be re-found. The proposed management for the open pools is therefore to mow a 5m width of the margins on a 2-year rotation, cutting half each year in September. They should be cut in short blocks of 10-20m, so that large swathes are not cut at once.
- Abrehart (2008) suggests low water levels in Betty's Fen in 2010 were responsible for the decline in the Annexe 1 mollusc *Vertigo moulinsiana*. He comments "Groundwater levels are one of the most important factors influencing the distribution of *V. moulinsiana*. ….. the species requiring water levels to be at or slightly above the local ground surface for at least part of the year. Other factors which indicate favourable habitat conditions are:
    - Average height of vegetation not less than 70 cm when measured in August.
    - Plant species composition and cover: *Glyceria maxima*, *Carex* spp., *Cladium mariscus*, *Sparganium erectum, Iris pseudacorus* and sometimes *Phalaris arundinacea*.
    - Light or rotational grazing, or no grazing."

  The two actions that seem appropriate for this animal are therefore restoration of enhanced hydrology, and rotational mowing in a mosaic, avoiding large-scale cut areas. He describes its status in 2010 as critical. Re-survey in 2012/13 would be helpful, and then at the end of the Plan period.
- An important management aim is to maintain the aquatic phase of the fen succession. Excavation of shallow turf ponds – scrapes – restored this first successional stage, but they are already progressing to fen. The succession can be arrested by mowing reed in winter beneath the water line.
- In summary, the adopted mowing management for this Plan is:
    - To mow the transitional margins to the road edge and the *Molinia* fen meadow annually.
    - To mow the short, very species rich calcareous fen area on a two year rotation, including the extension of this area to the west.
    - To mow the saw sedge fen to the west on a four year rotation, one quarter each year.

    - To mow the reed-dominated fen (i.e. the area under Stewardship Options HQ6/HQ11) on Betty's and Blo' Norton Fens on a four year rotation in summer, 25% each year.
    - For the benefit of the invertebrate fauna, mow the 5m margins of the scrapes on Betty's Fen every two years, half each year. Mow in 10-20m strips.
    - Where reed is encroaching on early successional pools, cut the reed below the winter water line to flood the rhizomes.
    - Areas cleared of scrub should be mown annually to control ruderals and scrub. They should then be integrated into the mowing regime of the surrounding fen.
- The programme of creation of semi-aquatic habitat renewal will be continued with a small peat cutting on Blo' Norton Fen (22m^2), and a larger scrape on Betty's Fen (510m^2). The latter is intended to rejuvenate the succeeding margins of the larger scrape on Betty's Fen. A smaller restoration area of 30m^2 will also be undertaken on Betty's Fen. All are funded as Stewardship Capital items. The areas on Betty's Fen are for successional turfponds behind the main scrapes, but are not shown on the HLS Maps.
- The river corridor is in poor ecological condition. In-channel and bankside habitats need to be improved. Low river levels are preventing restoration of historic habitats such as floating fens. In order to allow comprehensive restoration of the site, water quality and water levels both need to be improved. This would also allow re-integration of the site with adjacent fens in the Thelnetham-Blo' Norton complex. This long term and strategic objective for the valley is outside of the scope of this Plan, but the issue does constrain the restoration work that is possible within the site.
- Under Stewardship capital works, there is provision for tree surgery on 18 trees along the river of 8797 and one on 6006, intending to pollard or prolong the life of large willows. There is also 25m^3 of tree removal on the road margin of 8797, for safety reasons. An annual safety check of the roadside and footpath trees should be undertaken.
- Six bird or bat boxes will be put up on Betty's Fen.
- There is no formal monitoring undertaken on the site, although there are some dipwells inserted by the Environment Agency. A monitoring programme which provides surveillance of the key features and abiotic factors should be drawn up, subject to resourcing.
- Regular surveillance of the condition of the site infrastructure (gates, the bridge, the sculptures, the boardwalk -new in 2012 - and interpretation) should be undertaken. There should also be regular checks on the safety of trees where collapse or shedding of branches could form a health and safety hazard. This is a priority along road, boardwalk, the riverside path and informal paths through the site. Professional advice on both aspects may be needed from time to time, but the warden will make the checks annually in the first instance.

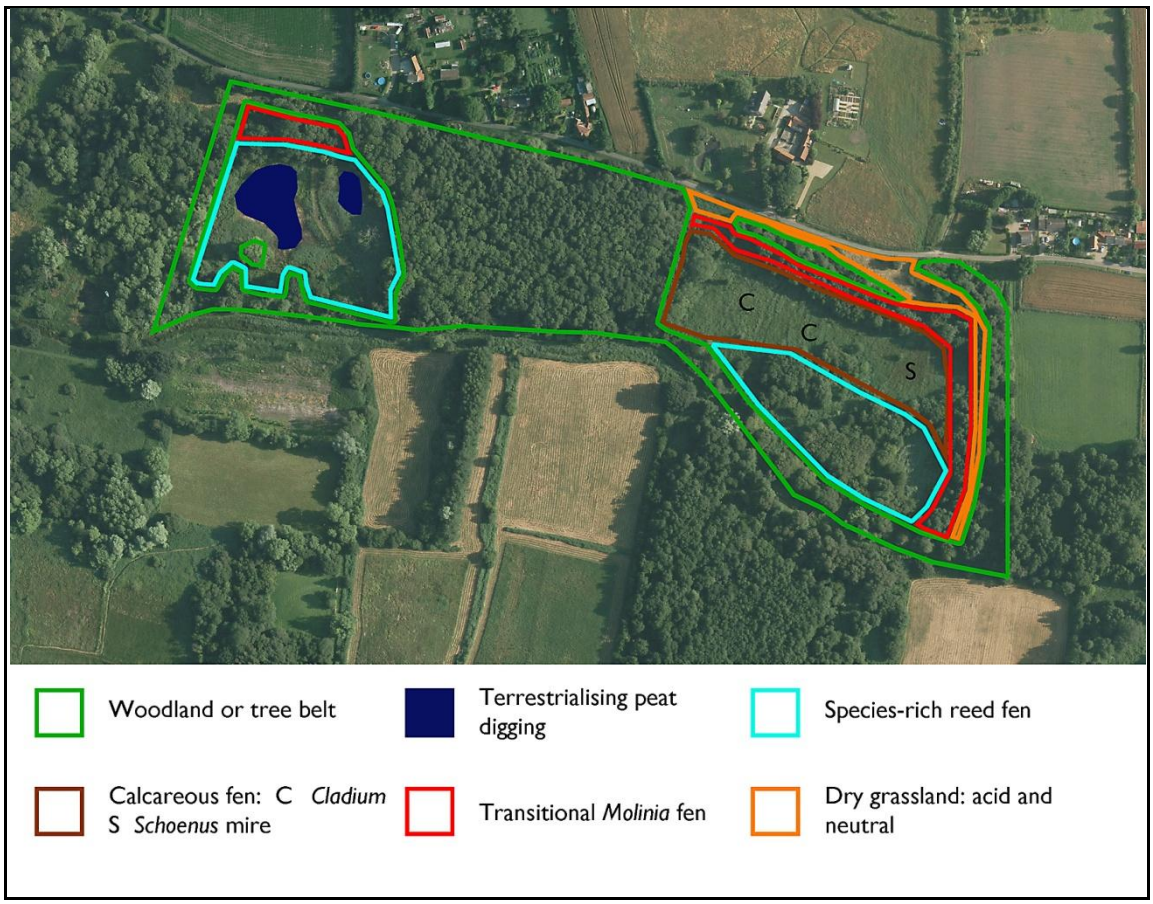
B5.5 Condition and Aspirations

Twenty Year Vision

Over the course of the next twenty years, Blo' Norton and Betty's Fens will support the full range of valley fen communities from a damp transition zone, through species-rich purple moor grass fen meadow to saw-sedge mire, swamp and reed communities. Early succession

fen will be represented by peat pools of different ages. The site will be integrated hydrologically and ecologically with the Thelnetham Fens to the south, with a fully restored river corridor. Once river levels are restored, restoration of historic fen types including floating fen and black bog rush mire, will be possible.

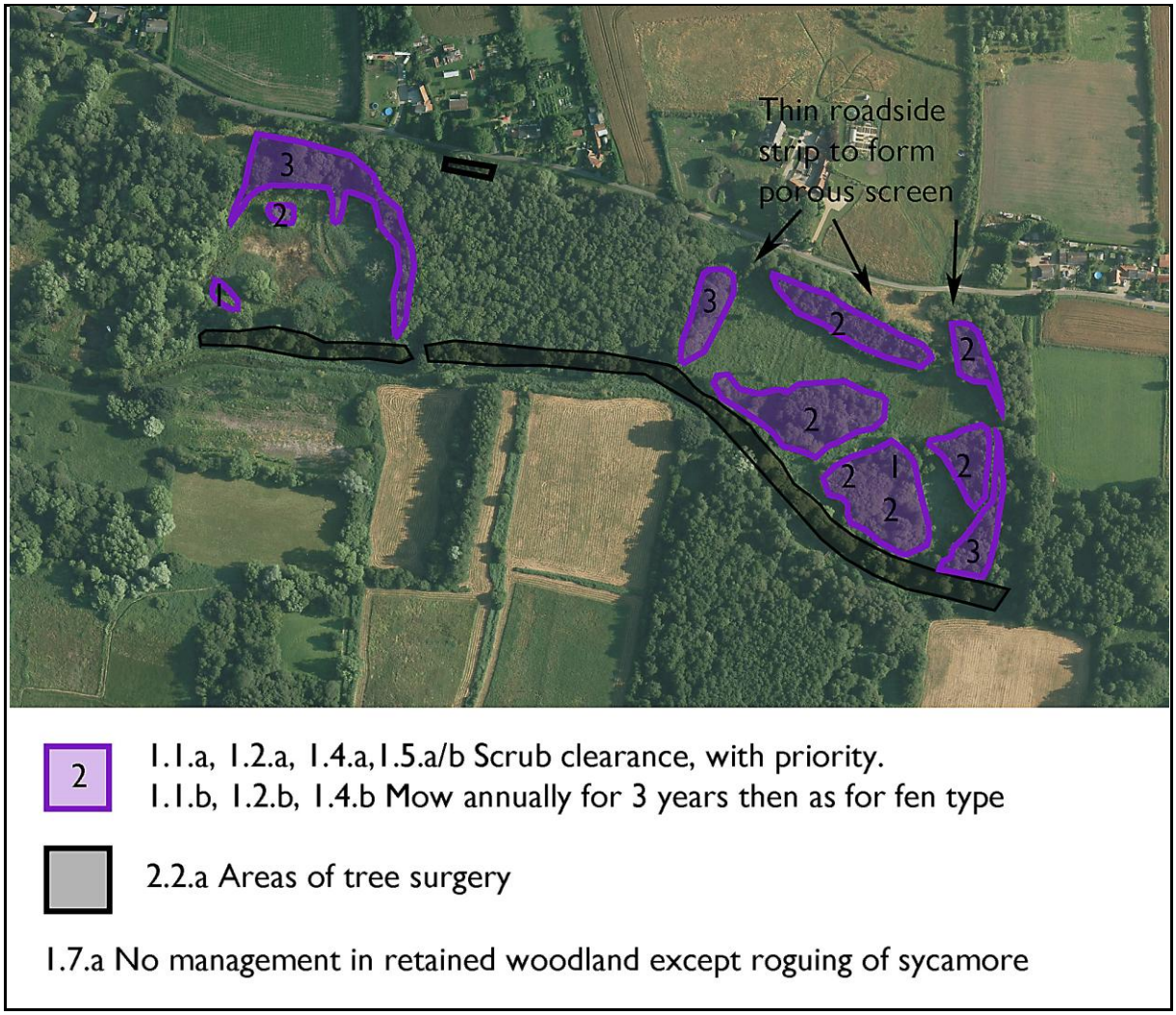
Figure 5-4 Desired Condition.



B5.6 Management Objectives

1. Restoration of the full sequence of valley fen habitats: dry grassland to fen transition, fen meadow, saw-sedge fen, species-rich tall herb fen, swamp and semi-aquatic communities, and wet alder woodland.
2. Ensure the conservation of *Vertigo moulinsiana.*
3. Promote understanding and appreciation of the site through physical access and interpretation.

Figure 5-5a : Summary of Tree and Scrub Management. Priority 1 scrub clearance areas are HLS commitments. Priority 2 and 3 are desirable long term aims. Note that the boundary of the HLS scrub areas are not defined on the Agreement maps and need clarification.

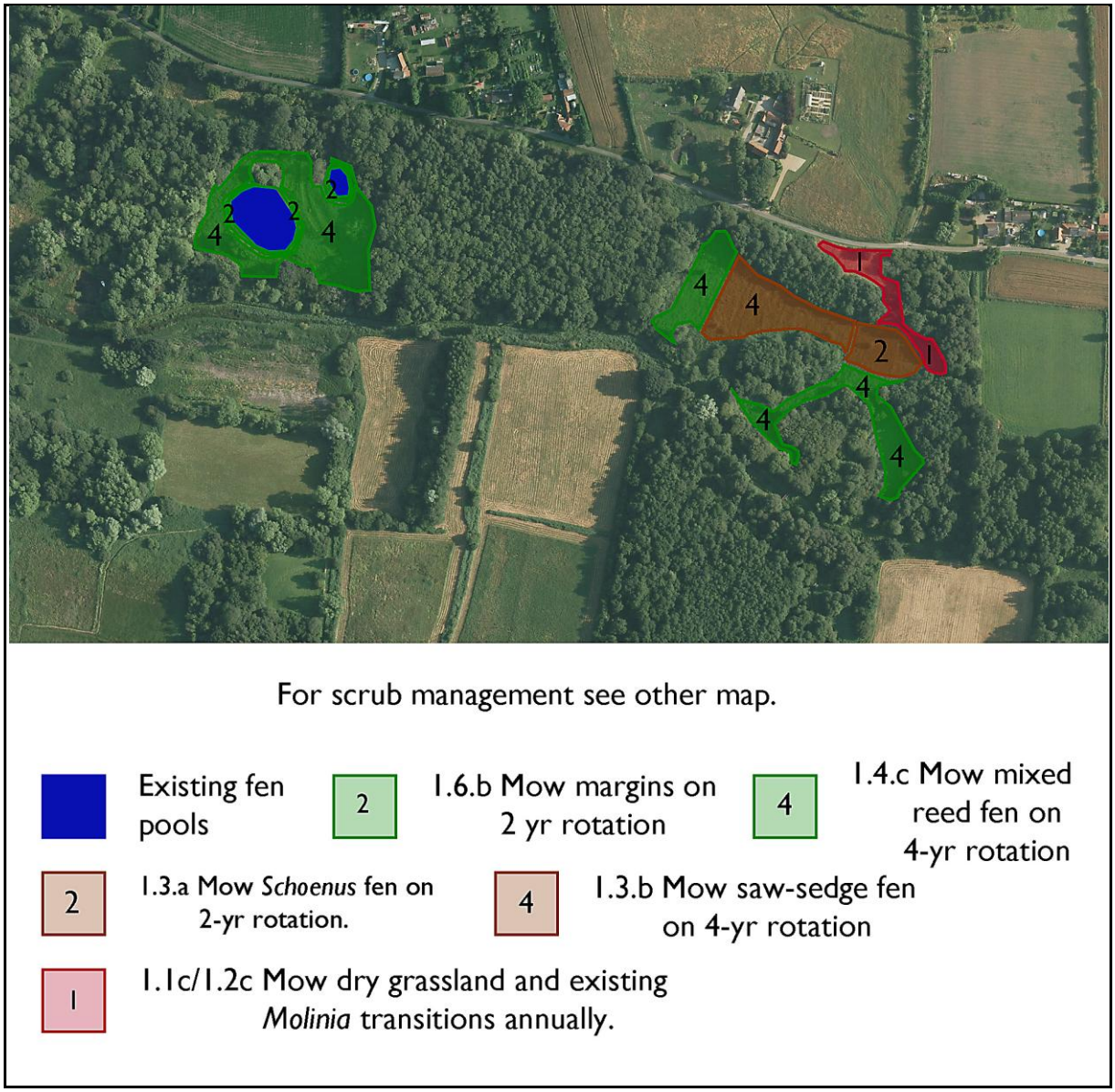


2 1.1.a, 1.2.a, 1.4.a,1.5.a/b Scrub clearance, with priority.
1.1.b, 1.2.b, 1.4.b Mow annually for 3 years then as for fen type

2.2.a Areas of tree surgery

1.7.a No management in retained woodland except roguing of sycamore

Figure 5.5.b : Summary of Other Management



Not Shown:

1.6.a Excavate new peat pits. **Note**: Locations on Betty's Fen not shown on HLS maps).

1.8.b Provide 6 bird/bat boxes on Betty's Fen.

2.1.a Ensure mowing of sedge and reed is in a mosaic,

2.2.a Ensure river levels can satisfy requirement for *V. moulinsiana.*

2.3.a Re-survey at least once (preferably twice) in Plan period.

3.1.a Mow the footpaths.

3.1.b Replace the boardwalk (completed October 2012).

3.1.c Check bridges, boardwalk and gates. Repair as needed.

3.1.d Check interpretation and clean regularly.

3.2.a Undertake 25m3 of tree removal along roadside verge.

3.2.b Check safety of trees twice annually. Obtain professional advice where needed.

B6. Webbs Fen

B6.1 Summary Information

Grid Reference	TM 017788
Parish	Thelnetham
District	St Edmundsbury Borough Council
Size	5.67 ha (14 acres)
Warden	None
Designations	None
Tenure	Freehold, bought 2010, funded by Heritage Lottery Fund
Access Details	Permissive path linking Middle and Old Fen along river.
Rights excluded	None. Boundary ditches assumed to have shared ownership.
Public rights of way	No PRoW. Angles Way along south boundary.
Third party easements/wayleaves etc	None
Principle habitats (ha/m)	Valley fen being restored from wet grassland Fen Pool Ditches (shared on the boundary)

Figure 6-1: Compartments

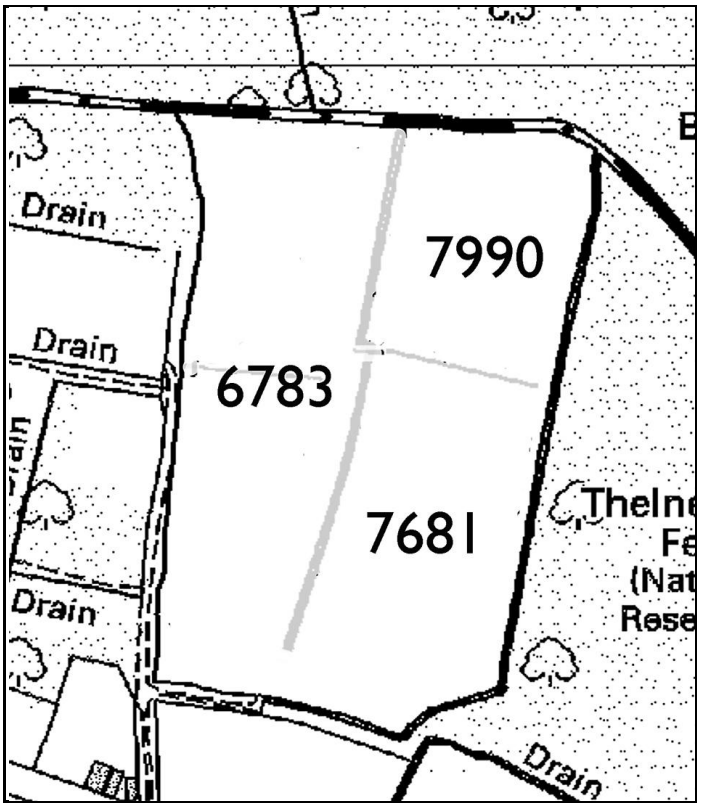


Figure 6-2: Habitats and Plant Communities in 2010 (prior to restoration work)

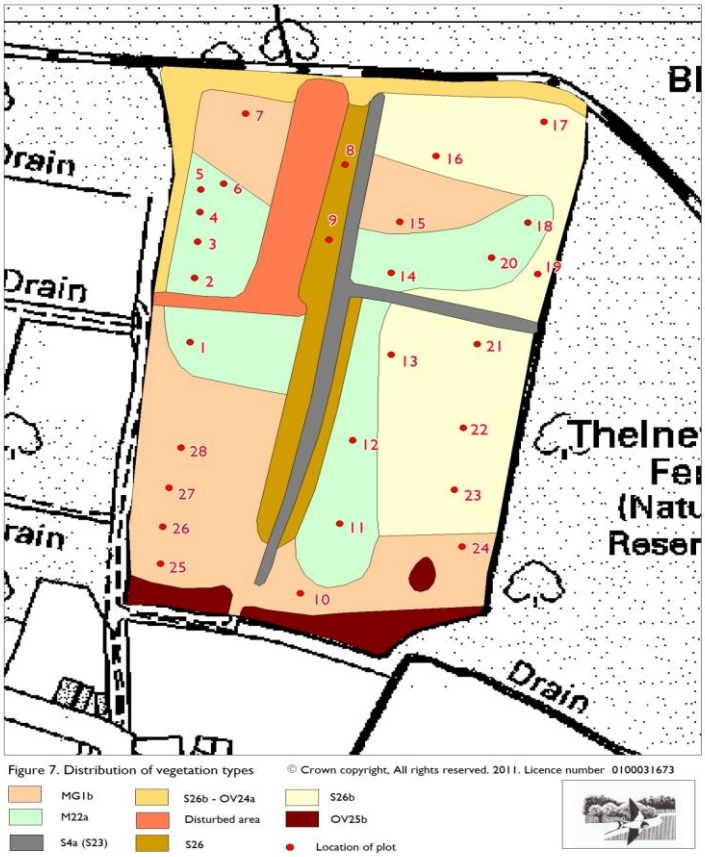


Figure 6-3: Aerial photograph: July 2008. The aerial pre-dates restoration work.

B6.2 Significant Features and Their Importance

FEATURE	ATTRIBUTES	IMPORTANCE			
		Europe	BAP	SSSI	Local
Habitats					
Fen Pool	Low nutrient, calcareous fen pool. Completed in autumn 2011. Some Charophyte colonisation in 2012.		*		*
Lowland Fen	Restoration from wet grassland started 2011. Target communities M22, M24, M27. Elements of M13 may be possible. Reed fen along river footpath.		*		*
Ditches	Negligible aquatic vegetation.		*		*
SPECIES					
Plants	Remnant M22 flora in low patches. Includes blunt flowered rush, ragged robin, iris, hemp agrimony.				*
Mammals	Colony of water voles along the margin of the river.		*		*
Birds	Boundary ditches support reed and sedge warblers, whitethroat and reed bunting. Fen used for hunting by barn owls. Lapwings and oystercatchers attempted breeding in 2012.		*		*
HISTORIC ENVIRONMENT					
Parish Boundary	The river is an old parish boundary and the current County boundary.				*
Historic Landscape (SCC)	Managed meadows and wetlands				*

LANDSCAPE					
Wooded Valley Meadowlands and Fen Landscape Character Area (Farmer 2011).	Part of the Frith-Blo' Norton River Corridor Character Area. Significant area of fen, meadow and turf pond contributing to the RCCA.				*
EARTH SCIENCE AND GEOLOGY					
Stratigraphy	Probable late- and post-glacial lake deposits. Subsequent peat infill. Surface layer disrupted by drainage and cultivation.				*

B6.3 Stewardship Details

Details	Agreement Reference: AG00357439. HLS on all land. Date commended: 01 October 2011	
Field Numbers	**Options**	**Agreement Targets and Indicators**
7681, 6783, 7990	A13 Non-payment option – permanent grassland for Article 13	
	HQ7 Restoration of Fen	The ground should be squelchy all the year round. At least two desirable species such as reed, hemp agrimony, valerian, water mint and angelica should be at least occasional and the vegetation on average less than knee high. Cover of undesirable species should be less than 5% and scrub less than 10%. HLS requires water levels in the ditch to be 20-45cm below ground level all year round. The target communities at Webb's Fen have more exacting hydrological requirements than the generalised Fen Option in Stewardship, so the target level for the ditches here is 20cm bgl in summer. The target for in-field water levels in the lower parts of the site will be 10cm bgl.
	HQ12 Wetland grazing supplement	30% of the vegetation should be in tussocks or patches over 50cm high. There should be a mosaic of taller and shorter plants.

B6.4 Management Issues

- Fen restoration commenced with the reversal of past drainage, excavation of a fen pool and the reintroduction of cutting and grazing.
- The fen pool was new at the time of writing (July 2012). In time, emergents may come to dominate to the detriment of aquatic and floating species, especially around the margins. Cutting may be needed to restore the balance. Charophytes have already colonised.
- Remnant M22 vegetation and past possible presence of M13 species such as *Schoenus* (John Webb oral history, not validated) indicates the high potential for restoration to valley fen.
- To screen visitors and to provide complementary habitat, a dense reed fringe will be encouraged between the north stock fence and the river.
- Establishing a groundwater table contiguous with Middle and Old Fens (an important step in restoring valley fen) requires addressing low water levels in the boundary ditches.
- All of the site is entered under Stewardship Option HQ7 *Restoration of Fen.* The ground should be squelchy all the year round. At least two desirable species such as reed, hemp agrimony, valerian, water mint and angelica should be at least occasional and the vegetation on average less than knee high. Cover of undesirable species should be less than 5% and scrub less than 10%. HLS requires water levels in the ditch to be 20-45cm below ground level all year round. The target communities at Webb's Fen have more exacting hydrological requirements than the generalised Fen Option in Stewardship, so the target level for the ditches here is 20cm bgl in summer. The target for in-field water levels in the lower parts of the site will be 10cm bgl. These targets are not being consistently met in the boundary ditches. However, because of the sensitivity associated with levels in these ditches, ground and ditch water monitoring will be required.
- The land is also under Option HQ12 *Wetland grazing supplement,* although according to the Agreement the target here is Coastal and Floodplain Grazing Marsh. Under this option 30% of the vegetation should be in tussocks or patches over 50cm high. There should be a mosaic of taller and shorter plants.
- The established, very dense grass sward, together with elevated surface nutrients arising from cultivation and drainage history, will retard restoration. A flush of fertile fen types and rush infestation are likely short term outcomes and need to be addressed through cutting and grazing regimes.
- Hay cut and removal is the most effective way to reduce surface nutrients but cost and the disposal of cuttings may limit this option, as might the soft and wet ground conditions which often prevail. Lack of opportunities for disposal of arisings will also limit further fen pool excavation or surface scraping.
- Summer grazing is the most sustainable and desirable long-term management option, possibly combined with periodic cutting.
- Changes to river and ditch management regimes require significant public consultation.
- Some formal vegetation monitoring has been undertaken on the site, with two plots recorded in 2011 before restoration works started. Monitoring of breeding birds has also

been undertaken. These should be repeated in 2013. Dipwells and stageboards will be inserted in 2012. An additional monitoring programme which provides surveillance of further key features and abiotic factors should be drawn up, subject to resourcing.

- Regular surveillance of the condition of the site infrastructure (gates, culverts, the footbridge, the sculpture, and interpretation) should be undertaken.

B6.5 Condition and Aspirations

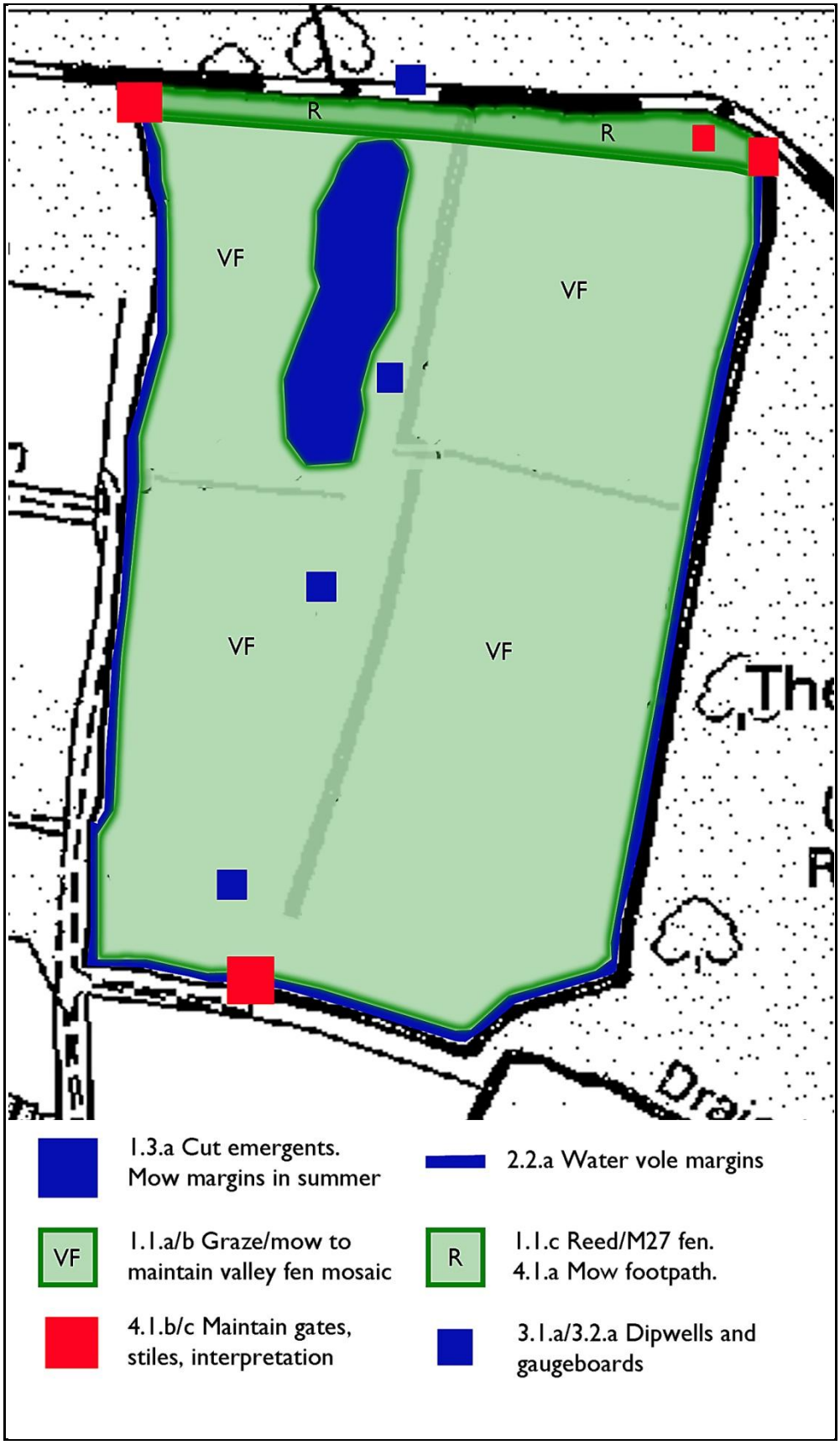
Twenty Year Vision

Over the course of the next twenty years, Webb's Fen will re-establish the full sequence of fen habitats from aquatic fen pools, through to wet species-rich fen and to tall herb fen and reed areas. The site will be re-integrated into the Thelnetham and Blo' Norton Fens complex, with a shared hydrological regime and fully functioning ecology. Together they will form a functioning ecological landscape unit, where all of the heritage values described above will be protected and enhanced.

B6.6 Management Objectives

1. Restore the following valley fen habitats: On the lower ground, aquatic and semi-aquatic fen pool habitats, M22, M24, elements of M13, *Cladium* fen. Along the boundary ditch edges, river margin and raised margins, M27 and reed fen.
2. Conserve and enhance the population of water voles along the river bank.
3. Restore hydrological continuity with Middle and Old Fen and with the Blo' Norton Fens.
4. Promote understanding and appreciation of the site through physical access and interpretation.

Figure 6-4: Summary of Management



NOTE: The following actions are not mapped:

1.1.d Repeat vegetation monitoring – see below.

1.2.a Mow dense lush vegetation and remove from site.

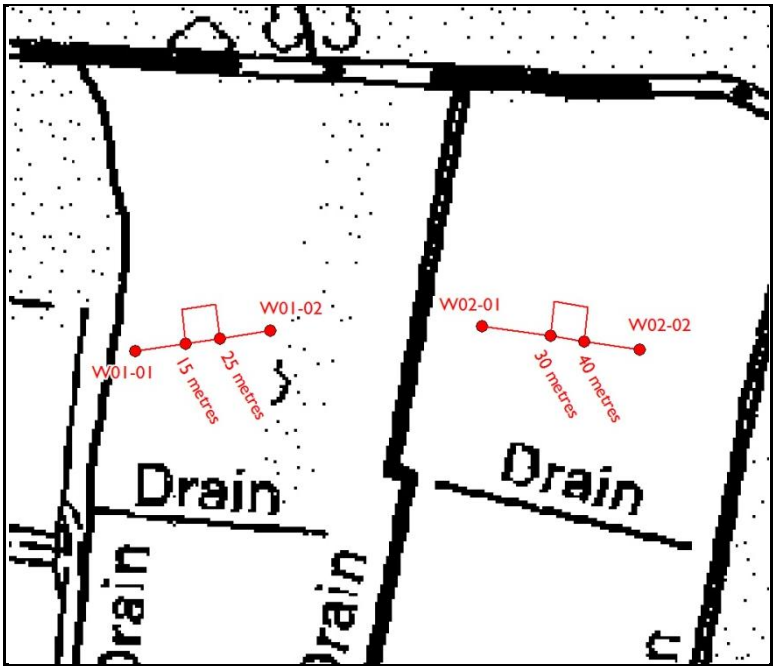
1.3.a Continue fen pool excavation.

2.1.a Ensure any work on the river margin does not impact water voles. Provide enhancements where possible.

2.1.b Undertake survey of all ditches prior to work.

4.2.a Check safety of trees twice annually. Obtain professional advice as needed.

Figure 6-5 Location of Vegetation Monitoring Plots



B7. Parkers Piece and Bleyswycks Bank

B7.1 Summary Information

Grid Reference	TM 595281
Parish	Thelnetham
District	St Edmundsbury Borough Council
Size	5.2 ha
Warden	None
Designations	SSSI (Parkers Piece)
Tenure	Freehold, purchased 2007
Access Details	Permissive path along the river to Webbs Fen, into Thelnetham Middle Fen, and across the river to Betty's and Blo' Norton Fens.
Rights excluded	None.
Public rights of way	None.
Third party easements/wayleaves etc	None
Principle habitats	Valley fen being restored from arable and plantation woodland. Fen pool (excavated 2009). Dry species-poor grassland. Scrub copse (sapling stage, native species). Ditches.

Figure 7-1: Compartments. The area marked pink is SSSI.

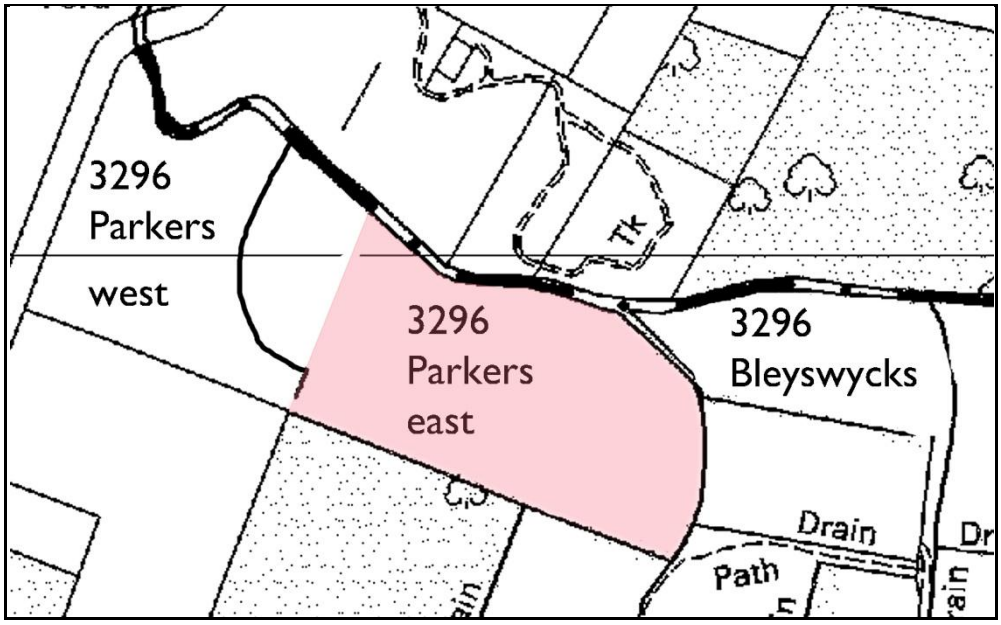


Figure 7-2: Aerial photograph: July 2008. It predates much of the restoration work

B7.2 Significant Features and Their Importance

Only known features from survey information are included. Importance relates to current value, not intended value following successful restoration.

Note that the eastern part of Parkers Piece was included in the SSSI as "buffer land", to protect the hydrological integrity of the site rather than because of its intrinsic wildlife value. It is hoped the restored habitats will develop SSSI-equivalent value in the near future.

FEATURE	ATTRIBUTES	IMPORTANCE			
		Europe	BAP	SSSI	Local
Habitats					
Pond	Calcareous fen pool. Completed in autumn 2009. Recolonisation by charophytes.		*		*
Lowland Fen	Restoration from wet grassland started 2009. Target communities M22, M24, M27. Elements of M13 may be possible. Encouraging signs of quality fen communities starting to re-		*		*

	assemble.				
Lowland Ditches	Negligible aquatic vegetation. Some *Chara* in the main ditch and in the archaeological trenches.		*		*
Dry grassland	Currently species-poor and improved. Potential for species enrichment.				*
Scrub copse	Native tree whips planted on pool spoil in 2010.				*
SPECIES					
Plants	Remnant M22 flora in low patches. Notable species include brookweed, marsh lousewort and meadow rue. Pool starting to regenerate with 3 charophytes and other aquatic species, including *P. berchtoldii.* A number of fine old crack willows along southern boundary of Bleyswycks Bank.				*
Mammals	Colony of water voles along the margin of the river.		*		*
Birds	Taller fen supports reed and sedge warblers and reed bunting.		*		*
Invertebrates	37 spp water beetles (Nobes 2010) including RDB3 *Enochrus nigriius* recorded in the fen pool. 16 spp found in a small shallow pool on Bleyswycks Bank, including two Notable. Abrehart (2010) found a very poor mollusc fauna with no notable species. He found *Vertigo moulinsiana (*RDB3 and Annexe 1 species) along the river margin in 2008, although it was not recorded in 2010.	*?			
HISTORIC					

ENVIRONMENT					
Features	Iron age pottery, flint and part of quern stone (THE014 on the HER). River is parish and County boundary.				*
Historic Landscape (SCC)	Managed meadows and wetland.		*		*
LANDSCAPE					
Wooded Valley Meadowlands and Fen Landscape Character Area (Farmer 2011).	Part of the Frith-Blo' Norton River Corridor Character Area. Substantial area of fen and pools characteristic of the RCCA.				*
EARTH SCIENCE AND GEOLOGY					
Stratigraphy	Margins of post- and late-glacial lake that underlies Thelnetham and Blo' Norton Fens. Further details of the level of interest uncertain.				*

B7.3 Stewardship Details

The following is taken from Part 2A of the Agreement, Parcel Based Options Summary.

Details	Higher and Entry level on all land. Agreement Ref: AG00357439. Commenced : 01 October 2011	
Field Numbers	**Options**	**Agreements Targets and Indicators**
3296	HK7 Restoration of species-rich semi-natural grassland (Dry grassland on Parkers west)	20% of the sward to be wildflowers, with 40% of these species in flower in May and June. The sward should be 2-10cm by the end of October. No fertiliser or supplementary feeding is permitted. Bare ground should not exceed 5%. There should be some scrub on the area, up to a maximum of 10%.
	HQ2 Maintenance of ponds of high	Marginal plant cover to be 25-100% in May-mid-September. Water depth

	wildlife value (fen pool)	should be no less than 10cm in mid-August to mid-September at least one year in two.
	HQ6 Maintenance of fen (all wetland) The feature in the Agreement is "grazing marsh".	All SSSI land should be in favourable condition. The Favourable Condition Tables give key indicators. The surface of the fen be "squelchy" all year round, at least two "desirable species" should be at least occasional across the fen. Stewardship gives the following examples: black bog rush, hemp agrimony, bog pimpernel, angelica and valerian. The vegetation should on average be less than knee height. Around 30% of vegetation should be in tussocks of 50cm or more across, creating a mosaic of shorter and taller areas. Undesirable species should be less than 5% and scrub less than 10%.
	HQ12 Wetland grazing supplement (all wetland)	
	HR2 Supplement for native breeds at risk (whole site)	None additional.
Capital Works (by September 2014)		
3296	PC Pond creation	75m^2.
	SBB Bird/Bat Boxes	3 no
	SC Scrub management, >75%	0.32ha

B7.4 Management Issues

- Fen restoration commenced following acquisition with the fencing and grazing of the whole parcel and the felling of the plantation of trees. Parkers Piece had a history of cultivation and pig rearing. At the time of acquisition the ground was dominated by ruderals and species indicating eutrophic soils such as nettle. There were some stands of reed and pond sedges north of Thelnetham Middle Fen. Bleyswycks Bank had a plantation of trees ca 30 years old.
- Re-assembly of fen plant communities has progressed well since 2010 with species typical of M22 and M27 present. These include a few individuals of marsh lousewort. Charophytes have colonised the fen pool and ditch. Currently the wetland areas is very heavily dominated by rush and would benefit from summer cutting. Prospects for restoration of high quality fen are good, but the timescale is likely to be long-term.
- The fen pool is still in early stages of succession. It is under Stewardship option HQ2 *Maintenance of ponds >100m^2.* The Stewardship target is for marginal plant cover to be 25-100% in May-mid-September. Water depth should be no less than 10cm in mid-August to mid-September at least one year in two. Use of herbicides, even for spot

treatment, is not allowed within 6m of the pool without consent from NE. No animal or plant species should be introduced.

- There is provision for excavation of another peat digging under Stewardship capital, pond creation, 75m^2. Continually renewing the fen succession by excavating small pools should continue long term.
- Over time, emergents may come to dominate to the detriment of aquatic and floating species. Cutting may be needed to restore the balance. This is also a part of the Stewardship agreement.
- Nobes (2010) suggests that grassy, mossy margins to the pools would benefit the invertebrate fauna. He felt the margins were too heavily grazed by sheep, although note that the sward was still recolonising bare ground.
- Abrehart (2008) provides a summary of requirements for *Vertigo moulinsiana*. He comments "Groundwater levels are one of the most important factors influencing the distribution of *V. moulinsiana*. ….. the species requiring water levels to be at or slightly above the local ground surface for at least part of the year. Other factors which indicate favourable habitat conditions are:
  - Average height of vegetation not less than 70 cm when measured in August.
  - Plant species composition and cover: *Glyceria maxima*, *Carex* spp., *Cladium mariscus*, *Sparganium erectum, Iris pseudacorus and sometimes Phalaris arundinacea*.
  - Light or rotational grazing, or no grazing. Heavy grazing and cutting of the river bank would not be appropriate.
- Many factors could have led to the decline or loss of the mollusc from Parkers; grazing, cutting, an unpredictable river flow, or simply stochastic changes in population. The population here may also be reflecting wider population changes. Careful management of the river and the hinterland fen could re-establish a strong population but continuity in habitat between the river and the fen is essential.
- Although grazing is not as effective as mowing at reducing soil nutrients, summer grazing is the most sustainable and desirable long-term management option. The amount of mowing that is practical will depend on ground conditions and suitable disposal of arisings. It will need to be combined with occasional mowing to reduce rush dominance. Stewardship Options HQ12 *Wetland grazing supplement* and HR2 *Supplement for native breeds at risk* together state that the site should be grazed with 7 redpoll cattle from a pedigree registered herd, grazing between 1st April and 31st October. They should make up at least 70% of grazing days.
- The fen is under Stewardship option HQ6 *Maintenance of Fen* and HQ12 *Wetland Grazing Supplement*. They require that the surface of the fen be "squelchy" all year round, at least two "desirable species" should be at least occasional across the fen. Stewardship gives the following examples: black bog rush, hemp agrimony, bog pimpernel, angelica and valerian. All SSSI land should be in favourable condition. The Favourable Condition Tables give key indicators. The vegetation should on average be less than knee height. Around 30% of vegetation should be in tussocks of 50cm or more across, creating a mosaic of shorter and taller areas. Undesirable species should be less than 5% and scrub less than 10%. No burning of cut scrub or grass is allowed on the fen.

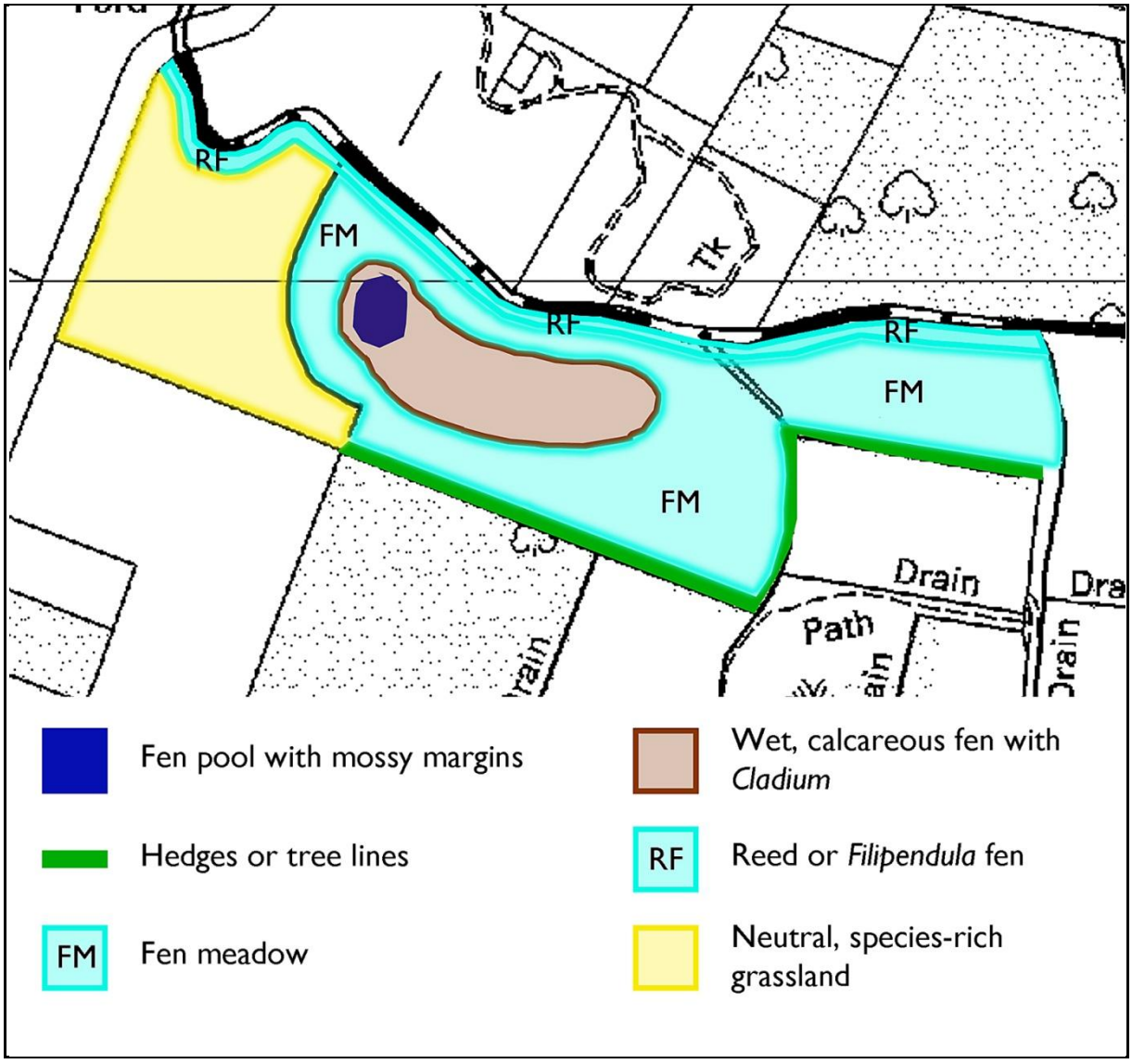
- The Little Ouse river forms the northern boundary of the site. It supports a colony of water voles all along its length. Kingfishers breed and otters are present, but otherwise the river corridor is in poor ecological condition.
- There is provision for erecting 3 bird or bat boxes in the Stewardship capital grant.
- Restoring fen, and re-connecting the Suffolk and Norfolk fens, is severely compromised by low river levels. Changes to river management regimes would also require significant public consultation.
- The spoil arising from pool excavation was spread on high, dry land at Parkers Piece west. A small copse of trees was planted on the spoil. It is still establishing; the ground layer is predominantly dense nettle and likely to remain so. Although ideally the material would have been removed from site, and this is still desirable, the practicalities mean this is likely to be a long term aim.
- The higher ground at the west end of Parkers Piece supports species-poor, semi-improved dry grassland. It provides significant potential for restoring species-rich grassland. It also provides useful early season grazing and a refugia from river floods. Under Stewardship option HK7 *Restoration of species rich grassland*, the target is for 20% of the sward to be wildflowers, with 40% of these species in flower in May and June. The sward should be between 2-10cm in height by the end of October. No fertiliser or supplementary feeding is permitted. Bare ground should not exceed 5%. There should be some scrub on the area, up to a maximum of 10%. These targets can only be approached by managing the grazing. Inevitably the dryer ground will receive preferential grazing compared to the fen. The light grazing implied by Option HK7 targets may be difficult to achieve while the site is grazed as one unit and may require separation of the grazing units.
- There are two dipwells in the site to monitor groundwater but to date these have not been read. A stageboard is needed in the fen pool and the river. Vegetation monitoring was set up in 2010 (see plot maps below).
- The line of ash which was pleached/pollarded was intended as a screen along the footpath, but has not worked. It will be removed under HLS scrub removal >75%.
- There are no management implications for the archaeological finds (FEP Consultation response), located on the high ground at the west end of Parkers. The river county and parish boundary and the historic landscape are all consistent with the provisions of this plan. The historic landscape type – managed meadow and wetland – is given national or local importance by SCC depending on whether or not it is part of the SSSI designation. This seems to rate the historic landscape according to nature conservation interest.
- Regular surveillance of the condition of the site infrastructure (fence, gates, the sculpture, bench and interpretation, bridges) should be undertaken. There should also be regular checks on the safety of trees where collapse or shedding of branches could form a health and safety hazard. This is a priority along the river and informal paths through the site. Professional advice on both aspects may be needed from time to time, but the warden will make the checks annually in the first instance.

B7.5 Condition and Aspirations

Twenty Year Vision

Over the course of the next twenty years, Parkers Piece and Bleyswycks Bank will re-establish the full sequence of fen habitats from aquatic fen pools, through to wet species-rich fen and to fen meadow, tall herb fen and reed areas. The site will be re-integrated into the Thelnetham and Blo' Norton Fens complex, with a shared hydrological regime and fully functioning ecology. Together they will form a functioning ecological landscape unit, where all of the heritage values described above will be protected and enhanced.

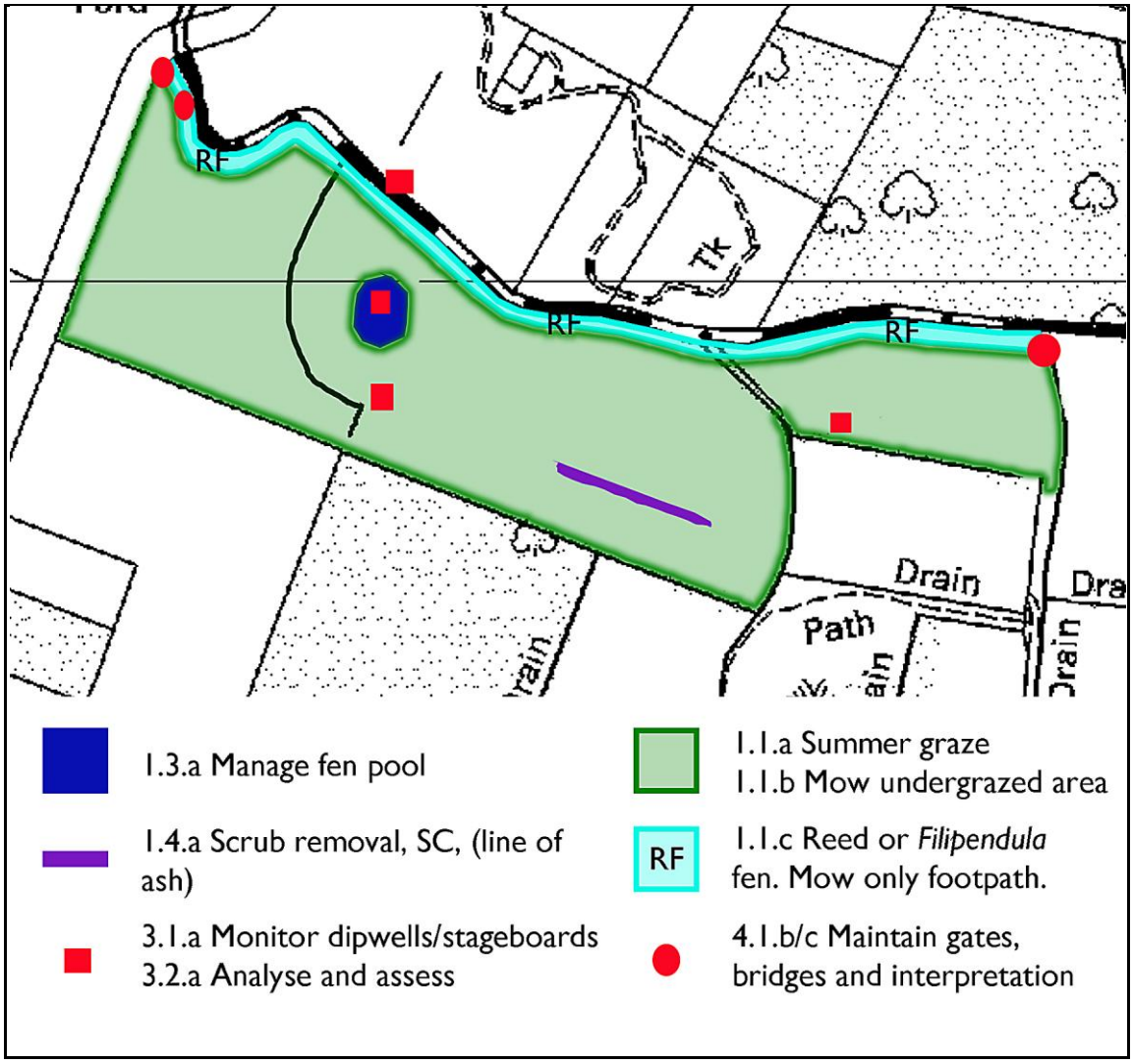
Figure 7-3 : Ideal Condition



B7.6 Management Objectives

1. Restore the following valley fen habitats: aquatic and semi-aquatic fen pool habitats, M22, M24, elements of M13, *Cladium* fen. On marginal parts of the fen, including the river bank, restore the following target fen types: M27, reed fen.
2. Conserve and enhance the population of water voles along the river bank.
3. Restore hydrological continuity with Middle and Old Fen and with the Blo' Norton Fens.
4. Promote understanding and appreciation of the site through physical access and interpretation.

Figure 7-4 : Summary of Management



NB: Not shown on map:

1.2.a Mow lush vegetation to reduce nutrients

1.3.b Excavate new small pool 75m2 (location to be decided)

1.3.c Continue rotation of shallow fen pool excavation 50-70cm (depending on disposal of arisings).

1.5.a Repeat 2010 vegetation monitoring. (see map below)

2.1.a Enhance river margin for water voles.

2.1.b Undertake water vole survey of all ditches prior to work.

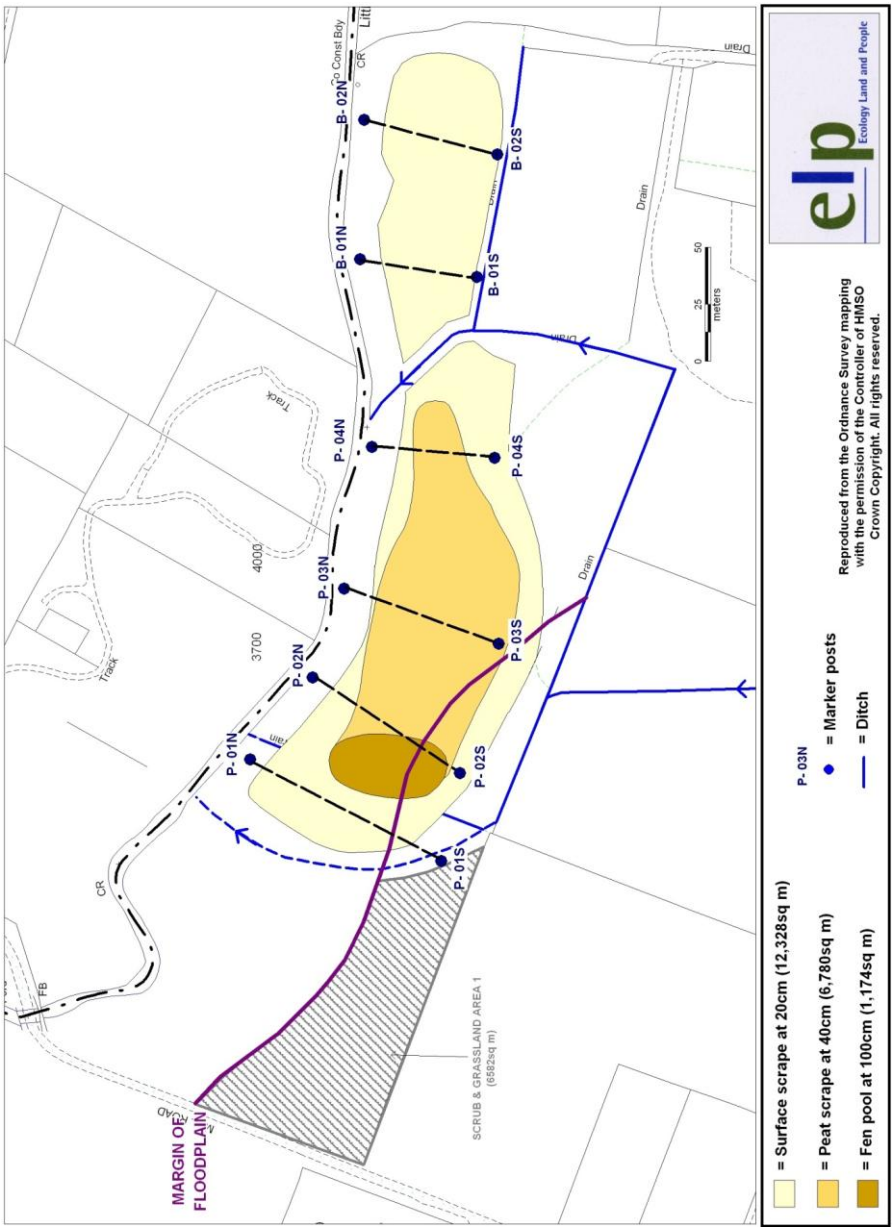
2.2.a Provide water vole margins along watercourses when slubbed.

4.1.a Mow the footpaths.

4.1.d Erect 3 bird or bat boxes.

4.2.a Check safety of trees twice annually. Obtain professional advice as needed.

Figure 7-5. Location of Monitoring Plots



B8. Broomscot Common

B8.1 Summary Information

Grid Reference	TM 005 806
Parish	Garboldisham
District	Breckland
Size	9.08 ha
Warden	None
Designations	County Wildlife Site No. 598; Registered Common
Tenure	Lease from Parish of Garboldisham (the Garboldisham Parish Charity), 2011, for 22 years
Access Details	Open at all times. Open access land under the CROW Act. Some access by custom from the houses on the east boundary, but this is in the process of being restricted.
Rights excluded	None.
Public rights of way	Public footpath from the recreation ground to the B-Road.
Third party easements/wayleaves etc	Overhead power cables along the recreation ground margin.
Principle habitats (ha/m)	Acid grassland with lichen. Fen meadow. Neutral grassland. Gorse scrub. Marginal dry scrub. Ditch and shallow pool. **NB**: transitions between habitats are particularly significant here.

Figure 8-1: Compartments

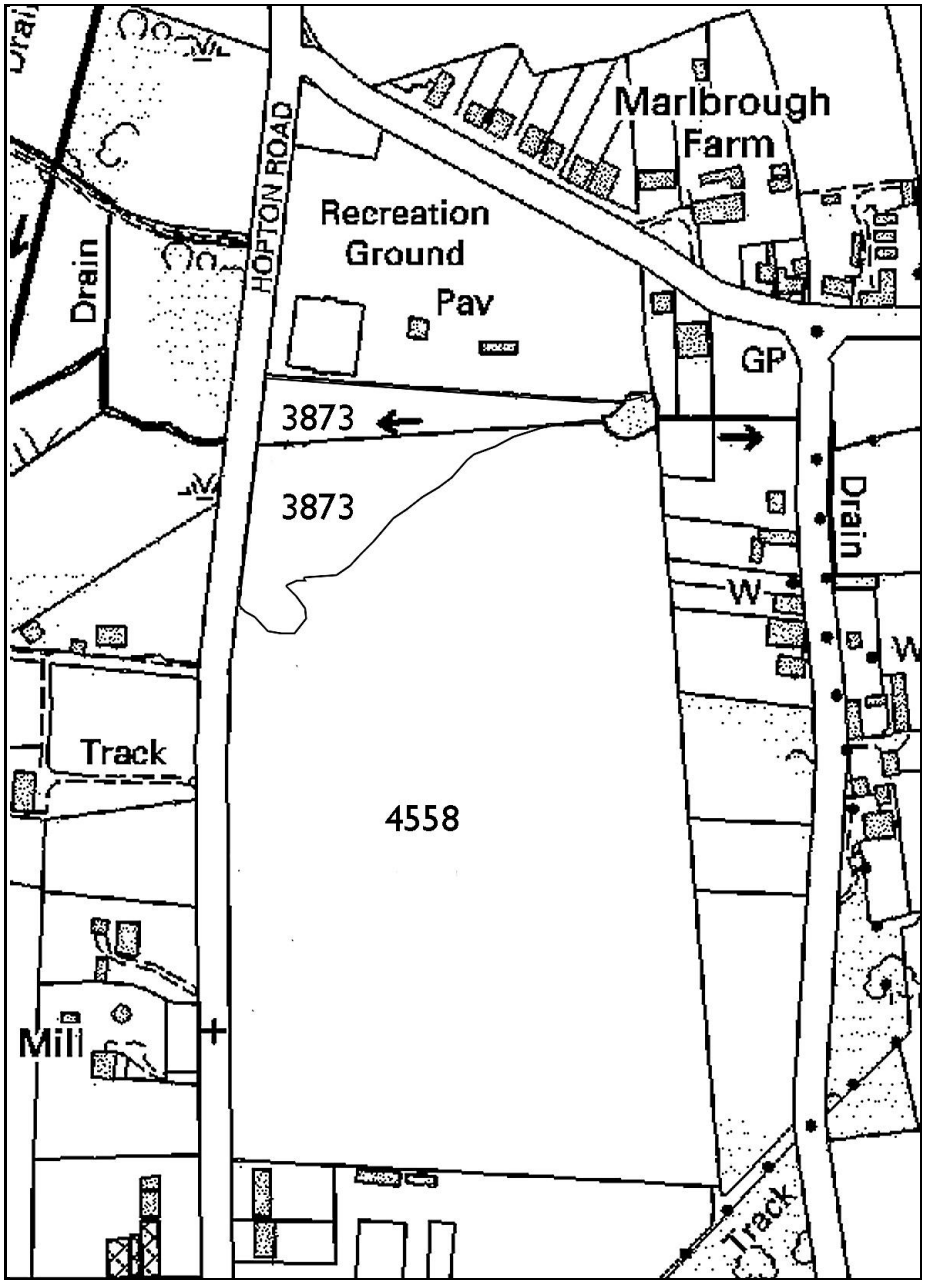
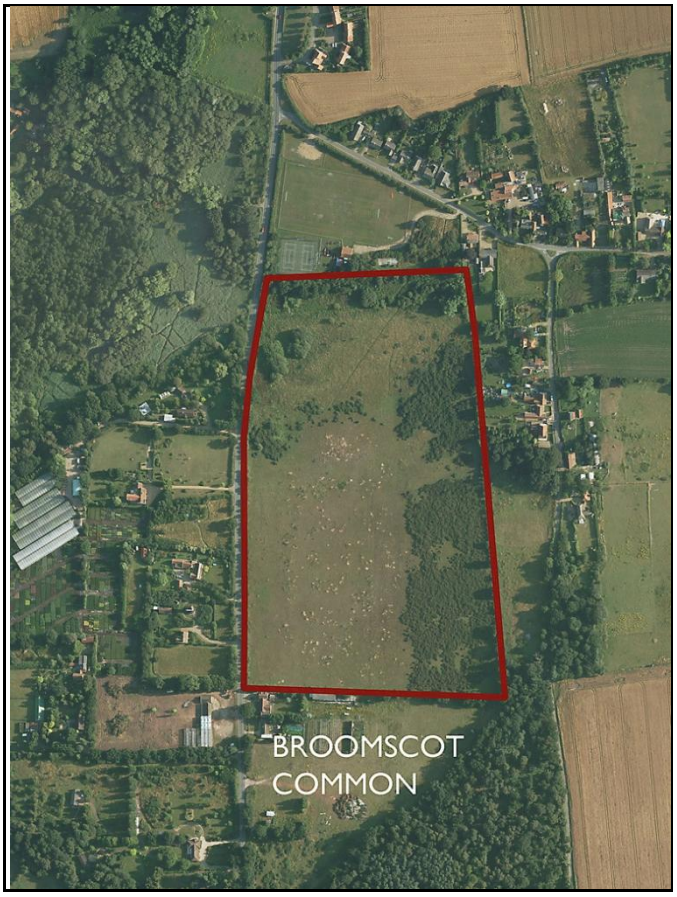


Figure 8-2: Habitats and Plant Communities from 2011 NVC Survey

Figure 8-3 : Aerial photograph: July 2008



B8.2 Significant Features and Their Importance

Note that on this site the transitions from heath-neutral grassland- fen and aquatic community are especially important and add considerable value.

FEATURE	ATTRIBUTES	IMPORTANCE			
		Europe	BAP	SSSI	Local
Habitats					
Pond and ditch	Pool restored in autumn 2011. Ditch deep and narrow, with emergent aquatic flora. Ditch probably reduced water table in the adjacent fen.		*		*
Lowland Fen	Small area of M22. Probably supported by groundwater from north slope. Restored in 2011 by scrub clearance and mowing.		*		*

Lowland Dry Acid Grassland	Short, open acid Breck grassland with stands of lichen. Maintained by rabbits. Dense stands of ragwort.		*		*
Lowland Meadow	Neutral grassland. Grades from damp to dry. Lies between the heath and the fen. Rather rank and species poor due to lack of management, but has great potential.		*		*
Gorse scrub	Significant area of old gorse. Coppicing starting to diversify physical structure. Some areas rabbit-sculpted.				*
Wet sallow scrub	Small areas in the hollows south of the ditch. Provides habitat for invertebrates and birds.		*		*
Hedges.	Part of a habitat mosaic. Hedges are linear strands of dry scrub. Of lower intrinsic value than the habitats they have in places invaded, but still provide breeding and feeding sites for scrub birds and invertebrates.		*		*
SPECIES					
Plants	Mosaic of habitats ensures long species list for the site. Some notable species – early marsh orchid, common spotted orchid (not recorded recently), silver hair grass, a rich lichen flora, common sedge.				*
Mammals	One record for water vole signs in the pond area. Used by badgers.		*		*
Birds	Scrub habitats are best for breeding birds with linnets and yellowhammer in the gorse.		*		*

HISTORIC ENVIRONMENT					
Historic landscape	A common and a heath.				*
LANDSCAPE					
Valley Settled farmlands (Farmer 2011) with characteristics of Estate Sandlands	Part of Blo' Norton to Smallworth River Corridor Character Area. Hill slope capped with acid grassland, sloping to fen in the valley bottom. Bridges the Breckland and Little Ouse-Waveney valley regional landscapes.				*
EARTH SCIENCE AND GEOLOGY					
Interest not defined.					

B8.3 Stewardship Details

Details	Higher Level. Agreement Ref: AG00376754 Date Commenced: 01 October 2011	9.08 ha in Agreement
Level	Higher on all land.	
Date signed	09 September 2011	
Field Numbers	Options	Agreement Targets and Indicators
3873	HQ6 Maintenance of fen (wet areas, 1.03ha)	Water levels in the ditch to be 20-45cm below ground level all year round with the ground squelchy (but see adopted water level below). At least two indicators of fen – e.g. reed, hemp agrimony, water mint and angelica – should be occasional in the fen. There should be 25-75% cover of aquatic species in the ditch. The vegetation should be in a mosaic of shorter and taller stands with 30% or more in tussocks or patches more than 50cm high. Scrub to be no more than 10% of fen area
	HQ12 Wetland grazing supplement	

	(wet areas, 1.03ha)	
4558	HC15 Maintenance of successional areas and scrub (Gorse areas, 1.55 ha).	No more than 50% should be mature or over-mature. 50% of the area should be grazed with sheep maintaining a close grazed turf interspersed with tussocks. Nettle and ragwort should be no more than occasional and there should be no net increase in gorse cover on the Common.
	HK7 Restoration of species-rich semi-natural grassland (acid grassland 5.73 ha).	The acid grassland and meadow should be 20-90% wildflower cover, with 40% flowering in May-June. At least two indicators for lowland acid grassland should be frequent in the sward and four occasional. The sward should be 2-10cm in height in October and November. The meadow and acid grassland should be grazed by cattle or sheep for at least six weeks in May-September. If hay is cut, the aftermath should be grazed. The area of bare ground should be 5%, distributed around in small patches and hoof prints. The cover of ragwort, other notifiable weeds and invasive trees and shrubs should all be less than 5% each.
	A13 Permanent Grassland	A maximum stocking density of 2 LU/ha for the fen, with 3 LU/ha elsewhere
Capital Works (by September 2014)		
4558	WS Water supply	110m
	WT Water trough	1
	SC Scrub management >75%	0.16ha
	SS Scrub control base payment	1

Single Farm Payment

SFP goes to the Garboldisham Parish Charity under the terms of the lease.

B8.4 Management Issues

- Fen restoration commenced with scrub removal, first mowing and fencing for grazing but years without management have left the stand in poor condition.
- The fen areas are too small and with too high a residual botanical value to consider scrapes or pools.

- Existing M22 vegetation suggests a high potential for restoration. Both cutting and grazing may be needed to bring the stand back into condition. The Stewardship agreement (Options HQ6 *Maintenance of Fen* and HW12 *Wetland Grazing Supplement*) states the vegetation should be in a mosaic of shorter and taller stands with 30% or more in tussocks or patches more than 50cm high.
- The fen is probably supported by groundwater to the north, but affected by drainage from the small ditch. HLS requires water levels in the ditch to be 20-45cm below ground level all year round with the ground squelchy. This is too low for our site. A target for this site will be 20cm bgl in the ditch and 10cm bgl for the fen throughout the summer. At least two indicators of fen – e.g. reed, hemp agrimony, water mint and angelica – should be occasional in the fen. Fen areas south of the ditch of poorer quality and invaded by sallows. Raising water levels in the ditch would benefit the fen interest, but impacts on upstream neighbours need to be considered. According to the Stewardship Agreement there should be 25-75% cover of aquatic species in the ditch.
- The sallow scrub provides an additional habitat used by invertebrates and birds, but is invading M22 fen. The sallows should be coppiced to retain but contain the wet scrub to no more than 10% of fen area (Stewardship requirement).
- The neutral grassland (meadow) has also been degraded by years of neglect. It has developed a tussocky structure of coarse grasses and is comparatively species poor. There are a number of old anthills. The remnant flora suggests that recovery is possible when management is re-introduced.
- Summer grazing is the most sustainable and desirable long-term management option, possibly combined with periodic cutting of rank and rushy areas. Grazing with cattle is most beneficial for the fen, while sheep grazing is favoured for the heath. Mixed grazing at low density would be ideal, but difficult to achieve. The Stewardship Agreement states a maximum stocking density of 2 LU/ha for the fen, with 3 LU/ha elsewhere (under A13 the Permanent Grassland).
- As the Common is fenced and managed as one single unit, managing grazing separately for the fen, acid grassland and meadow is not possible. This Plan provides the best resolution for the habitats managed as a single mosaic. It is consistent with the provisions of the Stewardship agreement.
- Under Option HK7 *Restoration of species-rich semi-natural grassland*, the acid grassland and meadow should be 20-90% wildflower cover, with 40% flowering in May-June. At least two indicators for lowland acid grassland should be frequent in the sward and four occasional. The sward should be 2-10cm in height in October and November. Prior to the introduction of grazing, this was achieved by rabbits in the acid grassland, but not in the ungrazed meadow. The meadow and acid grassland should be grazed by cattle or sheep for at least six weeks in May-September. If hay is cut, the aftermath should be grazed. The area of bare ground should be 5%, distributed around in small patches and hoof prints. With the density of rabbits and their holes, this is being greatly exceeded on the acid grassland. The cover of ragwort, other notifiable weeds and invasive trees and shrubs should all be less than 5% each.
- There had been no treatment of ragwort, concentrated on the acid grassland, for many years. Weed wiping in 2011 had a modest impact on ragwort density, possibly due to the very dry summer – better results may be achieved in wetter years, and a second

application was made in July 2012. Repeated tractor passage may damage the sensitive lichen swards, as would heavy stocking with cattle.

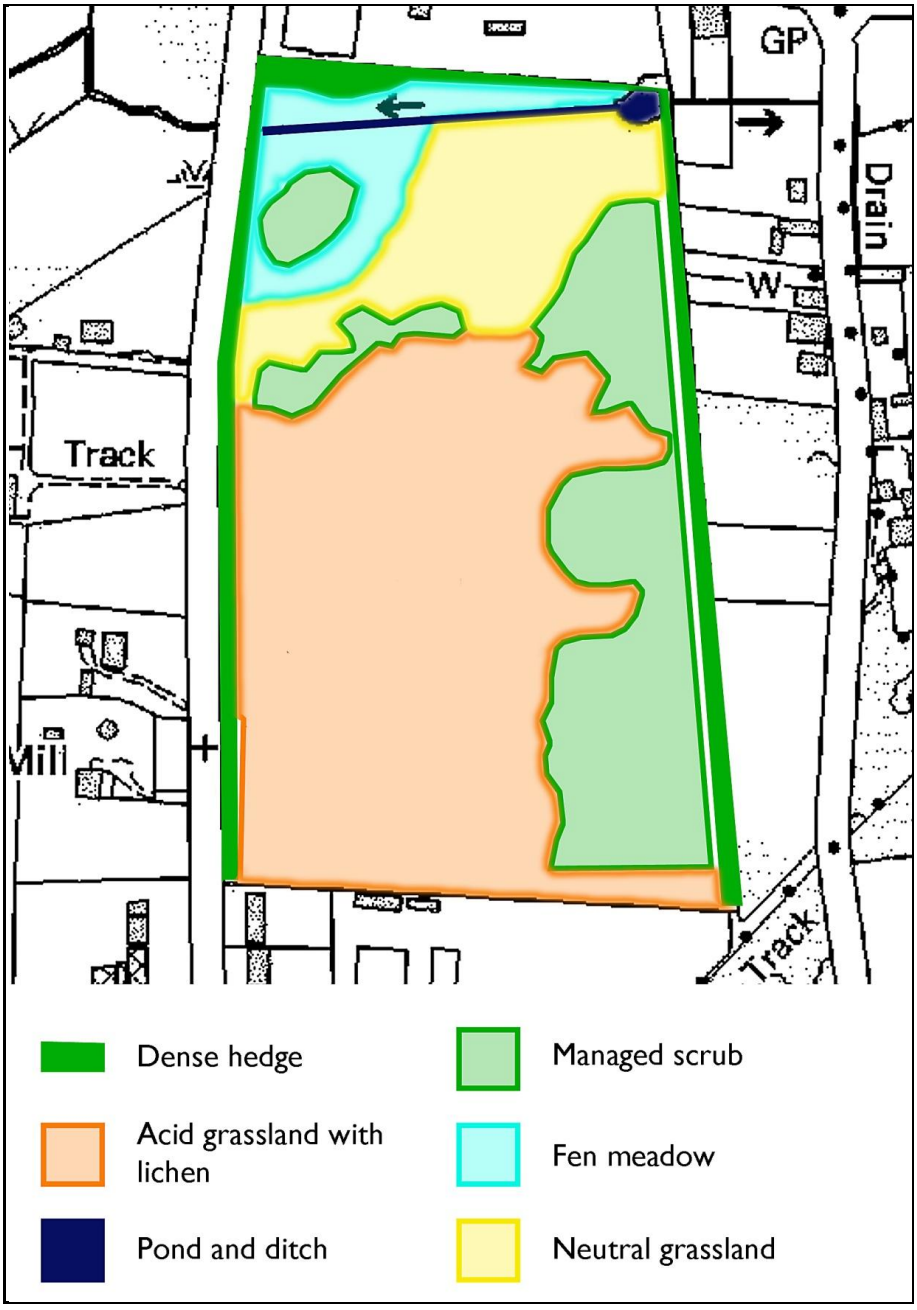
- There has been some discussion over rabbit numbers on the Common. Rabbits reduce scrub and gorse invasion and maintain the lichen heath areas. They also produce bare ground and regeneration sites for plants. However, in excessive numbers their disturbance creates too much bare ground, impedes regeneration of gorse after coppicing and encourages ragwort. The desired rabbit population has yet to be determined for the site and should be reviewed over this plan period. Controlling rabbits has very considerable issues in terms of resources, practicality and the PR issues surrounding it.
- The gorse should be managed to provide a varied structure for nesting birds. Under Stewardship Option HC15 *Maintenance of successional areas and scrub*, no more than 50% should be mature or over-mature. 50% of the area should be grazed with sheep maintaining a close grazed turf interspersed with tussocks. This is incompatible with maintaining gorse, and is probably a general prescription intended to apply to a more successional habitat than the established dense gorse. Nettle and ragwort should be no more than occasional and there should be no net increase in gorse cover on the Common.
- The Stewardship Capital Works provide for SC control of 0.16ha scrub by September 2014, and SS base scrub control, both in the gorse area. This equates to the rotational gorse management, with the SC area probably already achieved. The Agreement also provides for the installation of a trough and water supply (HLS WS/WT) at the southern end of the acid grassland, although the agreement map suggests it should be in the middle of the field not on the margin.
- HLS requires scrub work to be undertaken between 1st October and 28th February. It also requires all scrub to be cut to ground level with no protruding stems.
- There is an isolated record for water voles from the pond area. The structure of the ditch could be improved to encourage voles to spread.
- The site is an important component of the valley habitat complex. There are extensive areas of acid grassland around the Common, in private ownership. There is continuity with the Little Ouse floodplain via Garboldisham Old Fen. Uniting the Common, Old Fen and Scarfe meadows is an important strategic aim.
- Vegetation monitoring has been set up in the principle habitats in 2011. They should be re-surveyed periodically as resources allow, the next being in 2015. Monitoring of dipwells should also take place fortnightly if possible.
- Regular surveillance of the condition of the site infrastructure (fence, gates, the sculpture, interpretation, bridge) should be undertaken. There should also be regular checks on the safety of trees where collapse or shedding of branches could form a health and safety hazard. This is a priority along the road and public paths through the site. Professional advice on both aspects may be needed from time to time, but the warden will make the checks annually in the first instance.

B8.5 Condition and Aspirations

Twenty Year Vision

Over the course of the next twenty years, the full sequence of habitats from acid grassland to valley fen meadow will be restored to prime, species-rich condition. Associated habitats of ponds, gorse scrub and hedges will be retained as part of the habitat mosaic. The site will be re-integrated into the Garboldisham habitat complex, re-connected to the Little Ouse valley floodplain through sympathetic management of Old Fen, Scarfe Meadows and adjacent grassland in private ownership.

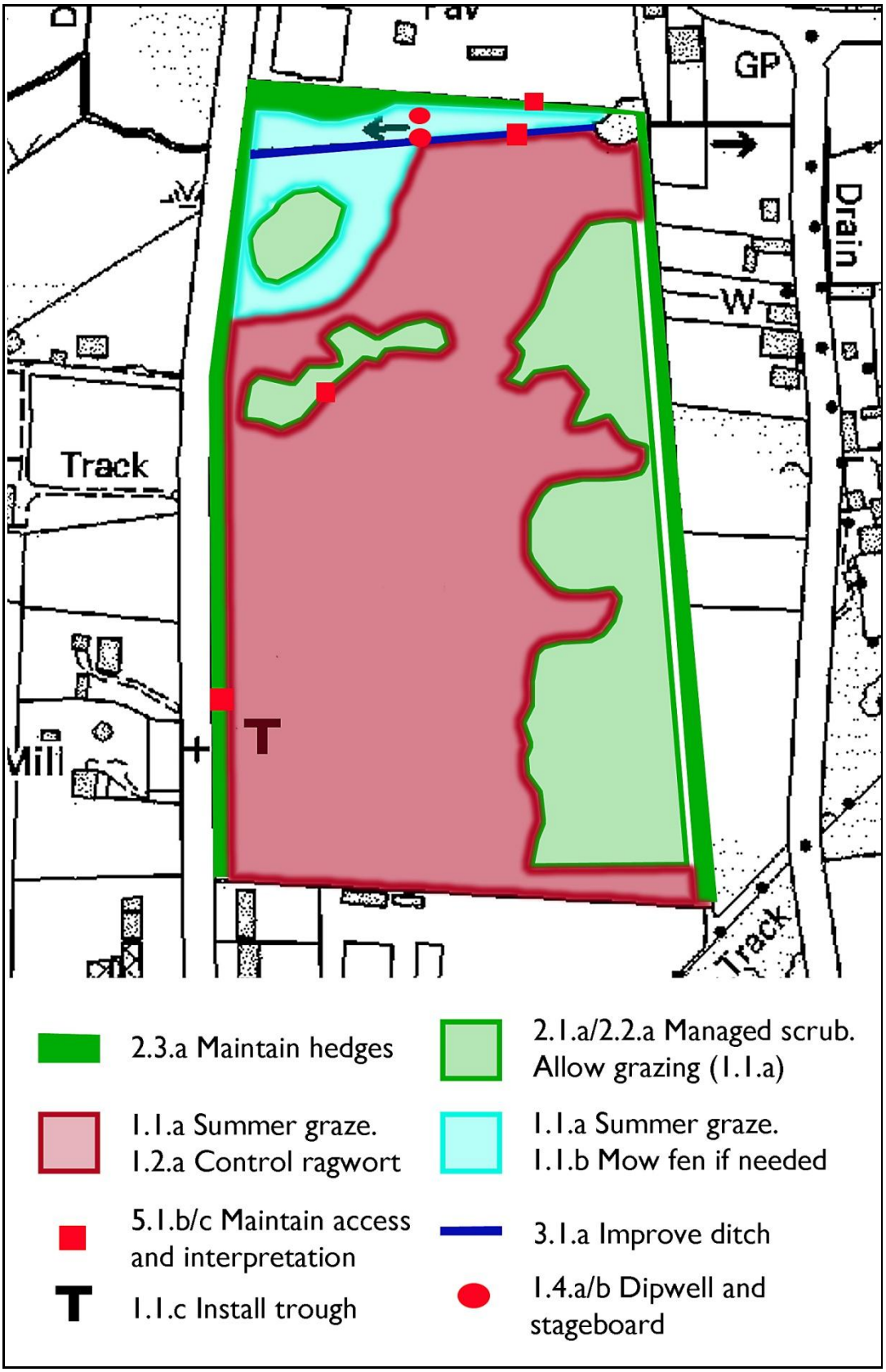
Figure 8-4: Ideal Condition



B8.6 Management Objectives

1. Restore and maintain the acid grassland-meadow-fen meadow habitat complex in favourable condition.
2. Maintain associated habitats (hedges, wet scrub, pond and ditch) for breeding bird and invertebrate interest, without compromising the habitat mosaic.
3. Conserve and enhance the population of water voles.
4. Promote the reconnection of the site with other wildlife sites in the parish.
5. Promote understanding and appreciation of the site through physical access and interpretation.

Figure 8-5: Summary of Management. Note all of the HLS Scrub capital work (SS/SC) relates to the gorse area. The trough location (WT/WS) shown below is different to that shown wrongly on the HLS map.



Not Shown:

1.3.a Rogue scrub as needed.

1.5.a Review desired bare ground and rabbit management options.

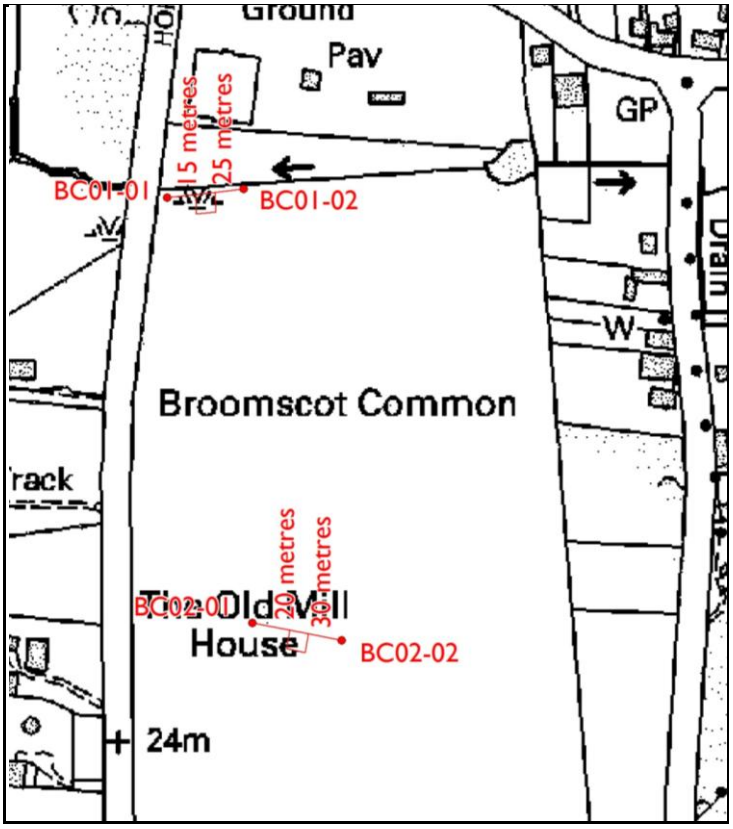
1.6.a Repeat vegetation monitoring set up in 2011 (see map below).

4.1.a/4.1.b/4.2.a/4.2.b Promote reconnection of the site

5.1.a Mow footpath as needed.

5.2.a Check safety of trees twice annually. Obtain professional advice when needed.

Figure 8-5 Location of Vegetation Monitoring Plots



B9. Scarfe Meadows

B9.1 Summary Information

Grid Reference	TL 997 808
Parish	Garboldisham
District	Breckland District Council
Size	5.7 ha
Warden	None
Designations	None
Tenure	Freehold, acquired 2010.
Access Details	Limited seasonal access to northern end. No formal paths within the site.
Rights excluded	None. Boundary ditches assumed to have shared ownership.
Public rights of way	No PROW. Public footpath along northern boundary (Fen Lane).
Third party easements/wayleaves	None
Principle habitats (ha/m)	Lowland wet grassland. Ditches Dry grassland River corridor Fen along ditch margins Mixed hedges with mature trees.

Figure 9-1: Compartments

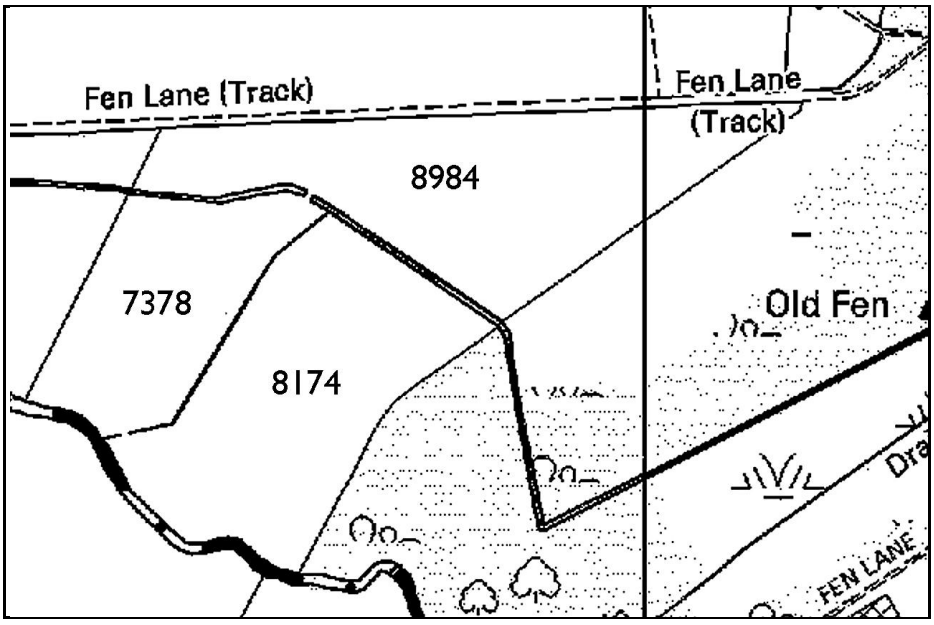


Figure 9-2: Habitats and Plant Communities

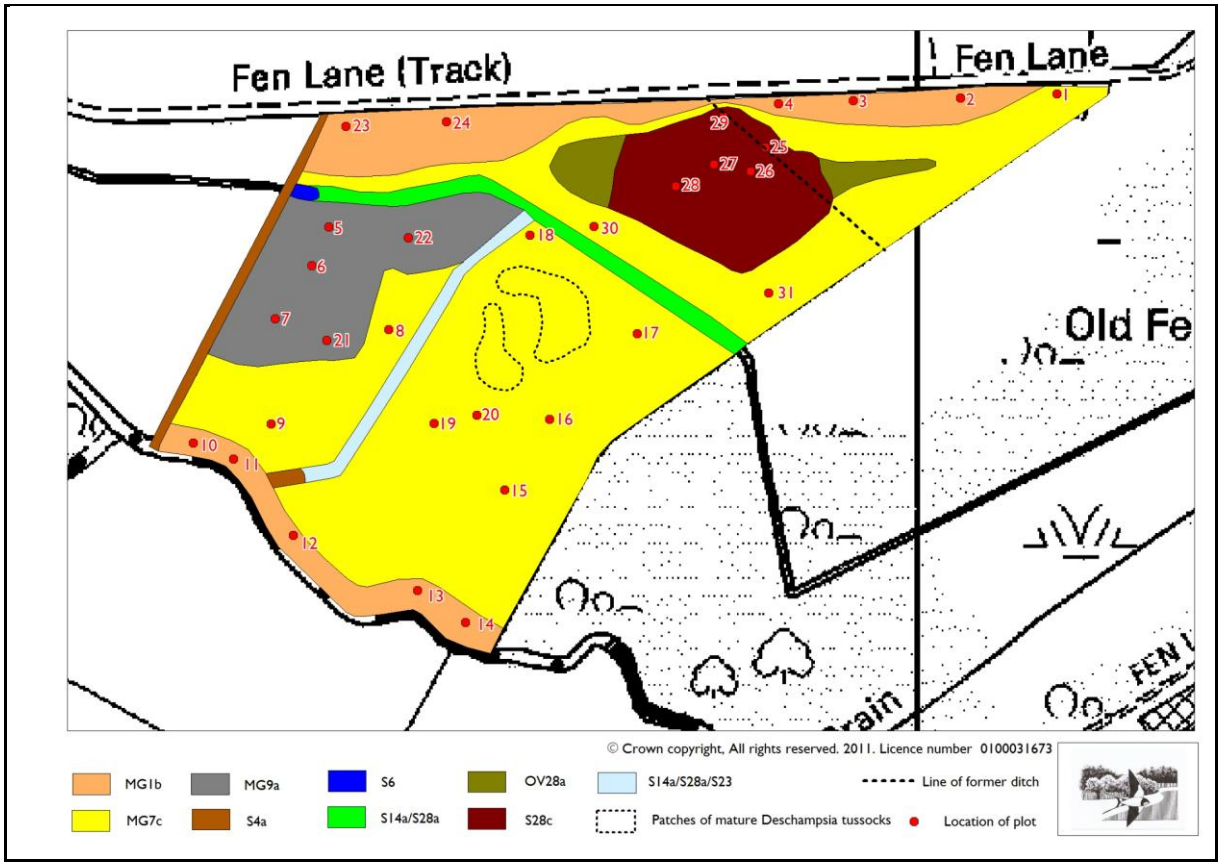


Figure 9-3: Aerial photograph: July 2008

B9.2 Significant Features and Their Importance

FEATURE	ATTRIBUTES	IMPORTANCE			
		Europe	BAP	SSSI	Local
Habitats					
Lowland wet grassland	Open marshland habitats. Potentially suitable for breeding waders, wintering birds and marsh invertebrates if in-field wetness could be increased.		*		*
Ditches	Aquatic habitats potentially rich in plants and invertebrates.		*		*
Little Ouse river corridor	South boundary of site. Lined with tall trees. River itself in poor condition.		*		*
Fen marginal habitats	Providing the transition between aquatic and wet grassland habitats, these strips can be botanically important and provide structural diversity.		*		*
Scrub and Hedgerow	Provides habitat and structural diversity		*		*
SPECIES					
Plants	Generally species poor in grassland and ditches. *Catabrosa aquatica* found by Alec Bull 2012.				*
Birds	Boundary hedges and scrub support good range of breeding songbirds.		*		*
Mammals	Good colony of water voles along the main east-west ditch.		*		*
HISTORIC ENVIRONMENT					
Parish Boundary	The river is an old parish and County boundary				*

LANDSCAPE					
Wooded Valley Meadowlands and Fen Landscape Character Area (Farmer 2011).	Part of the Blo' Norton to Smallwoth River Corridor Character Area. Transition to more open valley landscapes and from fen to wet grassland on the valley floor.				*
EARTH SCIENCE AND GEOLOGY					
Stratigraphy	Possible old river course or other peat-filled channel.				*

B9.3 Stewardship Details

Details	Higher and Entry on all land. Agreement Ref. AG00357439 Commenced 01 October 2011	Total of 5.57ha in agreement
Field Numbers	**Options**	**Agreement Targets and Indicators**
7378, 8174, 8984	A13 Permanent Grassland (1.27 ha)	
	HK15 Maintenance of grassland for target features (1.27 ha)	Flowering heads of wild flowers should be frequent from 1st April to 31st August. Cover of invasive trees should be less than 5%. At least 5% of tussocks should remain. Wintering waders and wildfowl, to be present for a few weeks in the period November-February inclusive. 10% of the area should have grasses gone to seed and be undisturbed between 1st September and 28th February. The sward should be no more than 5-15cm tall by November. For breeding lapwing the sward height should be less than 5cm in spring. Target in-field water levels are 15cm bgl or above in summer, with water tables at ground level with hollows shallow-flooded in winter (**NB: LOHP target, not Stewardship)**.
	HR1 Supplement for cattle grazing (1.27 ha)	
Capital Work	None	

B9.4 Management Issues

- Ecological condition of the river corridor along the southern margin is very poor, although there has been meander restoration further downstream.
- Water levels in the internal ditches can fall to very low levels to the detriment of wetland wildlife. Low river levels may be drawing water out of the site along the southern boundary. The north-south ditch is especially vulnerable to low levels. Sustaining high in-field wetness is not possible with current ditch levels. The east-west ditch receives "upstream" water from Old Fen and Broomscot Common. It has the potential to re-wet the grassland and sustain ditch levels. It will require sluicing.
- The meadows will be summer grazed under Stewardship Option HK15 *Maintenance of grassland for target features*. The Stewardship agreement provides for grazing from 1st April to 30th October. A later start is normal under Brian Lambert's grazing habit, and would be needed should ground nesting birds settle in spring.
- The grassland should not be topped, rolled or harrowed between 1st October and 30th June, and then only 30% of the land should be treated in any one year. At least 5% of tussocks should remain.
- The Stewardship management objective is for wintering waders and wildfowl, to be present for a few weeks in the period November-February inclusive. When this is achieved NE will consider switching the Option to HK10 *Maintenance of wet grassland for wintering waders and wildfowl.*
- To support this objective Stewardship specifies 10% of the area should have grasses gone to seed and be undisturbed between 1st September and 28th February. The sward should be no more than 5-15cm tall by November. The Agreement also suggests that for breeding lapwing the sward height should be less than 5cm in spring. Surface treatments (e.g. rolling and harrowing) are banned between October and June inclusive.
- The land is also under Stewardship Option HR1 *Supplement for cattle grazing*. Cattle are to be the only grazers between 1st April and 31st October. They should comprise 70% of the livestock grazing days in any year (i.e. if sheep are used outside of the period they should not comprise more than 30% of total grazing).
- To achieve a close grazed finish, late autumn grazing by sheep is possible but will need a derogation from NE. Grazing may not be feasible in wetter autumns.
- High in-field wetness is critical to providing suitable for conditions for breeding and wintering birds. Target in-field water levels are 15cm bgl or above in summer, with water tables at ground level with hollows shallow-flooded in winter.
- Meeting the water level target will only be achieved by a combination of raising ditch water levels and cutting of footdrains to spread water out from the drains. These works are not currently in LOHP's HLS Agreement. First a sluice will be installed, then if brim-full ditch levels can be sustained, footdrains will be cut.
- Sustained high water table levels damage the grass sward and soil invertebrates. Consequently, a rest period from 15th July to 30th September should be provided with dropping of water levels at this time. Winter water levels should be restored in October.
- Perhaps the most important existing feature is the population of water voles in the east-west drains. Work will be undertaken to this drain in 2012-15, and will include early removal of invading scrub. Extreme caution will be used in these works with best

practise management carried out and a minimal approach. The ditch will be worked on over three years, with a review following water vole surveys each year. The heavily wooded river bank is unlikely to support water voles. Ideally, work should be undertaken October or possibly November, when the voles will be neither breeding nor hibernating in their burrows.

- The ditch network as a whole should be managed to maintain a range of successional stages. Marginal fen vegetation should be encouraged, grazed and with a variable structure is ideal for plants, invertebrates and water voles. There is no data on aquatic invertebrates.
- The hedges support a range of breeding song birds and provide habitat for invertebrates. However, they also enclose the meadow and may harbour corvids, both inimical to ground nesting birds. At acquisition, it was decided to reduce the hedges and maintain them comparatively short, retaining some breeding songbirds but without impeding breeding and wintering birds. The main work was complete when the site was re-fenced in 2012 – ongoing work is to retain this form.
- Removal of the western hedge would open the valley landscape and create more favourable conditions for wintering and breeding birds. However, all boundaries and parcels surrounding the marsh are similarly occluded by trees and hedges. Removing this hedge as a one-off action is unlikely to materially change the site for ground birds, especially with the current in-field water tables. In conclusion, although opening up the marsh is desirable, it could only be justified if (a) high in-field wetness can be achieved (b) the surrounding marshes and fens can be similarly and comprehensively treated to open the valley and (c) some wintering and breeding bird interest can be established.
- The three large standard trees in the middle of the marsh have so far been retained. The future of the riverside trees should also be considered, especially in the context of any river restoration proposals.
- A unified management scheme which creates a single area of habitat continuous to Broomscot Common to the east and Froggshall Carr to the west is a long term aim. It should go hand in hand with river restoration.
- Uncontrolled public access could significantly affect breeding and wintering birds. The opportunities for obscuring access routes or providing facilities are few. Conversely, some access has already been assumed by local people. The access policy will need to be reviewed periodically.
- Vegetation monitoring has been set up in the principle habitats in 2011. They should be re-surveyed periodically as resources allow, the next being in 2015. Monitoring of the ditch gaugeboards should also take place fortnightly if possible. A gaugeboard has been put in the river and the main ditch.
- Regular surveillance of the condition of the site infrastructure (fence, gates, the sculpture, interpretation, sluice when installed) should be undertaken. There should also be regular checks on the safety of trees where collapse or shedding of branches could form a health and safety hazard. This is a priority along the adjacent track and public paths through the site. Professional advice on both aspects may be needed from time to time, but the warden will make the checks annually in the first instance.

B9.5 Condition and Aspirations

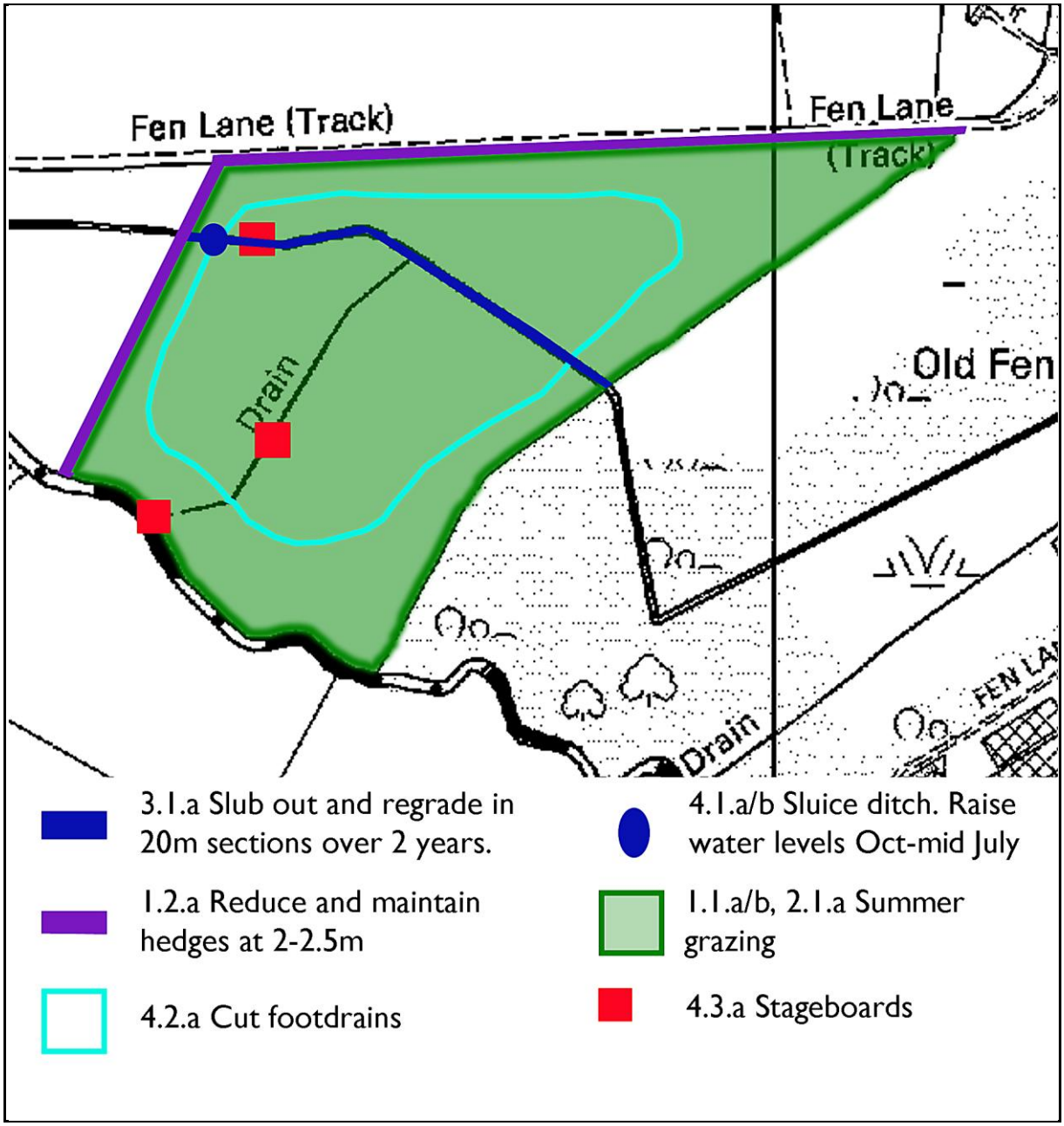
Twenty Year Vision

Over the course of the next twenty years, Scarfe Meadows will develop into a healthy lowland wet grassland habitat with breeding and wintering waders and wildfowl, a strong and stable water vole population and a developing wet grassland and fen flora. The site will increasingly be integrated with the habitats around it, forming a complex of wet woodland, restored fen, heath and a restored Little Ouse river.

B9.6 Management Objectives

1. Establish breeding waders and wildfowl on the meadows.
2. Establish a group of overwintering wildfowl and waders present on the site for at least four weeks between November and February inclusive.
3. Ensure a stable water vole population in both the main ditches.
4. Maintain a high water table and in-field wetness to support the above objectives.
5. Bring the marshes and wet woodland to the west, and Old Fen and Broomscot Common to the east, into one continuous habitat complex.
6. Promote understanding and appreciation of the site through physical access and interpretation.

Figure 9-4: Summary of Management



Not Shown:

1.2.a Maintain hedges in current state by cutting on 3-year rotation.

3.1.b Survey for water voles and amend ditch plans as needed.

4.4.a Repeat vegetation monitoring set up in 2011. (see map below).

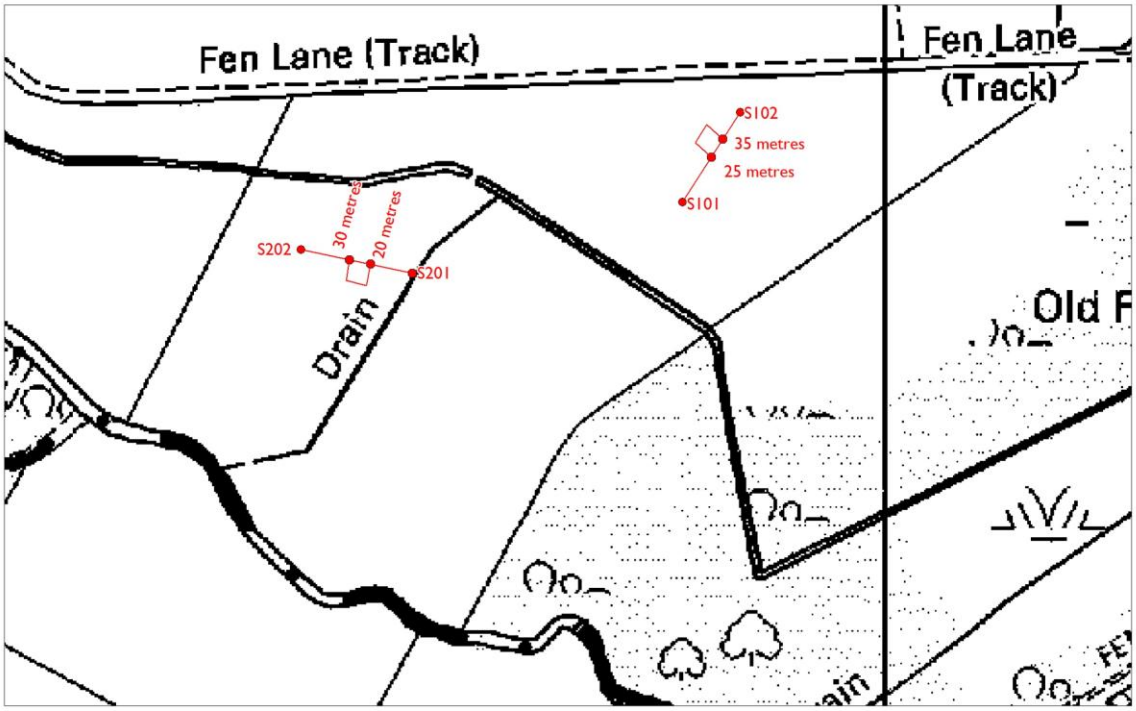
5.1.a/5.2.a Develop habitat complex.

6.1.a Check bridges and gates and undertake repairs.

6.1.b Check interpretation and clean regularly.

6.2.a Check safety of trees twice annually. Obtain professional

Figure 9-5 Map of Vegetation Monitoring Plots



B10. Universal Management Considerations

B10.1 Property Leases and Agreements

B10.2 Stewardship

Under the Stewardship Agreement (Non-Commons Land, AG00357439, all land (44.09 ha) is subject to EA1 Farm Environment Record (FER), a compulsory requirement under Entry Level Stewardship (see p.55 of the ELS Handbook). During the application process, a Farm Environment Plan was submitted. This is also the FER. The requirement is that all features on the FER/FEP map is maintained during the period of the Stewardship Agreement. This requirement is accommodated in the above management plans.

B10.3 Single Farm Payments and Cross Compliance

Summary of Single Farm Payments

Single Business Identifier for LOHP Single Farm Payment Agreement: 107574341

Total area registered: 55.86 ha, total area eligible for payments: 46.82 ha (as of May 2012).

Site	Details	Fields and area
The Frith	Registered, all eligible.	7515, total 10.72 ha
Little Fen	Registered but not eligible for payments as it is woodland..	4117, total 4.18ha registered, 0 ha eligible
The Lows	Registered, all eligible.	2213, 2225, 2817, 2902 total 4.48 ha
Hinderclay Fen	Registered and eligible since 2012 following discussion with RPA.	1467, total 11.75ha, 11.75ha eligible
Blo' Norton and Betty's Fen	Registered. Parts cannot be claimed as it is woodland.	8797, 6006, total 8.21 ha registered, 3.37ha eligible
Webb's Fen	Registered, all eligible.	6783, 7681, 7990, total 5.55ha
Parkers Piece and Bleyswycks Bank	Registered and eligible since 2012 following discussion with RPA.	3296, total 5.28ha registered, 5.28 ha eligible.
Broomscot Common	Registered by Garboldisham Parish Trustees who take the payments under the terms of the lease.	None registered or eligible.
Scarfe Meadows	Registered, all eligible.	7378, 8174, 8984, total 5.67ha

Cross Compliance

Cross compliance entails a set of rules that all recipients of single farm payments, Stewardship grants and Woodland grants must abide by. Many are specific to certain types of farming or certain types of land. Those that apply to LOHP, and the implications for management, are summarised in the table below.

Note that **all land within the holding is subject to cross compliance, even if is not entered into or receiving grants under SFP or Stewardship**. All of LOHP's land holdings are therefore subject to cross compliance, although the specific rules that apply may vary between sites depending on their nature and on the management work applied to them.

Most of the provisions would be accommodated within LOHP's standard management and we would hope that our land management standards are higher than the baseline established by cross-compliance. However, some (especially those more closely related to standard agricultural practise) may have additional implications for management. These are identified in the timings and works in the Work Programme spreadsheet.

Some, such as care of grazing animals, are principally the responsibility of the grazer but LOHP may have an implied or moral responsibility to ensure the standards are met when stock are on our land. Care of grazing animals rules are therefore included for completeness sake.

The following cross compliance measures are not relevant (as of April 2012). This would change if LOHP owned stock or applied manure on land such as wet grassland.

SMR 2 : Groundwater protection. Prevents discharge of hazardous and polluting substances.
SMR 3 : Relates to disposal of sewage sludge.
SMR 6, 7 and 8 : Pig, cattle, sheep and goats identification and registration. These are the responsibility of the stock owners – currently not LOHP.
SMR 9 : Use of Plant Protection Products – not used by LOHP.
SMR 10 : Use of hormones, thyristic actions or beta-agonists in farm animals. This is the responsibility of stock owners.
SMR 11: Food and feed law. This is the responsibility of stock owners.
SMR 12 : Prevention of TSEs ("mad cow" disease). This is the responsibility of stock owners.
SMR 16 : Welfare of calves: refers to housed calves.
SMR 17 : Welfare of pigs. Not applicable.
GAEC 7: Scheduled Ancient Monuments – none on LOHP Land
GAEC 10: Burning of heather, rough grass and gorse outside of winter period (1st November-31st March). This is not LOHP policy on any sites.
GAEC 13: Stone Walls – none on LOHP sites.
GAEC 17: Felling of trees – this provision merely states the need for felling licenses.
GAEC 18: Water abstraction: ensures obtaining abstraction license and adherence to conditions for any abstraction from a watercourse of more than $20m^3$/day.
GAEC 19: No spreading of fertiliser or manures within 2m of a watercourse or open water or 50m of a spring, well or borehole.

Table Summarising Cross-Compliance Implications. Full details can be found in *The Guide to Cross Compliance in England, 2012 edition*, available on the RPA website.

Rule	Summary of Management Implications for LOHP	Sites affected
Statutory management Regulations (SMR)		
SMR1 : Wild Birds	Not to disturb birds when nesting is the only provision likely to be relevant to LOHP. Any time but especially 1st March to July 31st. August, and even September, may require caution in some years and some circumstances.	All
SMR 4: Nitrate Vulnerable Zone.	LOHP must maintain records of the number of livestock, the duration of grazing each year and a calculation of their production of nitrogen. Records must be completed for the preceeding season by April 30th each year.	All sites.
SMR 5 : Habitats and Species. Protection of species and SAC habitats.	LOHP to obtain permission for work on all protected plant species and SAC habitats (where not included in Stewardship programmes).	Blo' Norton and Betty's Fen, eastern end of Parkers Piece.
SMR 13, 14 and 15. Control of foot and mouth, animal disease and bluetongue. Largely the concern of the stock owners.	If animals are considered "under the charge" of LOHP, we are required to notify the Animal Health and Veterinary Labs Agency if we are aware they are diseased.	The Frith, The Lows, Webb's Fen, Parkers-Bleyswycks, Broomscot, Scarfe Meadows.
SMR 18: Animal Welfare. Provides overview of the care of agricultural animals. Largely the concern of stock owners.	Applies if LOHP are considered responsible for stock grazing our land. Relevant provisions: • Stock are cared for by staff with necessary skills. • Animals are checked regularly, appropriate to the grazing system used. • Ensure animals have sufficient drinking water.	The Frith, The Lows, Webb's Fen, Parkers-Bleyswycks, Broomscot, Scarfe Meadows.
Good Agricultural and Environmental Condition (GAEC)		
GAEC 1: Soil Protection Review. Aims to prevent erosion and compaction of land on environmental features. Provisions contained in LOHP's ***SPR 2010.***	With no arable and low intensity land use with minimal soil disturbance there are few soil issues. The main issues are: • Compaction and erosion from machinery and stock. • Maintaining vegetation cover especially on slopes. • Waterlogging and run-off causing erosion. • Operations such as ditching and scraping which break ground (NB:	All sites

	This is not a risk according to the SPR) All of the above operations or threats should be managed to minimise potential soil erosion and transport to water courses. Gateways, troughs, tracks and slopes are the most vulnerable areas, especially where associated with regular machinery operations or cattle grazing. Vigilance for soil erosion problems should be a constant feature of site visits with follow-up remedial work a priority.	
GAEC 6: SSSI's. Relates to protecting SSSIs and obtaining NE consents.	Stewardship schemes provide consents for operations required to implement them. Consent needed for additional operations.	East end of Parkers Piece. Blo' Norton and Betty's Fen
GAEC 8: Public rights of way. Maintain PROW open and free for access.	No issue as access is an important aim of LOHP. All sites have some form of permissive access, but these are not part of cross compliance.	Broomscot Common and Hinderclay Fen
GAEC 9: Overgrazing. Prevent overgrazing and supplementary feeding on semi-natural sites.	Main implication is no supplementary feeding except for animal welfare in extreme conditions.	The Frith, The Lows, Webb's Fen, Parkers-Bleyswycks, Broomscot, Scarfe Meadows.
GAEC 11: Control of invasive non-native and injurious weeds.	Control spread of *Rhododendron*, Himalayan balsam, Giant hogweed, Japanese knotweed, ragwort, broad-leaved and curled dock, spear and creeping thistle. LOHP would wish to control ALL invasive non-natives.	All sites. On most sites this is not an issue except for the ragwort on Broomscot Common.
GAEC 12: Land not in agricultural production (cultivated or grazed). Aimed at the protection of natural habitats and species not being farmed.	Standard LOHP management meets these provisions, possible exceptions: Land must be cut or cleared of scrub at least once every 5 years. Vegetation cannot be cut between 31st March and 15th July. Derogations could be granted.	All sites
GAEC 14: Protection of hedges and watercourses.	Maintain green cover and do not apply pesticides (other than spot treatment of weeds) within 2m of the centre of a ditch, river or hedge. Might apply when controlling weeds or non-native invasives, especially those associated with watercourses.	All sites
GAEC 15: Protection of Hedgerows.	No removal of hedgerows without LA Permission. No cutting or trimming of hedgerows between 1st March and 31st July	All Sites

B10.4 Management Recording

C. Reconnecting Sites: Toward an Integrated Land Management Plan

Broad strategy outlining objectives of connecting sites up.

Include associated strategic objectives such as river restoration, community engagement, access to sites.

Intended to be broad brush and form the basis later of the ILMB.