Northern Ireland Priority Habitat Guide: Fens

What are Fens?

Fens are peatlands that receive the majority of their water and nutrients from soil, rock and ground water. They occur in river valleys, poorly drained basins or inter-drumlin hollows, along lake margins or on river flood-plains. Fens include a wide range of wetland vegetation types depending on the process of formation, existing and historical land use and the nature of underlying rocks and substrates. Sites are classified as either '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. Rich Fens are fed by mineral-enriched calcareous waters and are mainly confined to the lowlands and where there are localised occurrences of base-rich rocks such as limestone in the uplands.

Table 1: Linking Habitat types with Annex 1 features, ASSI features and NI Priority Species

Northern Ireland Priority Habitat type: Fens		
Habitat Directive Annex 1 habitats (SAC feature)	**ASSI features**	**NI priority species**
H7140 Transition mires and quaking bogs, H7220 Petrifying springs with tufa formation (*Cratoneurion*), H7230 Alkaline Fens, H7150 Depressions on peat substrates of the *Rhynchosporion*	Lowland fen (tall herb / short, medium) Upland flushes, fens and swamps	European Fog, Smooth Newt, Reed Bunting, Breeding waders, Shoveler, Marsh Fritillary Butterfly, Reed Beetle, Greater Water-parsnip, Curlew, Redshank, Lapwing, Grasshopper Warbler, Irish Hare, Irish Lady's-tresses

Definition

Fens encompass a wide range of plant communities included in traditional Fen vegetation as described above and listed in Appendix 1. It includes, taller more species poor Fen and associated wet marshy grassland vegetation often dominated by Meadowsweet *Filipendula ulmaria*, tall grasses and rushes and associated with peatlands subject to past drainage schemes and excessive nutrient enrichment.

This definition of Fens excludes areas dominated by Wet woodland. It also excludes areas of monodominant Common Reed *Phragmites australis* (Reedbed) and tall species-poor swamp vegetation (Swamp) which is often found in very wet conditions. These are both included in the Reedbed habitat.

Fen in Northern Ireland is defined as being:

Wetland habitat that receives water and nutrients from surface and/or groundwater as well as from rainfall, most water is received via rock and soil which contain dissolved minerals creating growing conditions that allow more lush vegetation than bog sites.

Vegetation consists of a mixture of sedges, mosses, rushes and flowering plants, exact composition depends on Fen type and mineral content.

- Rich Fen species have great variety across many sites dominated by Bog Pimpernel *Anagallis tenella*, Meadow Thistle *Cirsium dissectum*, Saw Sedge *Cladium mariscus*, Marsh Helleborine *Epipactis palustris*, Blunt-flowered Rush *Juncus subnodulosus*, Grass-of-parnassus *Parnassia palustris*, Common Butterwort *Pinguicula vulgaris*, Black Bog-rush *Schoenus nigricans*, and Bladderworts *Utricularia spp.*

- Poor Fen species incorporate a mosaic of *Sphagnum spp*., Purple Moor-grass *Molinia caerulea*, Bottle Sedge *Carex rostrata* and the smaller sedges, such as Star Sedge *C. echinata* and Common Sedge *C. nigra*.

- Include a suite of characteristic plant species, which vary according to the habitat type, e.g. species associated with *Molinia*-rich pastures often include Devil's-bit Scabious *Succisa pratensis*, Meadow Thistle *Cirsium dissectum* and Tormentil *Potentilla erecta*, whilst rush-dominated sites may include Marsh-bedstraw *Galium palustre* and Wild Angelica *Angelica sylvestris*.

- Have less than 25% cover of scrub or dwarf shrub.

The priority habitat should not be confused with species-poor, rush-dominated flushes and semi-improved pastures where Soft Rush *Juncus effusus* is often the most abundant rush. The National Vegetation Classification (NVC) codes are useful in determining which habitat types fall within Fen habitat. NVC codes are provided in Appendix 2.

Upland Flushes, Fens and Swamps

Upland Fens are included within the Upland Flushes, Fens, and Swamps priority habitat definition. Upland Fens can be managed extensively within the upland landscape.

The small size of many sites, sitting within a mosaic of other habitats, means that minimising adverse impacts from the management of adjacent habitats will often be the most important adaptation response.

Where Upland Flushes form part of the open moorland habitat, they should be grazed appropriately in conjunction with surrounding habitats to keep the vegetation cover open.

Where are they found?

It is considered that Northern Ireland holds a significant proportion of the UK Fen resource in terms of extent and habitat diversity and quality. Fen surveys have shown that many rich Fens are associated with Lakes or Lowland raised bogs that occur in inter-drumlin hollows. Rich Fens are very restricted, occurring mostly in south-east County Fermanagh and Lecale (County Down). Poor Fens and transition mires are rather more widespread. However the majority of Fen vegetation is tall Fen or swamp with inter-mixed wet grassland or swampy wood.

No comprehensive survey has been carried out in Northern Ireland to correctly quantify Fen coverage, however, the NICS 2000 suggests a decrease of 18% (484 ha) Lowland Fen land cover type between 1988 and 1998.

DAERA hold priority habitat and species data on the NIEA Natural Environment Map Viewer. See https://appsd.daera-ni.gov.uk/nedmapviewer/ (and link to video tutorial). Note that the Map Viewer indicates areas which hold NIEA records of habitat / species data, but does not infer the complete coverage of these environmental assets in Northern Ireland.

Why are they important to wildlife?

Fens are highly diverse habitats which support a very wide range of plant and animal species; these include breeding birds where there is taller vegetation such as Reed Bunting, Breeding waders in open areas and in open water species such as Shoveler. Fens are particularly important for invertebrates; these include dragonflies such as the Irish Damselfly, beetles such as the Whirligig Beetle, Water beetles, Carabid beetles, pond skaters, and butterflies and moths such as the Marsh Fritillary Butterfly. A number of locally rare plant species are associated with Fens such as the Fen Bedstraw *Galium uliginosum*, Greater Water-parsnip *Sium latifolium*, Grass of Parnassus *Parnassia palustris*, Irish Lady's-tresses *Spiranthes romanzoffiana*, Marsh Helleborine *Epipactis palustris* and Marsh Pea *Lathyrus palustris*.

The variety and abundance of flowering plants within semi-natural habitats provide good sources of pollen and nectar for many of our pollinating insects such as bumblebees, hoverflies, butterflies and moths. For further information on habitat management for pollinators, refer to the All-Ireland Pollinator Plan resources: www.pollinators.ie.

Pressures & Threats

- Drainage –any changes in the water-table, particularly the lowering and stabilisation of water-tables, can affect the extent and quality of Fens. This can be the result of both direct drainage and indirectly by marginal drainage; changes in water-levels of lakes and water abstraction from aquifers can also have an effect.
- Agricultural practice – high grazing levels can result in excessive poaching, nutrient enrichment and eventual changes to Fens. Conversely on some Fens, lack of grazing or mowing can result in a loss of low growing plant communities and loss of Fen to Reedbed or woodland and an eventual drying of the site. Fens are sensitive to changes in grazing levels.
- Eutrophication – nutrient enrichment from intensively managed farmland or other sources has resulted in the widespread replacement of important fen plant communities and associated invertebrate species with more competitive species of lower conservation value.
- Land infill – agricultural land reclamation, waste disposal or development affects a large number of Fens. This directly results in the loss of extent and quality of Fen vegetation and can affect water-levels and water quality over a wide area.
- Peat-cutting – has affected the character of many important Fen sites. Although this has largely ceased, without appropriate management, the biodiversity associated with many sites will continue to deteriorate due to vegetation succession resulting in the loss of open water and more open fen habitats.
- Climate Change – The vegetation communities occurring in Fens are likely to be impacted from the prediction of higher temperature, increased rainfall and changed weather patterns.

Favourable Management of Fens

These important sites should be protected and maintained where they occur, and should be restored where their condition has declined. Some of our most important Fens are protected through National and International legislation. In the wider countryside, fens are protected from development and increased agricultural productivity through planning policies and legislation such as the Environmental Impact Assessment Regulations.

Land reclamation techniques such as use of fertilisers and drain cutting can result in habitat loss or damage and should be prevented.

Fen has a natural transitional process, from open water to mature woodland or bog. Conservation aims to stall this at a specified stage to maintain species composition. This can only be achieved by intervention in the form of management.

Active management will reduce the rate Fens are colonised by scrub and trees. Encroaching scrub can lead to the loss of this sensitive habitat. Annual (non- chemical) control of Routine Common Reed *Phragmites australis*, and invasive scrub is required. Trees should not be planted on this habitat type and nor should they be used for supplementary feeding or storage areas.

Fen is best managed by light, extensive grazing at a low stocking rate, with a 'no grazing' period. Undergrazing and/or overgrazing should be avoided. However, some very wet or floating fens which are inaccessible to stock should not be grazed.

Nutrient enrichment and drainage are both damaging to Fen. Application of lime, organic and inorganic fertilisers is damaging as is reduces species-richness and diversity with a loss of nature conservation value.

Increase in traditional management systems such as reed-cutting and the production of bog hay will assist many Fen sites being restored.

Additional objectives include the maintenance of mosaic habitat for birds and invertebrates, as well as for the plant communities.

Where Upland flushes form part of the open moorland habitat, they should be grazed appropriately in conjunction with surrounding habitats to keep the vegetation cover open.

How do we determine the "health" or condition of Fen?

The conservation status can be determined by the condition of the habitat. Favourable condition is defined by setting targets or target ranges for a series of different attributes. These are components or characteristics of the vegetation that are relatively easy to measure, but which are reliable indicators of the "health" of the habitat.

The main reasons for Fens not being in favourable condition are lack of management, under-grazing, water management, invasive species, and water quality. Surface or groundwater quality is of particular importance to fen type, calcium and pH levels will influence fen development and species diversity.

NIEA has developed Rapid Condition Assessments for several broad habitat types (grassland, moorland, woodland, coastal and wetlands). These will be made available online in the future. In the interim copies can be requested by contacting NIEA by E-mail: NIEA.EFSHigher@daera-ni.gov.uk.

Appendix 1: Fen Indicators

Positive Indicators:

Alisma-plantago aquatica	Water-plantain
Anagallis tenella	Bog Pimpernel
Angelica sylvestris	Wild Angelica
Caltha palustris	Marsh Marigold
small *Carex* sp.	small *Carex* sp.
medium *Carex* sp.	medium *Carex* sp.
bulky *Carex* sp.	bulky *Carex* sp.
Cicuta virosa	Cowbane
Crepis paludosa	Marsh Hawk's-beard
Dactylorhiza sp.	Marsh Orchid
Epilobium palustre	Marsh Willowherb
Equisetum fluviatile	Water Horsetail
Equisetum palustre	Marsh Horsetail
Eriophorum angustifolium	Common Cottongrass
Galium palustre	Common Marsh-bedstraw
Hydrocotyle vulgaris	Marsh Pennywort
Juncus articulatus	Jointed Rush
Lotus pedunculatus	Greater Bird's-foot-trefoil
Lysimachia nummularia	Creeping Jenny
Lysimachia vulgaris	Yellow Loosestrife
Lythrum salicaria	Purple-Loosestrife
Mentha aquatica	Water Mint
Menyanthes trifoliata	Bogbean
Parnassia palustris	Grass of Parnassus
Pedicularis palustris	Marsh Lousewort
Pinguicula vulgaris	Common Butterwort
Polytrichum commune	Common Haircap Moss
Potamogeton spp.	Pondweed
Potentilla erecta	Tormentil
Potentilla palustris	Marsh Cinquefoil
Ranunculus flammula	Lesser Spearwort
Sagina nodosa	Knotted Pearlwort
Selaginella selaginoides	Lesser Clubmoss
Silene flos-cuculi	Ragged Robin
Sphagnum sp	Peat Moss
Succisa pratensis	Devil's-bit Scabious
Triglochin palustre	Marsh Arrowgrass
Valeriana officinalis	Common Valerian
Veronica scutellata	Marsh Speedwell
Viola palustris	Marsh Violet

Guide to *Carex* sp. (sedges are difficult to identify when not flowering, and so it is more practical to assign to broad groups in the field)	
small *Carex* sp.	*Carex curta*
	Carex dioica
	Carex flacca
	Carex hostiana
	Carex nigra
	Carex panicea
	Carex pulicaris
	Carex viridula
medium *Carex* sp.	*Carex diandra*
	Carex disticha
bulky *Carex* sp.	*Carex rostrata*
	Carex vesicaria

Negative Indicators:

Agrostis stolonifera	Creeping Bent
Arrhenatherum elatius	False oat-grass
Brachypodium sylvaticum	False-brome
Deschampsia caespitosa	Tufted Hair-grass
Epilobium hirsutum	Great Willowherb
Glyceria fluitans	Flote-grass
Glyceria maxima	Reed Sweet-grass
Juncus acutiflorus	Sharp-flowered Rush
Juncus conglomeratus	Compact Rush
Juncus effusus	Soft Rush
Juncus inflexus	Hard Rush
Juncus subnodulosus	Blunt-flowered Rush
Lolium perenne	Perennial Rye-grass
Molinia caerulea	Purple Moor-grass
Phalaris arundinacea	Reed Canary-grass
Phragmites australis	Common Reed
Poa trivialis	Rough Meadow-grass
Sparganium erectum	Branched Bur-reed
Typha latifolia	Bulrush
Urtica dioica	Stinging Nettle

Appendix 2: National Vegetation Classification codes

Fens in Northern Ireland encompass a range of plant communities that broadly reflect a number of those communities described in the National Vegetation Classification (NVC) of Great Britain (Rodwell, 1991a) where descriptions and codes are given to associations of plants that are characteristic of particular environmental and management conditions.

In Northern Ireland, the main NVC communities which make Fens are species-rich variants of:

M4 - *Carex rostrata-Sphagnum recurvum* mire (poor fen, transition mire) (**Appendix 1: medium Fen**)

M5 - *Carex rostrata-Sphagnum squarrosum* mire (transition mire) (**Appendix 1: medium Fen**)

M6 - *Carex echinata-Sphagnum recurvum/auriculatum* mire (poor fen) (**Appendix 1: medium Fen**)

M9 - *Carex rostrata-Calliergon cuspidatum* mire (transition mire, rich fen) (**Appendix 1: medium Fen**)

M10 - *Carex dioica-Pinguicula vulgaris* mire (rich fen, rare in lowlands)-(**Appendix 1: short Fen**)

M13 - *Schoenus nigricans-Juncus subnodulous* mire (rich fen, rare)-(**Appendix 1: short Fen**)

M22 - *Juncus subnodulosus-Cirsium palustre* (rich fen, local) (**Appendix 1: medium Fen**)

S27 - *Carex rostrata-Potentilla palustris* fen (transition mire) (**Appendix 1: medium Fen**)

S24 - *Phragmites australis –Peucedanum palustre* tall-herb fen (**Appendix 1: tall Fen**)

S25 - *Phragmites australis – Eupatorium cannabinum* tall herb fen (**Appendix 1: tall Fen**)

S26 - *Phragmites australis – Urtica dioica* tall herb fen (**Appendix 1: tall Fen**)

S28 - *Carex rostrata – Potentilla palustris* tall herb fen (**Appendix 1: tall Fen**)

M25 - *Molinia caerulea-Potentilla erecta* mire (**Appendix 1: tall Fen**)

M26 - *Molinia caerulea – Crepis paludosa* mire (**Appendix 1: tall Fen**)

M27 - *Filipendula ulmaria- Angelica sylvestris mire* (**Appendix 1: tall Fen**)

M28 - *Iris pseudacorus-Filipendula ulmaria* mire (**Appendix 1: tall Fen**)

The target vegetation height during the summer for short Fen communities is 5-15 cm, medium Fen is 30-75 cm and tall is Fen 50-150 cm.

Species-poor communities which may not meet the priority habitat quality, and which commonly exist as transitions to other habitats:

A wide range of other NVC types associated with other lowland priority habitats e.g. Reedbeds, Swamp, Purple moor-grass and rush pasture, and more species-poor communities often form transitions with Fens.