Fen and Marsh Habitat Action Plan

1. Introduction

Fen and marsh vegetation is groundwater-fed permanently, seasonally or periodically waterlogged peat, peaty or mineral soils where grasses do not predominate. It also includes emergent vegetation or frequently inundated vegetation occurring over peat or mineral soils. It does not include areas of carr that are greater than 0.25 ha nor wet grassland (with the exception of purple moor grass, reed, or sweet-grass dominated vegetation). Lowland wet grassland has its own Action Plan within this BAP

The following relevant habitats were listed as UK BAP priority habitats and subsequently in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006: Lowland fens; Coastal and floodplain grazing marsh; Purple moor grass and rush pastures.

The UK is thought to host a large proportion of the fen surviving in the EU. As in other parts of Europe, fen vegetation has declined dramatically in the past century. Peatland habitats have been identified as major contributors to carbon storage and their degradation leads to the release of thousands of tonnes of CO_2 into the atmosphere every year.

Within the county fen and marsh, as with other wetland habitats, have undergone a serious decline in extent and quality. Sites are fragmented, generally small in size and under threat from a range of factors (see below). They were once common throughout the county and would have been found on low-lying river floodplains in conjunction with wet grasslands. These habitats still support some of Worcestershire's rarest species in sedge or tall herb dominated mire and swamp communities.

2. Current Status

2.1 Description of Habitat

Fens are peatlands that receive water and nutrients from the soil, rock and ground water as well as from rainfall: they are minerotrophic. Two types of fen can broadly be distinguished: topogenous and soligenous. Topogenous fens are those where water movements in the peat or soil are generally vertical. They include basin fens and floodplain fen. Soligenous fens, where water movements are predominantly lateral, include mires associated with springs, rills and flushes in the uplands, valley mires, springs and flushes in the lowlands, trackways and ladder fens in blanket bogs and laggs of raised bogs.

Fens can also be described as `poor-fens` or `rich-fens`. Poor-fens, where the water is derived from base-poor rock such as sandstones and granites occur mainly in the uplands, or are associated with lowland heaths. They are characterised by short vegetation with a high proportion of bog mosses *(Sphagnum* spp.) and acid water (pH of 5 or less). Rich-fens are fed by mineral-enriched calcareous waters (pH 5 or more) and are mainly confined to the lowlands and where there are localised occurrences of base-rich rocks such as limestone in the uplands. Fen habitats support a diversity of plant and animal

communities. Some can contain up to 550 species of higher plants, a third of our native plant species, up to and occasionally more than half the UK`s species of dragonflies, several thousand other insect species, as well as being an important habitat for a range of aquatic beetles.

Marsh is found on mineral soils and is defined as periodically inundated pasture or meadow with ditches, which help to maintain water levels, containing standing brackish or fresh water. The ditches are especially rich in plants and invertebrates. Mostly grazed, some are also cut for hay or silage. Sites may contain permanent ponds, seasonally wet hollows and areas of emergent swamp although not tall fen species like reeds. Areas of marsh are important for breeding waders especially lapwing *(Vanellus vanellus)*, curlew *(Numenius arquata)*, redshank (*Tringa totanus*) and snipe *(Gallinago gallinago)*. However, only a very small proportion of marsh is semi-natural and capable of supporting a high diversity of plant species.

Swamp and tall herb fen habitats are characterised by the fact that the water table is at or above the soil surface for most of the year. They tend to be botanically species-poor (e.g. reedbeds) relative to other wetland habitats.

Fen and marsh habitats are often found in association with other wetlands such as open water, ditches, lowland wet grassland and wet woodland.

A county wetlands survey in 1998 by Liley (1999) looked at the 88 most important wetlands in the county and described the fen, marsh and swamp National Vegetation Classification (NVC) communities occurring (table 1).

Table 1. Description of NVC communities containing fen, marsh and swamp vegetation within Worcestershire as surveyed by Liley (1999).

NVC Code	Community Description
S3	*Carex paniculata* sedge swamp (0.16ha) Dominated by tussocks of greater tussock sedge with open water or silt and a sparse flora between, sometimes with young willows or alders.
S5	*Glyceria maxima* swamp (2.09ha) Dominated by dense stands of reed sweet-grass, which may form large collapsed mats with little else other vegetation.
S6	*Carex riparia* swamp (4.79ha) A dense canopy of greater pond sedge up to 1 metre high, usually with a poor associated flora.
S7	*Carex acutiformis* swamp (7.13ha) Similar to S6, but dominated by the lesser pond sedge. Sometimes a sparse tall herb component.
S8	*Scirpus lacustris* swamp (0.16ha) This community, dominated by common bulrush, is more often found along rivers in Worcestershire but sometimes occurs around pools and very wet marshes.
S9	*Carex rostrata* swamp (0.3ha) Bladder sedge dominates this species poor swamp, which tends to occur in fairly shallow water in pools or in swamps.
	Carex vesicaria swamp (0.36ha)

S11	Although bottle sedge often dominates this community in shallow water there can be other species such as soft rush, sometimes in reasonable amounts.
S12	*Typha latifolia* swamp (4.18ha) Common reedmace is always dominant, frequently with no other species present.
S13	*Typha angustifolium* swamp (0.56ha) This is dominated by lesser reedmace, which prefers more basic water around pools with silty substrate.
S14	*Sparganium erectum* swamp (1.33ha) This typical sub-community is normally species poor with the branched bur-reed overwhelmingly dominant.
S18	*Carex otrubae* swamp (0.06ha) False fox sedge swamp normally forms narrow and usually fragmented stands between other communities.
S19	*Eleocharis palustris* swamp (0.27ha) Common spike rush forms narrow strips around pools, often in such small amounts to not be measurable.
S20	*Scirpus lacustris* ssp *tabernaemontanii* swamp (3.36ha) Glaucous clubrush is always dominant, sometimes with other species but often alone.
S22	*Glyceria fluitans* water margin (2.0ha) This is dominated by a low floating mat of floating sweet-grass, normally around the edges of pools. Sometimes other species are present in shallow water.
S23	Mixed water margin vegetation (0.49ha) This is a ditch/river/pond margin habitat, normally narrow and with a wide range of plants such as water forget-me-not, water mint, fools watercress and lesser water parsnip.
S28	*Phalaris arundinacea* tall herb fen (3.36ha) This is always a species poor community dominated by reed canary grass.
SM23	*Spergularia marina-Puccinella distans salt marsh* (0.26ha) Sea spurrey and salt marsh grass dominate a sparse turf where salt excludes most species
SM28	*Elymus repens* salt marsh (0.7ha) This community is dominated by dense stands of salt tolerant couch grass within which few other plants grow.
M22	*Juncus subnodulosus-Cirsium palustre* fen-meadow (8.42ha) Dominated by dense blunt flowered rush with other rushes and sedges. Marsh thistle often common. Mainly on base rich soils and peat.
M23	*Juncus effusus/acutifflorus-Galium palustre* rush-pasture (3.4ha) Either soft or sharp flowered rushes dominate often within a species rich sward, marsh bedstraw common.
M25	*Molinia caerulea-Potentilla erecta* mire (0.51ha) Purple moor grass dominates this habitat with other acid wet ground species such as cottongrass, tormentil and some rushes.
M27	*Filipendula ulmaria-Angelica sylvestris* mire (7.61ha) Meadowsweet is normally very dominant with angelica being one of a number of minor tall herbs. Usually on rich soils protected from

	grazing.
WE27	*Epilobium hirsutum* weed community (1.36ha) Greater willowherb dominates this tall herb community on damp ground normally along riverbanks and in areas of ungrazed marsh.
Unknown	Dominants *Scirpus sylvaticus-Carex pseudocyperus* (0.76ha) On several sites, areas of swamp dominated by wood clubrush and cyperus sedge occur.
Total area	53.62ha

2.2 Distribution and extent

The 1998 county wetlands survey indicated that remaining fen and marsh communities totalled 53.62 ha in area. Small sites such as riparian fen habitats along streams or ditches will not have been surveyed and so this figure was assumed to be an underestimate. The 2008 Worcestershire Habitat Inventory (WHI) gives a combined figure for fen, marsh and swamp habitat of 108 ha.

Historically, the largest wetland complex in Worcestershire was Longdon Marsh in the south west of the county and this would have supported large areas of fen, marsh and swamp. The marsh was drained in the late nineteenth century and little semi-natural habitat now remains, however Worcestershire Wildlife Trust is working to restore part of the historic marsh at Hill Court Farm.

2.3 Protection of the habitat

Legal protection can be granted through the designation of a Site of Special Scientific Interest (SSSI) under the Wildlife and Countryside Act 1981 (as amended). 18 sites are designated in Worcestershire at least in part for their fen, marsh and swamp interest. The largest of these sites are described in 2.4.

Lowland fen, coastal and floodplain grazing marsh and purple moor grass and rush pastures are listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Sites not meriting SSSI status can be listed as a Local Wildlife Site (LWS). Although not a statutory designation LWS status does confer some protection through the planning system.

2.4 Summary of important sites

Wilden Marsh and Meadows SSSI, Stourvale Marsh SSSI and Puxton Marshes SSSI are all located on alluvial soils in the floodplain of the River Stour:

- **Wilden Marsh and Meadows SSSI** lies alongside the River Stour and is the richest and most diverse wetland habitat in Worcestershire. It includes fen, damp meadow, marshy grassland, small alder and willow woods, reedbeds and a network of drainage ditches. There are many old willow pollards and several black poplars. The tall fen vegetation in the centre of the site is botanically rich with large colonies of lesser reedmace (*Typha angustifolia),* southern marsh-orchid (*Dactylorhiza praetermissa*), marsh cinquefoil (*Potentilla palustris*), marsh arrowgrass (*Triglochin palustre*), marsh pennywort (*Hydrocotyle vulgaris*) lesser waterparsnip *(Berula erecta)* and water dock *(Rumex hydrolapathum).*

- **Puxton Marshes SSSI** comprises a large area of unimproved marshy grassland with associated damp woodland and open water. The marsh is notable for the variety of its plants of which 110 species have been recorded. Most of the marshy grassland is dominated by tall fen with reed canary-grass (*Phalaris arundinacea)*, reed sweet-grass (*Glyceria maxima)*, common valerian (*Valeriana officinalis)*, great hairy willowherb (*Epilobium hirsutum)* and meadowsweet (*Filipendula ulmaria)*. Other less common species include marsh cinquefoil (*Potentilla palustris)*, skullcap (*Scutellaria galericulata)* and water dock (*Rumex hydrolapathum)* with seven species of sedge including panicled sedge (*Carex paniculata)*, cyperus sedge (*C. pseudocyperus)* and false fox-sedge (*C. otrubae)*.

- **Stourvale Marsh SSSI** is situated on the opposite bank of the River Stour from Puxton Marshes. It contains a number of wetland habitats including tall fen dominated by meadowsweet *(Filipendula ulmaria)* with abundant lesser pond-sedge *(Carex acutiformis)* and marsh horsetail *(Equisetum palustre).*

At **Upton Warren SSSI** near Droitwich the second most important inland saltmarsh in Britain has developed around a series of saline pools created through subsidence as a result of brine extraction. The site is significant for its ornithological interest but the designation also includes plants found here such as spotted and southern marsh orchids (*Dactylorhiza fuchsia)* and (*D. praetermissa)*, together with their hybrids. Apple-scented mint (*Mentha rotundifolia)* is also present. There are other scattered brine upwellings in the Droitwich area that are listed as LWS.

In the east of the county a series of fens occur notably **Ipsley Alders** and **Feckenham Wylde Moor SSSIs**. Both are examples of “rich” fens. Examples of acid marsh or fens are rare in the county but small tracts can be found at Castlemorton and Ashmoor Commons (both SSSI).

Grimley Brick Pits SSSI contains a wide range of wetland habitats, including willow and alder carr, sedge and reedmace swamp, open water, mixed tall fen vegetation and wet neutral grassland. They remain wet because of the seasonal flooding of the River Severn and impeded drainage. The resultant wetland plant community contains a number of species rare in the county including the golden dock (*Rumex maritimus)* and marsh cinquefoil (*Potentilla palustris)*. The site also has significant ornithological and invertebrate interest (in particular dragonflies).

Redstone Marsh is a LWS and Local Nature Reserve situated in the River Severn floodplain and managed by Wyre Forest District Council. The site mainly comprises marshy grassland and swampy woodland, with the marsh vegetation existing in ponded depressions of tall herb fen communities containing common valerian, slender tufted-sedge *(Carex acuta)*, skullcap and marsh speedwell *(Veronica scutellata)*.

At **Hartlebury Common SSSI** near Stourport-on-Severn is a 0.5 ha area of species-rich valley mire known as "The Bog", which is of significant ecological and archaeological interest. Most of the habitat is dominated with purple moor-grass (*Molinia caerulea)* but included within are a number of notable species including white sedge (*Carex canescens)*, cross–leaved heath (*Erica tetralix)*,

common cotton-grass (*Eriophorum angustifolium)*, marsh cinquefoil and sphagnum mosses. The diverse flora and small pools help to support rare fauna including several regionally scarce species of Lepidoptera and Odonata. Water levels in The Bog appear to have lowered over time and actions have been taken to increase these such as tree removal. Investigations have also been made into artificially maintaining water levels from bore hole fed pumps.

3. Current factors affecting the habitat

- Groundwater abstraction and/or field drainage lowering the water table so that many important fen and marsh sites are now drying out leading to changes in vegetation communities. This results in a loss of quality and extent of target habitat.

- Reduction in ground water levels has resulted in the oxidation and erosion of organic soils and the loss of dependent flora and fauna. Where organic soils are lost from wetland sites future restoration becomes difficult or even impossible.

- Difficulty in securing financially viable mechanisms for re-wetting sites that are suffering from desiccation.

- Geographical and ecological isolation of sites has increased as abstraction and drainage have been carried out. Genetic exchange between these sites is therefore decreasing and individual sites are becoming more vulnerable to environmental change.

- Engineering works for flood alleviation (including river channel re-sectioning and creation of flood defences) has reduced water supply to floodplain sites e.g Wilden Marsh SSSI. This results in a loss of quality and extent of target habitat.

- Water quality in many rivers has become increasingly eutrophic as a result of agricultural and urban pollution. Floodplain sites inundated with this water will become enriched with nutrients which in turn will result in changes to plant communities.

- A number of significant fen and marsh sites are impacted by the build-up of urban waste such as plastic litter that becomes trapped behind natural blockages due to the location of sites at low-lying areas of the floodplain immediately adjacent to the watercourse.

- Severe encroachment of alien species on some sites, for example Himalayan balsam (*Impatiens glandulifera)*, giant hogweed *(Heracleum mantegazzianum)* and Japanese knotweed *(Fallopia japonica)*.

- Climate change may affect rainfall patterns resulting in changes to the water supply to sites (total amount, seasonality etc).

- Inappropriate management of sites, in particular those within urban fringe areas. There may also be problems with anti-social behaviour (fly-tipping, arson etc).

- Housing and industrial development can lead to outright destruction of sites plus increased recreational pressure, additional abstraction from aquifers and further lowering of the water table.

- Limited funding available through agri-environment schemes to protect existing sites or to fund restoration/creation programmes.

- Poor economic incentive for landowners to manage fen and marsh habitats appropriately. More advice and resources are required to encourage activities such as local branding schemes to "add value" to these habitats and encourage sympathetic management.

- Inappropriate creation of other habitats within fen and marsh sites such as woodland planting.

4. Current Action

4.1 Local protection

There are 18 SSSIs in Worcestershire designated at least in part for their fen, marsh and swamp interest. Many more sites are listed as LWS.

4.2 Habitat management and programmes of action

- In 2001 Worcestershire Wildlife Trust purchased the 120 ha Hill Court Farm on the Longdon Marsh in south Worcestershire. Work to raise water levels and re-wet the site began in 2004 and the site is developing into a mixture of wet grassland, ditches and scrapes in the north and hay meadows with hedgerows and veteran trees in the south.

- Wilden Marsh SSSI is being restored to favourable condition by Worcestershire Wildlife Trust under an agri-environment agreement. The site had been drying out over a long period of time following historic flood defence works on the River Stour. Partnership working with the Environment Agency, begun in 2010, has restored the ditch system and the installation of water control structures has restored water levels to re-wet the site.

- Desiccation of wetland habitats is being tackled at Puxton Marshes and Stourvale Marsh by Wyre Forest District Council. Water levels had been severely impacted by over abstraction and the construction of a flood alleviation bund interrupting the natural hydrology. An old Victorian drainage system has been broken open and surface run-off is now collected from a nearby housing estate and diverted to the wetland. Willow scrub has been removed and trees pollarded. The site is grazed at a low intensity.

- Southern marsh orchid seed has been collected from plants at Puxton Marshes and are being grown on in a lab with a view to future introductions.

- Many of the county's most important fen and marsh sites are managed under agri-environment agreements.

4.3 Survey, research and monitoring

- Water levels have been monitored by dipwell on Puxton and Stourvale marshes for over a decade. Further detailed surveys are planned by Natural England to take place in 2018.

- Botanical and hydrological monitoring is being carried out at Wilden Marsh alongside the ongoing restoration work.

- Water levels are being monitored at Upton Warren as further subsidence and changes to the water table are resulting in a contraction of the area of salt marsh.

- Field trials of a new Himalayan balsam biological control agent (a rust fungus) are planned in Worcestershire on sites badly affected by this invasive species.

5. Associated plans

Reedbeds, Wet Grassland, Wet Woodland, Ponds and Lakes, Rivers and Streams, Canals, Otter, Water Vole, Great Crested Newt.

6. Conservation Aim

Existing habitat extent has been maintained and opportunities for the creation of new habitat have been taken, particularly through minerals site restoration schemes.

7. Conservation Objectives

- Prioritise the restoration of habitat north of Puxton and Stourvale Marshes along the River Stour, aiming to achieve connectivity with the remnants of Wolverley Marsh

- Identification and resolution of point source pollution along the River Stour

- Undergrounding of power lines where these cross high value sites

- Use of Green Infrastructure approach to planning to deliver creation and / or restoration of fen and marsh habitat as 'stepping stones' through urban areas in particular between Wilden Marsh and Puxton and Stourvale Marshes

- Look for opportunities to create areas of fen as part of oxbow restoration through the Carrant Catchment Area Restoration Project

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Fens for the Future Partnership https://www.fensforthefuture.org.uk/the-partnership/