

Ant Broads and Marshes National Nature Reserve Management Plan

BUTTERFLY CONSERVATION CATFIELD FEN SECTION

2013 - 2018

**This plan covers the period:
*April 2013 – March 2018***



Author:

This plan was written by Richard Mason (Sutton Fen Site Manager, RSPB) on behalf of Butterfly Conservation.

The 2008 – 2013 Catfield Fen management plan should be referred to for more detailed background information (Section 1) if required.

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1.4 Physical Features

The physical aspects of the reserve which form part of the site's importance or which have a bearing on its management

Geology

Cretaceous chalk underlies The Broads and this is overlain by pre-glacial Quaternary deposits of iron-rich sands, laminated clays and pebbly gravels collectively known as the Norwich Crag (Funnell, 1976). Sandy clays, often decalcified, were deposited over the Norwich Crag by successive glaciations. The post-glacial Holocene period experienced the Romano-British Transgression marine transgression which resulted in a series of intercalated peats and marine clays in the The Broads' river valleys (Coles & Funnell, 1981). Catfield Fen lies at the head of the Ant estuary in the Romano-British Transgression. The upper layers of alluvium (0-3 m depth) correspond to the 'upper clay' laid down during the second transgression and the 'upper peat'. The latter was formed when tidal penetration decreased in the Ant valley and fen communities developed. The clay layer becomes shallower towards the valley margin, grading to *Phragmites*-rich silts which were presumably laid down in brackish marginal swamps, and eventually replaced by peat with negligible inorganic content where freshwater herbaceous fens predominated. The peat at the fen margin also becomes shallower and overlies sand, gravel and gritty clay. This sequence is contained in consolidated peat column along a north-south transect through the west side of the site (Giller & Wheeler, 1986), and is a valuable palaeoecological archive.

Peat covers the entire site, but varies in character. That on the west compartment is consolidated and humified where there is no history of peat removal, whereas the upper 50-80 cm of peat on the east compartments where turf cutting was practiced is loose and discontinuous. At the southern part of the site, there are horizons of brackish peat and estuarine clays which are shallow enough to influence the vegetation, especially where they have been exposed by peat cutting.

Hydrology

The hydrology of the site is complex and this is a much simplified account, for more detail the 2008 – 2013 management plan and the 2012 AMEC hydrology report of the Catfield area should be consulted.

The Catfield and Irstead fens are split into two distinct hydrological units, the 'external system' and the 'internal system' by the 'Commissioner's rond' (a large peat bank). The external system is directly connected to Barton Broad and the River Ant by an extensive (though largely overgrown) dyke network. The Internal system is separated from the external system by the rond. The only direct connections between the two systems are the 'sluice' at TG 36652135 and another sluice to the South of the site, it is also highly likely that there is hydraulic transmission through the rond, though this has never been studied.

In addition to movement of water through the rond, the site also receives water from the arable land to the North of the site through flow into the perimeter catchwater drain, through direct rainfall and through springs fed by the underground aquifer. To what extent each source of water contributes is not known, but it is generally considered that direct rainfall and flow in from surrounding upland are the largest components.

Over the course of its recorded history, the site water levels have been artificially altered through operation of the sluice, both to allow water in from the external system and to drain water out. Generally this has been done to ensure circulation of water, prevent stagnation and to lower water levels to allow habitat management. In recent years there has been much debate regarding sluice

operation, the problem being that lowering of the water level at Catfield Fen also lowers water levels throughout the internal system, some of which lays higher than Catfield fen, and it is unclear what impact this may have on the condition of the SSSI features. This concern has been exacerbated in recent years due to the very dry summers of 2010 and 2011 and an ongoing study investigating potential connection between fen water level and local water abstractions. Permission to open the sluice is unlikely at the present time, until the results of the ongoing hydrology investigation are clear.

The site water quality is excellent, with TON <0.4mg/l , Total P <0.01mg/l and conductivity 400uS/cm and pH 7.2 (average of 3 sets of 8 ditch samples taken 02/12, 10/12 and 03/12). However, poor water quality is detected to the North of the site where there is input of arable run off and from overflowing septic tanks on Fenside. There are ongoing concerns that the fen (but not necessarily the ditch water), is become more acidic over time, informal visits suggest an increase in acidophilic fen vegetation on the site (sphagnums, sundew, crested buckler fern etc.), this may be linked to the site becoming drier in recent years or a recent lack of replenishment from the more base rich water in the external system. Water quality on the external side of the sluice is not known in detail, but Phosphate, Nitrate and Conductivity levels are known to be slightly higher.

Climate

This is one of the drier parts of Britain, with an average annual rainfall of around 700mm, fairly evenly distributed throughout the year, but with an early winter maximum. Winds are generally from the south-west, but northerlies and north-easterlies can bring low temperatures.

30 year climate change scenario predictions suggest hotter, drier summers and warmer wetter winters in the long term. The net effect of this would be an increase in evapotranspiration and a significantly increased moisture deficit, particular during the summer.

1.5 Biological Features

The plants, animals and habitats which form part of the reserve's importance and which contribute to national and local biodiversity

Flora - Communities

Open Fen

The NNR holds one of the most extensive remaining areas of undeveloped primary fen habitat in Britain which is also considered to form the finest example of an unpolluted valley fen in Western Europe. Much of the fen vegetation has developed on former early 19th Century shallow turf ponds, but areas of uncut ancient peat remain.

Within the 16.48Ha of open fen is a mosaic of S24 subcommunities typical of summer dry, winter wet floodplain fen in The Broads. Within this mosaic are small areas of S2, S4, M13, S12, S26, S25 and M23 and the recently recognised BS3 and BS4. The site supports extensive areas of acidic fen, which support a number of endangered plant species rarely found in the alkaline fen more typical of The Broads.

The communities are very patchy and there are no clear trends except for a general transition from *Cladium* dominated communities toward the North of the site to *Phragmites* dominated toward the South. This is likely a result of the transition from upland to estuary soils beneath the peat.

Sluice marsh and The Island are consolidated peat with no evidence of past peat digging, regular sedge cutting on Sluice marsh and The island have increased the dominance of *Cladium mariscus* and allowed persistence of a number of species characteristic of the S24f community (*Cicuta virosa*, *Schoenus nigricans*, and *Carex lasiocarpa*). It is unclear however if the continued regular sedge cutting is beneficial or damaging to the fen plant communities in comparison with other potential management techniques such as maintenance through rogeuing or non-commercial fen cutting.

Toward the South of Sluice marsh, the vegetation is dominated by *Phragmites australis*, the lack of management here has allowed greater persistence of some plant species such as *Peucedanum palustris*, *Thelypteris palustre* and *Sium latifolium* but has also allowed development of scrub, largely, *Salix spp.* and *Myrica gale*.

On the trampled areas of fen near to Catfield Staithe a very rich community of plants has developed, including *Potamogeton coloratus*, *Chara spp.* and *Utricularia spp.* There are small areas of M13 vegetation with *Sphagnum* and *Molinia caerulea* which have largely become scrubbed up due to lack of management.

Turf pond marsh is largely dominated by *Cladium*, especially the unmanaged areas between South and North water, with very rank and species poor S2 and S24 communities. Around and to the West of South water, the S4 fen is very wet and species poor, dominated by *Phragmites*. Toward the East and north of Turf pond marsh, the vegetation is richer, with areas of S24e and S24f but with an acidic influence, which supports *Drosera rotundifolia*, *Dryopteris cristata* and *Sphagnum magellanicum*. Recent cutting in this area has seen an increase in flowering plants, but patchy scrub is ever present despite past clearance efforts, likely due to the relatively dry conditions and considerable seed source.

Meadow marsh is scrubby S24 dominated by *Phragmites* and *Juncus*, with relatively low variation and species diversity. Hubbard's marsh is a variety of S2, S24 and BS communities, typically with

more *Cladium* dominance toward the West. The North Eastern corner was cleared of scrub in 2011 and has been colonised by a species poor S24 community. In the South East corner is a *Sphagnum* boil of note with *Dryopteris cristata* and *Drosera rotundifolia* amongst *Betula pubescens*.

Mill marsh has also been dug for peat in the past and the Southern parts now supports a relatively rich community of S24e with varying amounts of *Cicuta virosa*, *Peucedanum palustre*, *Sium latifolium* and *Ranunculus lingua* and a large colony of *Liparis loeselii* Annual / Biannual reedcutting has helped to maintain this habitat. The drier areas of Mill Marsh (North of Mill marsh West and most of mill marsh East) hold *Sphagnum* rich vegetation with frequent *Dryopteris cristata* and *Drosera rotundifolia*, but of generally poor species richness.

Open Water

The turf ponds on site are generally of poor species diversity for plants, but also very difficult to survey and certainly under-recorded. The pond dug in Sluice marsh in the 1990s held populations of *Najas marina*, *Utricularia vulgaris*, *Potamogeton natans* and *Potamogeton berchtoldii* and *Chara* spp. in the 1990s, but none of these were present in 2012. All turf ponds are being colonised from the edges by a variety of emergents; *Cladium mariscus*, *Phragmites australis*, *Typha angustifolia*, *Typha lacustris* and *Scirpus lacustris*. On South and North water in particular these swamp communities are extensive and whilst poor from plant diversity they are likely important for a range of invertebrates and birds.

The dyke system is moderately rich in aquatic macrophytes, with species typical of the A4: *Hydrocharus morsus-ranae* – *Stratiotes aloides* NVC community present. The dyke edges are very valuable for a range of fen species such as *Potamogeton coloratus*, *Sium latifolium*, *Peucedanum palustre* and *Cicuta virosa*.

Scrub

Scrub occurs scattered throughout areas of open fen, generally in areas with a lack of management and around more mature wet woodland. *Salix cinerea* is the main component, along with *Betula pubescens*, *Alnus glutinosa*, *Rhamnus catharticus* and *Myrica gale*.

The topography of the site is very variable and scrub colonisation is rapid on the drier areas of fen, whilst it can lead to the loss of other plant communities, it is a valuable component of the site for its invertebrate and bird communities.

Woodland

The wet woodland on the site is mostly patchy W2 on the margins of more mature wet or dry woodland, these areas of mature scrub are an important habitat for a range of invertebrate species and for breeding birds. The more mature areas such as Cottage wood, Sweet gale wood and North Sluice marsh have areas of W5 dominated by alder with some areas of tussock sedge. Floristic value is generally low except for bryophytes but these areas are likely important for a range of invertebrate species as well as birds (marsh tit, song thrush, willow warbler). On the upland fringes of the wet woods and on banks within / adjacent are areas of dry wood with oak, hawthorn and some ash.

See: Map 4 Habitats

Flora – Species:

The site holds important populations of some key fen specialist plants:

Fen orchid – discovered on the site in 2007 in Mill marsh west, the colony is now thought to number over 1000 plants (though no accurate count has been done). This makes it the equal largest colony in the UK with at least 40% of the UK population of this species. The colony is found entirely within the former commercial reedbed, now managed on non commercial rotations.

Fen pondweed – scarce on site and only known from regularly disturbed access routes through wet fen, particularly to the sedge beds on sluice marsh.

Crested buckler fern – frequent and widespread, found in almost all of the acidic areas of the fen and scattered scrub and not infrequent in the drier base rich fen. Tends to be more numerous in uncut fen and is not found at all in the commercial sedge beds. Persists under some shade, but not a closed canopy. No accurate count, but perhaps as many as 2-3000 plants.

Greater water parsnip – found scattered in the wetter parts of the fen, mature plants in the unmanaged areas and more, smaller plants in the cut areas, frequent on ditch edges.

Round leaved wintergreen – recorded on site in past, but location and population size unknown.

Holly leaved Naiad – recorded in the 1990s in the turf pond in sluice marsh, but not re found despite survey effort in recent years. Likely to colonise new ponds which dig into the marine clay silts.

Fauna

Birds

In 2012, there were 30 breeding bird species present at Catfield Fen and 80 species have been recorded in the Catfield area since 1998. The key regular breeding populations are (2012 figures): Reed Bunting (6), grasshopper warbler (3), Cetti's warbler (4), willow warbler (27), sedge warbler (15) and reed warbler (15). The following species have also been recorded breeding in the last ten years; common crane, bittern, bearded tit.

The richest areas for numbers of breeding birds tend to be in the scrubby fen, especially for reed bunting, Cetti's warbler, sedge warbler and grasshopper warbler. The unmanaged wet reed areas support all of the reed warblers and the more mature scrub holds the bullfinch and willow warblers. In general areas cut commercially are very poor for breeding birds, though are probably the most likely areas for potential species such as common crane, marsh harrier and spotted crane to nest.

In combination with adjoining fen, the site is likely an important feeding area for wintering birds, in particular; bittern, marsh harrier and bearded tit. No roosts of marsh or hen harriers have been recorded in recent years.

Mammals

No specific surveys of mammals have been carried out, but informal records highlight water voles and otters as regular on the site. Water voles are known to breed along the dykes edges and otters feed (though probably do not breed) on site. Although unrecorded, the site will also hold populations of harvest mouse, water shrew and an assemblage of bat species.

Fish

There has been no survey of fish populations.

Herptiles

There has been no survey of herptile populations. Common frog, common toad, smooth newt, common lizard and grass snake are all known to occur.

Invertebrates

The site is of national and international importance for fenland insects. The Lepidoptera include 20 resident and 1 migrant butterfly, including the British sub-species of the Swallowtail *Papilio machaon britannicus* for which Catfield Fen is a stronghold. A total of about 400 moth species have been recorded. Particularly notable are the Dotted Footman *Pelosia muscerda*, Small Dotted Footman *Pelosia obtusa* and Fenn's Wainscot *Photodes brevilinea*. The water bodies support 20 species of Odonata including the RDB Norfolk Hawker *Aeshna isoceles*. A colony of Small-eyed Red Damselfly *Erythromma viridulum* which has recently become established in Norfolk has been recorded. The beetle fauna (Coleoptera) is exceptionally rich totalling about 350 species including over 30 RDB species, including the Norfolk BAP species Lesser Water Measurer *Hydrometra gracilentata*. Similarly, amongst the 82 species of Diptera (flies), there are 22 RDB, 25 nationally notable and 1 local species. The Hymenoptera (Bees, Ants and Wasps), Hemiptera (Bugs) and Aranae (Spiders) also include 1, 3 and 2 RDB species respectively. Of particular note is *Trogus lapidator* a wasp parasite of the Swallowtail for which Catfield Fen may be the only known British site. There are also appreciable numbers of the RDB species Desmoulins Whorl Snail *Vertigo moulinsiana*, Shiny Ram's-horn Snail *Segmentina nitida* and False Orb Mussel *Pisidium pseudospaerum*.

The most important invertebrate areas of the site are the less managed areas of scrubby (10 – 20% cover) fen and the undermanaged ditches.

2.4 Objectives

What we want to do during the period of the plan to take us towards realising the Vision

2.4.1 Geological and Biological Objectives

Attributes and targets for these objectives are those which can be addressed through this plan; many features, particularly species, will be maintained through habitat management, and do not require separate objectives. The SSSI objectives should be consulted for the full list necessary to assess condition.

Objective 1: FEN	
Increase area and restore favourable condition of the internationally important Fen, Marsh & Swamp communities.	
Features addressed by this objective:	
1 S2 saw sedge fen	5. Invertebrate assemblage
2 S24 tall herb fen	6. Plant assemblage and communities
3. S4 reed swamp	7. Bird, mammal and herptile populations
4. Other fen communities	
Attributes/targets for key features:	
FTRS 1 – 4: ALL OPEN FEN / SWAMP HABITATS	
Attribute:	Extent
Target:	Increase area to 19.1Ha (from 16.7Ha), although locations of communities may change. See objective 4 for scrub removal.
FEATURE 1: CALCAREOUS FEN WITH CLADIUM MARISCUS (S2)	
Attribute:	Extent
Target:	No reduction in area (4.8 ha)
Attribute:	Habitat Structure
Target:	Varied physical structure and mosaic of age ranges
Attribute:	Scrub cover
Target:	Mostly less than 1.5m higher than fen vegetation, cover within fen 5 – 10%, patchily distributed.
FEATURE 2: TALL HERB FEN (S24)	
Attribute:	Extent
Target:	No reduction in area (11.6Ha)
Attribute:	Habitat Structure
Target:	Varied physical structure and mosaic of age ranges, with tussocks.
Attribute:	Scrub cover
Target:	Scattered, mostly less than 1.5m higher than fen vegetation, cover 5 - 10%, patchily distributed.

Objective 1: FEN

FEATURE 3: REEDSWAMP S4

Attribute: Extent
Target: No reduction in area (0.9Ha)

Attribute: Scrub cover
Target: Maintain below 5%

FEATURE 4: OTHER FEN / SWAMP COMMUNITIES

Attribute: Presence
Target: Scarce communities persist; M5, S24 with *Sphagnum*, S24 with *Molinia*

FEATURE 5: INVERTEBRATE ASSEMBLAGE

Attribute: Swallowtail butterfly population
Target: Increased adult presence recorded on transect

Attribute: Presence of key moth species
Target: Record the following species when trapping during flight time (and at least once in 5 years); *Fenn's wainscot*, *Dotted footman moth*, *small dotted footman moth*, *Reed leopard*

Attribute: Presence of key water beetle species
Target: Targeted surveys show no decrease in quality of assemblage or reduction in area of suitable habitat.

Attribute: Invertebrate assemblage
Target: Maintain or improve quality of invertebrate assemblage over 5 years.

FEATURE 6: VASCULAR PLANT ASSEMBLAGE

Attribute: Crested buckler fern
Target: Stable or increasing population over 5 years

Attribute: Fen orchid
Target: Stable or increase population over 5 years
 Increase area of suitable habitat from c. 0.7Ha to 1.1Ha

Attribute: Round leaved wintergreen
Target: Stable or increasing population over 5 years

Attribute: Fen Pondweed
Target: Stable or increasing population over 5 years

Attribute: Other scarce plant species
Target: Maintain or increase average DOMIN value for; Greater water parsnip, Milk parsley, Cowbane, Fibrous tussock sedge and Marsh fern.

Attribute: Conservation value of plant communities
Target: RWPFSS score higher in 2017/18 than 2012/13

FEATURE 7: BREEDING & WINTERING BIRD, MAMMAL AND HERPTILE POPULATIONS

Objective 1: FEN

Attribute:	Bittern, marsh harrier
Target:	Present as breeding species at least once during man plan period Bittern sighted at least occasionally during winter months
Attribute:	Fen passerines
Target:	Increase population and distribution of key fen species; Reed bunting, bearded tit, reed warbler, sedge warbler, grasshopper warbler. Loss of scrub species (willow warbler, Cetti's warbler) no more than 10%
Attribute:	Mammal and herptile populations
Target:	No loss of or deterioration of suitability of habitat.

Objective Methods:

- **All open fen habitats:** Restore 2.4Ha of open fen habitat by removing young scrub (See SW code on HLS map). Scrub to be felled using chainsaws with brush burnt on fire trays and ash removed where access allows. Some cut scrub to be left in piles where it will not interfere with other habitat management. Some scattered bushes to be left. Stumps to be cut low and treated with glyphosate. This removal is funded by a HLS capital item payment and must be completed by March 2015.

Ongoing scrub 'rogueing' to maintain a 5-10% level of scattered scrub. Stumps and regrowth, where excessive, to be treated with glyphosate. Arisings will be minimal and may generally be cut up and left to decay in small piles, in thicker areas of scrub, brush may need to be burnt on high points with ash removed where possible. This management will aim to maintain higher level of scrub (15 – 20% cover) within the HC15 areas (see HLS map) and lower levels (5-10%) on the HQ6 areas (see HLS map)

Cut banks and other access points at least twice per year, ideally 3 times to maintain usable access. In time the vegetation will become short enough to cut and allow natural wastage. Widen banks in late summer by cutting a further 1m on either side and piling or burning litter. Aim to eradicate bracken in the longer term, cut all bracken on all banks at least twice per year, aiming to cut in early summer (May/ June) and again in late summer (August / September) though additional cuts where resources allow will help.

- **Tall-herb fen** – Carry out non-commercial fen cutting in Hubbard's marsh and meadow marsh (1.3Ha) to retard succession of fen, improve structural diversity and improve plant communities, exact rotation length will depend on response of vegetation. Elsewhere, cut fen in small areas on an opportunistic basis or to gain access to areas of scrub removal with litter piled. This management seeks to maintain existing fen condition for invertebrate and bird populations.
- **Cladium-dominated mixed S2 communities:** Maintain commercial cutting on 4-year rotation, no increase to area cut. Cutting can commence during breeding season where no risk of disturbance to breeding birds can be demonstrated. Water levels will not be changed to facilitate sedge cutting unless exceptional circumstances lead to agreement between NE, BC and the owner of Catfield Hall estate. Sedge cutting must be done opportunistically to take advantage of suitable conditions. Where commercial cutting has not taken place in the recent past, retard succession by hand-removal of scrub, this may be supplemented by some small scale fen cutting and/or small scale opportunistic commercial sedge cutting to provide structure to the habitat.
- **Reedswamp** – non intervention except for occasional scrub removal where necessary

Objective 1: FEN

- **Other Fen / swamp:** Small scale scrub removal to prevent loss of areas of M5, S24 with Sphagnum and S24 with Molinia. Maintain similar hydrological functioning to previous five years. Allow current level of trampling / peat disturbance caused by footfall / machinery use associated with habitat management (For Fen pondweed).
- **Invertebrate assemblage:** No further removal of scrub or increase in commercial or non-commercial cutting except as detailed in this plan. Increase number of permanent litter piles. Search for and re-locate swallowtail larvae within areas to be cut, avoid cutting large milk parsley plants where practical.
- **Fen orchid** – Carry out March cutting and burning / removal on 1, 2 and 4 year rotations on 1.3Ha in Mill marsh west. Amount per year varies.
- **Bittern, marsh harrier, fen passerines, mammals** – Maintain breeding sites free from disturbance, control foxes if clear threat established, by liaison with local gamekeeper and neighbours.
- **Water control:** The default water management policy for this plan is to leave the sluice closed throughout and for habitat management (including commercial sedge and reed) to work around water levels, taking advantage of lower levels. Monitoring of the site water quality, levels and vegetation will continue to allow long term trends to be identified and appropriate measures taken if SSSI features are negatively affected by this lack of water control. In exceptional circumstances BC reserves the right to apply for consent to open the sluice, but it is understood that agreement must be made with the adjoining land owner at Catfield Fen. These exceptional circumstances may include – drying and acidification of the fen due to lack of replenishment of river water or a run of wet summers leading to a lack of important habitat management.

Likely Significant Effect:

These proposals are likely to have a significant effect on the internationally important nature conservation features of the site, but are directly connected with or necessary for their nature conservation management.

Monitoring Methods:

- Record by ground and aerial photography to monitor significant events and management operations and their effects.
- Annually map all habitat management using GPS and GIS, record in annual report.
- Record breeding success of bittern, marsh harrier and other notable birds.
- Carry out four visit territory mapping of red/amber breeding bird species
- Record butterfly numbers by UK Butterfly Monitoring Scheme transect on the rond
- Regularly update species records, encourage and participate in local/national surveys, e.g. Norfolk Moth Group light-trapping visits.
- Monitor 27 permanent vegetation quadrats once every 5 years, analysis to compare results with different habitat management techniques.

Objective 1: FEN

- Initiate regular fen orchid monitoring programme, to compare effects of habitat management on species and plant community.
- Commence annual sphagnum moss transects to identify change in sphagnum distribution
- Carry out surveys of rare fen plants where resource allows – *Dryopteris cristata*, *Pyrola rotundifolia*, *Potamogeton coloratus*
- Regularly update species records, encourage and participate in local/national surveys.

OBJECTIVE 2: OPEN WATER

Achieve and maintain favourable condition for the internationally important Standing Open Water communities.

Features addressed by this objective:

- | | |
|-----------------------------|-------------------------------|
| 8. Open water – Dykes | 11. Vascular plant assemblage |
| 9. Open water – Turf ponds | 12. Breeding bird assemblage |
| 10. Invertebrate assemblage | |

Attributes/targets for key features:

FEATURE 8: OPEN WATER - DYKES

Attribute: Extent of open, managed dykes

Target: No reduction in channel length (1124m)

Attribute: Extent of in-channel vegetation

Target: Maintain variety of successional stages to NE condition assessment standards.

Attribute: Extent of bankside vegetation

Target: Majority managed on rotation to prevent excessive shading.

Attribute: Depth

Target: Adequate to allow access by boat all year round.

FEATURE 9: OPEN WATER – TURF PONDS

Attribute: Extent

Target: Small reduction in area due to natural succession

Attribute: Extent of emergent vegetation

Target: Allow to proceed to late-succession stage.

FEATURE 10: INVERTEBRATE ASSEMBLAGE

Attribute: Presence of key aquatic beetle species

Target: Targeted surveys show no decrease in quality of assemblage or reduction in area of suitable habitat.

Attribute: Invertebrate assemblage

Target: Maintain or improve quality of invertebrate assemblage over 5 years.

FEATURE 11: PLANT ASSEMBLAGE

OBJECTIVE 2: OPEN WATER

Attribute: Aquatic macrophyte assemblage
Target: A2 – A5 communities present in 90% of dykes
 No reduction in diversity of in ditch and ditch edge flora compared to 2012 baseline.

Attribute: Negative indicator species
Target: No invasive non-native species present except now naturalised species (i.e. *Elodea canadensis*)
 Cover of filamentous algae less than 10%.

FEATURE 12: BREEDING & WINTERING BIRD, MAMMAL AND HERPTILE POPULATIONS

Attribute: Disturbance
Target: No increase in human disturbance.

Attribute: Water vole population
Target: Stable or increasing

Attribute: Otter use
Target: Stable or increasing

Objective Methods:

Ditches

Dyke maintenance will require a combination of regular cutting of vegetation and occasional mechanical operations.

Cut dyke edges on a 1 in 4 year rotation, between July and October, remove most overhanging trees. Cut material to be raked and stacked away from the dyke edge or burnt.

Commence re-profiling and slubbing rotation to maintain open conditions with a variety of successional stages. Many ditches will require use of floating reciprocating cutter/digger due to access limitations. Timing and location of maintenance determined by basic survey of ditch vegetation before work starts, using NE condition assessment tables to determine if maintenance is required. Due to lack of recent ditch maintenance, considerable restoration will take place in 2013/14 and 2014/15 of up to 500m, after this, Digger access is likely to be required approx. once in 8 years. Material to be spread on adjacent banks. Short lengths (up to 50m) should be slubbed/profiled rather than whole dyke lengths, slubbings will be used to top up existing banks rather than spread on fen habitat.

Water vole mitigation requires management in autumn or winter, after breeding has finished, with pre-cutting to discourage voles before re-profiling.

Dyke maintenance should be supplemented with a floating reciprocating cutter where resource allows, this will help to slow colonisation by reed and other emergents, but has best affect when done consistently over many years.

Water levels in the dykes will be maintained through keeping the sluice closed unless there are exceptional circumstances leading to agreement between NE, BC, and Mr Harris that operation of the sluice is necessary to avoid damage to site features.

Turf ponds require no management other than allowing them to terrestrialise, providing litter-rich late succession reedswamp on their edges, shallow open water, areas of hover and deeper

OBJECTIVE 2: OPEN WATER

open water. Some control of scrub on their fringes may be necessary but some areas of shaded pool are valuable for some specific invertebrates.

No new ponds are needed during this management plan period, but should be considered in the next period to maintain total open water area on site remains consistent in the longer term and to provide early open water habitats.

Any new invasive aquatic plants should be controlled as a highest priority and regular informal monitoring for non-natives should take place on site visits by staff.

Invertebrate and plant assemblage. Ensure ditch maintenance is carried out on a suitable rotation to ensure no significant long term damage to invertebrate populations. Rotational mowing of bank edged will improve ditch side plant communities.

Wintering waterfowl will be maintained by ensuring no increase in present levels of disturbance (low level public access along the pond, low level boat use for sedge harvest)

Water vole populations to be maintained by control of mink, using floating raft method, effective mitigation methods prior to mechanical maintenance of dykes and by retaining current ditch edge structure (variety of sloping and steep edges).

Otter use largely beyond management control except for dyke maintenance methods above. No increase in human disturbance.

Likely Significant Effect

These proposals are likely to have a significant effect on the internationally important nature conservation features of the site, but are directly connected with or necessary for their nature conservation management.

Monitoring Methods:

- Record by ground and aerial photography to monitor significant events and management operations and their effects.
- Annually map all habitat management using GPS and GIS, record in annual report.
- Record extreme events (droughts, storm surges etc) which may affect water quality.
- Record water quality through 8 twice annual water samples for Phosphate, Nitrate, Conductivity and pH.
- Record water level by taking readings from gauge boards and acquiring and analysing EA water level data. .
- Survey aquatic plant species 5-yearly following CSM methods. (Next due in 2017)
- Record water vole activity prior to mechanical ditch maintenance.
- Regularly update species records, encourage and participate in local/national surveys.

OBJECTIVE 3: WOODLAND

Achieve and maintain the mature Wet Woodland, scrub and woodland to fen transitions in favourable condition.

Features addressed by this objective:

13	Mature W2 / W4 wet woodland	16: Bird populations
14	W2 <i>Salix-Betula-Phragmites</i> scrub	17: Plant assemblage
15:	Invertebrate assemblage	

Attributes/targets for key features:

FEATURE 13: MATURE W2 / W4 wet woodland

Attribute: Extent

Target: At least current area maintained, no overall loss of mature woodland

FEATURE 14: YOUNG W2 *SALIX-BETULA* scrub

Attribute: Extent

Target: Remove 2.4Ha of recent scrub colonisation to restore open fen, areas targeted at less valuable scrub habitats.

FEATURES 14, 15, 16, 17

Attribute: Structural diversity

Target: Where resources allow, enhance through coppicing and / or long rotation scrub management. Increase number of permanent habitat piles

Attribute: Quality of invertebrate and plant communities

Target: At least maintained across the site, scrub removal targeted to improve populations by removal of least valuable scrub.

Objective Methods:

Mature woodland: Continue to manage by non-intervention, thereby maintaining high levels of biodiversity, especially associated with the deadwood community. Exceptions are:

Young woodland / scrub:

Scrub removal as mapped over 2 years, using chainsaw contractors with the majority of brash burnt, stumps cut low and treated with glyphosate, with ash removed where practical. Some piles of brash to be left as habitat piles and some scattered bushes to remain (c.5%) to provide structural diversity. A soft edge should be created with remaining scrub through a fringe of untreated coppice and avoiding hard edged/straight lines.

Scrub coppicing/long rotation management areas to be determined following the main scrub removal project, likely to involve opportunistic clearance of very small (<0.2Ha) areas of scrub followed by non-intervention to allow succession back to scrub over c.20 years. This management should be aimed at maintaining or increasing the amount of habitat suitable for the very important invertebrate communities on site.

Crested buckler fern and round leaved wintergreen

OBJECTIVE 3: WOODLAND

These species are often associated with scrub, where there are healthy colonies within scrub then intensive management must be avoided, these areas should be maintained through very low level and occasional removal of a small numbers of bushes.

Likely Significant Effect:

These proposals are likely to have a significant effect on the internationally important nature conservation features of the site, but are directly connected with or necessary for their nature conservation management.

Monitoring Methods:

- Record by ground and aerial photography to monitor significant events and management operations and their effects.
- Annually map all habitat management using GPS and GIS, record in annual report.
- Informal monitoring / searches for colonies of scarce species. i.e. round leaved wintergreen.
- Encourage survey for bats in woodland
- Carry out four visits territory mapping of red/amber breeding bird species
- Regularly update species records.

2.4.2 Landscape and Cultural Objectives

OBJECTIVE 4: LANDSCAPE, ECONOMICS and COMMUNITY	
Maintain the landscape quality, encourage local economic use and manage community involvement.	
Features addressed by this objective:	
18 Peat resource	20. Local economy
19. Landscape	21. Community involvement
Attributes/targets for key features:	
FEATURE 18: PEAT RESOURCE	
Attribute:	Extent of uncut peat
Target:	Avoid digging new turf ponds in areas not known to have been dug historically.
FEATURE 19: LANDSCAPE	
Attribute:	Quality of landscape
Target:	Maintain through delivery of management plan
FEATURE 20: LOCAL ECONOMY	
Attribute:	Marsh produce
Target:	Maintain commercial sedge cutting at current levels Seek to employ local contractors where possible
FEATURE 21: COMMUNITY INVOLVEMENT	
Attribute:	Volunteer involvement
Target:	Maintain / increase volunteer involvement
Objective Methods:	
<ul style="list-style-type: none"> • Continue the policy of reed and sedge harvesting by local cutters, though ecological objectives must take precedence where any conflict arises. • Increase the use of local volunteers to carry out management tasks, increase the number of weekend work parties and volunteer groups who work on the site. 	
Likely Significant Effect:	
These proposals will have no significant effect on the internationally important nature conservation features of the site.	
Monitoring Methods:	
<ul style="list-style-type: none"> • Record management, visitor and volunteer numbers. • Record area and number of bundles of commercial crops cut each year. 	

OBJECTIVE 5: EDUCATION, RESEARCH and DEMONSTRATION	
Encourage use of the site for education, research and demonstration, where compatible with the biodiversity interest and access constraints.	
Features addressed by this objective:	
22: Education	24: Demonstration
23: Research	25: Public access
Attributes/targets for key features:	
FEATURE 22: EDUCATION	
Attribute:	Guided visits
Target:	Maintain current open day and occasional additional small guided walks
FEATURE 23: RESEARCH	
Attribute:	Availability
Target:	Promote and allow use of the site for relevant research where no ecological conflict
Attribute:	Output
Target:	Increase output of published or reported research / survey work on site
FEATURE 24: DEMONSTRATION	
Attribute:	Guided visits to demonstrate management
Target:	Occasional demonstration events (up to 3 per man plan cycle)
FEATURE 25: PUBLIC ACCESS	
Attribute:	Guided walk for members of the public
Target:	Maintain current level (1 guided walk per year)
Due to the lack of permanent local staff members, access difficulties and lack of any visitor infrastructure, there are considerable limitations for Education Research and Demonstration. Therefore the objectives are modest.	
<ul style="list-style-type: none"> • Education: Occasional open days for BC members and other interested parties will allow engagement with small groups to explain the conservation and management of Catfield Fen. • Research work should be promoted to relevant organisations and universities (i.e. Broads Authority, Queen Mary University) with opportunities for worthwhile research taken. • Demonstration of wetland management techniques, such as fen orchid management should be carried out occasionally, but not as a high priority. These could involve internal and external land managers, trainees and students. 	
Likely Significant Effect:	

OBJECTIVE 5: EDUCATION, RESEARCH and DEMONSTRATION
These proposals will have no significant effect on the internationally important nature conservation features of the site.
Monitoring Methods:
<ul style="list-style-type: none">• Record guided visits and research.

3.2 Project Register

A complete list of projects for this management plan

Project Code	Project Title	Project Description
AF00	Finance general	As necessary
Al++	Inspections and audits	As necessary
AL++	Legal / land agency matters	As necessary
AP++	General planning	As necessary
AT++	Train and manage volunteers	As necessary
ME00	Maintain structures	As necessary
ME06	Provide / maintain signage	As necessary
ME20	Comply with legal obligations	As necessary
ME40	Maintain parking area and track	As necessary
MH00	Coppicing	Scrub coppicing / long rotation management areas to be determined following the main scrub removal project, likely to involve opportunistic clearance of small (<0.2Ha) areas of scrub followed by non-intervention to allow succession back to scrub over c.20 years. This management should be aimed at maintaining or increasing the amount of habitat suitable for the very important invertebrate communities on site, but is a lower priority than maintenance of fen and should only be done where resource allows.
MH07	2.4Ha Scrub removal	2.4Ha Scrub removal 2013/13 and 2014/15, using chainsaws with the majority of brash burnt, stumps cut low and treated with glyphosate, with ash removed where practical. Some piles of brash to be left as habitat piles and some scattered bushes to remain (c.5%) to provide structural diversity. A soft edge should be created with remaining scrub through a fringe of untreated coppice and avoiding hard edged / straight lines.
MH09	Non intervention of woodland	Continue to manage by non-intervention, thereby maintaining high levels of biodiversity, especially associated with the deadwood community.
MH2+	Control of non native species	Any new invasive aquatic plants should be controlled as a highest priority and regular informal monitoring for non-natives should take place on site visits by staff

MH50	Water control	The default water management policy for this plan is to leave the sluice closed throughout and for habitat management (including commercial sedge and reed) to work around water levels, taking advantage of lower levels. Monitoring of the site water quality, levels and vegetation will continue to allow long term trends to be identified and appropriate measures taken if SSSI features are negatively affected by this lack of water control. In exceptional circumstances BC reserves the right to apply for consent to open the sluice, but it is understood that agreement must be made with the adjoining land owner at Catfield Fen. These exceptional circumstances may include – drying and acidification of the fen due to lack of replenishment of river water or a run of wet summers leading to a lack of important habitat management.
MH52	Scrub roqueing	Ongoing scrub 'roqueing' to maintain a 5-10% level of scattered scrub across open fen area. Stumps and regrowth, where excessive, to be treated with glyphosate. Arisings will be minimal and may generally be cut up and left to decay in small piles, in thicker areas of scrub, brush may need to be burnt on high points with ash removed where possible. This management will aim to maintain higher level of scrub (15 – 20% cover) within the HC15 areas (see HLS map) and lower levels (5-10%) on the HQ6 areas (see HLS map)
MH52	Reedswamp scrub	Non intervention of reedswamp except for occasional scrub removal to maintain <5% cover, stumps cut low, treated with glyphosate, material removed and piled in nearby fen / scrub.
MH53	Bank cutting	Cut banks and other access points at least twice per year, ideally 3 times to maintain usable access. Pile cuttings to the side of the bank. In time, the vegetation will become short enough to cut and allow natural wastage. Widen banks in late summer by cutting a further 1m on either side and piling or burning litter.
MH53	Hubbard's marsh long rotation summer fen cut	Carry out non commercial fen cutting in Hubbard's marsh in late summer (0.9Ha) to retard succession of fen, improve structural diversity and improve plant communities, exact rotation length will depend on response of vegetation. Cut with brushcutters, burn in piles or rows on the fen, some can be piled.
MH53	Meadow marsh short rotation summer fen cut	Carry out non commercial fen cutting in Hubbard's marsh in summer (0.4Ha) to retard succession of fen and enhance flowering plant community. Cut with brushcutters, pile all cut material in big piles within plot.
MH53	Informal fen cutting	Elsewhere, cut fen in small areas on an opportunistic basis or to gain access to areas of scrub removal with litter piled. This management seeks to maintain and enhance existing fen condition for invertebrate and bird populations. Most material to be piled, some can be burnt where piles may block access.

MH53	Commercial sedge cutting	Maintain commercial cutting on 3-year rotation, no increase to area cut. Cutting can commence during breeding season where no risk of disturbance to breeding birds can be demonstrated. Water levels will not be changed to facilitate sedge cutting unless exceptional circumstances lead to agreement between BC, NE and Catfield Hall. Sedge bundles to be removed from site, additional litter to be burnt on fen or piled off the bed.
MH53	Targeted restoration of scarce communities	Small scale scrub removal to prevent loss of areas of M5, S24 with Sphagnum and S24 with Molinia. Allow current level of trampling/peat disturbance caused by footfall/machinery use associated with habitat management (For Fen pondweed).
MH53	Mill marsh short rotations	Carry out March cutting and burning / removal on 1, 2 and 4 year rotations on 1.3Ha in Mill marsh west. Amount per year varies.
MH59	Non intervention of fen	Leave areas of fen unmanaged to allow development of dense, rank sward good for certain invertebrates and birds, these areas will typically be small areas within larger blocks of managed fen and / or on fen / scrub edges.
MH64	Re-profile and slub ditches	Commence re-profiling and slubbing rotation to maintain open conditions with a variety of successional stages. Many ditches will require use of floating reciprocating cutter/digger due to access limitations. Timing and location of maintenance determined by basic survey of ditch vegetation before work starts, using NE condition assessment tables to determine if maintenance is required. Due to lack of recent ditch maintenance, considerable restoration will take place in 2013/14 and 2014/15 of up to 500m, after this, Digger access is likely to be required approx. once in 8 years. Material to be spread on adjacent banks. Short lengths (up to 50m) should be slubbed/profiled rather than whole dyke lengths, and only one side at a time, slubbings will be used to top up existing banks rather than spread on fen habitat.
MH64	Clearance of in ditch vegetation	Dyke maintenance should be supplemented with a floating reciprocating cutter where resource allows, this will help to slow colonisation by reed and other emergents, but has best affect when done consistently over many years.
MH65	Cut dyke edges	Cut dyke edges on a 1 in 4 year rotation, between July and October, remove most overhanging trees. Cut material to be raked and stacked away from the dyke edge or burnt
MH69	Non intervention of turf ponds	Require no management other than allowing them to terrestrialise, providing litter rich late succession reedswamp on their edges, shallow open water, areas of hover and deeper open water. Some control of scrub on their fringes may be necessary but some areas of shaded pool are valuable for some specific invertebrates.
MI20	Research / demonstration / education	Allow site to be used for third party research projects ensuring no disturbance to breeding birds or damage to habitats.
MI60	Open days / guided walks	Carry out one open day per year for BC members and more as required, ensuring no disturbance to breeding birds or damage to habitats.

MM++	Provide and service machinery	As necessary
MS10	Bracken cutting	Aim to eradicate bracken in the longer term, cut all bracken on all banks at least twice per year, aiming to cut in early summer (May/ June) and again in late summer (August / September) though additional cuts where resources allow will help. Either burn cuttings or pile to the side of the bank
MS30	Fox control	Where necessary to protect breeding bird populations, fox control should be implemented using a local fully qualified contractor.
MS30	Mink control	Mink rafts should be deployed and monitored from August to March with live traps deployed when signs of mink are found. Mink to be despatched on site using air rifle
RA 1	Wintering birds	Record key wintering bird species.
RA02	Water vole survey	Before major ditch maintenance works, a full water vole survey should be carried out.
RA02	Bat survey	Encourage survey for bats in woodland
RA12	Breeding birds	Record breeding success of bittern, marsh harrier and other notable species. Carry out four visit territory mapping of red/amber breeding bird species
RA40	Moth trapping	Carry out occasional moth trapping to confirm continued presence of key species.
RA44	Butterfly transect	Record butterfly numbers by UK Butterfly Monitoring Scheme transect on the rond
RA70	Other surveys	Commission surveys of under-recorded taxa
RF02	Aquatic plant survey	Once every 5 years a full ditch survey should be carried out to NE CMS methods (Next due 2017).
RF02	Fen orchid monitoring	Initiate regular fen orchid monitoring programme, to compare effects of habitat management on species and plant community.
RF04	Vegetation quadrats	Monitor 27 permanent vegetation quadrats once every 5 years, analysis to compare results with different habitat management techniques.
RF04	Sphagnum transect	Commence annual sphagnum moss transects to identify change in sphagnum distribution
RH00	Record visitor numbers	Record visitor numbers
RH8+	Annual mapping of habitat management	Annually map all habitat management using GPS and GIS, record in annual report.
RH9+	Record number of bundles harvested	Record number of bundles of sedge and reed harvested from each bed annually.
RP13	Record water levels	Water level data kept by EA should be retrieved regularly and visual water levels taken occasionally as necessary.
RP13	Water quality sampling	8 water quality samples will be surveyed twice per year where resource allowed. Parameters to be measured: Total oxidised Nitrate, Total Phosphate, Conductivity, Iron and pH.
RV0+	Update records	Store records in excel database or on Mapmate system, send records to relevant county recorders annually.
RV20	Aerial photos	As necessary to record management and monitor habitats.