



Basin Mire

The majority of basin mires in Cumbria are found in lowland situations and they are often surrounded by intensive agriculture. They do not usually fit in with any type of modern land management system and, unless they are managed as nature reserves or are used for low intensity activities such as rough shooting, tend to exist as unmanaged islands.

Current status

Basin mires, or basin fens, form in water-logged hollows where there is little or no lateral flow of water (no stream outlet or gradient). As peat forms in the basin from dead plant remains the mire surface will gradually rise. While the surface vegetation remains accessible to groundwater the mire remains a basin fen; however, if the surface rises above the influence of groundwater, so that it is fed solely by rainwater, the mire develops into a raised mire (see *lowland raised mire* Action Plan). There is a great deal of variation in habitat both within and between sites due to topography and hydrology, nutrient status, management history and the dynamics of successional change.

Basin mires are a rare habitat type in the UK and NW England. Basin mires occur mainly in lowland areas, although a few examples occur in the uplands. Nationally important sites occur in the Eden Valley (e.g. Cliburn Moss, Moorthwaite Moss, Newton Reigny Moss), Solway Plain (e.g. Biglands Bog), Cumbria Fells and Dales and West Cumbria Coastal Plain Natural Areas. Although this habitat is

widely distributed, the number of sites is small. Basin mires fed by base-rich groundwaters are particularly uncommon and Cumbria contains several important examples of this type.

There are 4 National Nature Reserves containing basin mires in Cumbria. 14 Sites of Special Scientific Interest are notified for their basin mire. Basin mires are included within the *Alkaline fens; Molinia meadows on chalk and clay; transition mires and quaking bogs; depressions on peat substrates (Rhynchosporion); and calcareous fens with Cladium mariscus and Carex davalliana* types identified in Annex I of the EC Habitats Directive, the latter is a priority habitat. A number of sites supporting this habitat are owned or managed by conservation organisations.

Characteristic wildlife

Many basin mires exhibit a range of vegetation communities across their surface, with central zones which are largely oligotrophic, characterised by species such as *Sphagnum* bog mosses, common cotton grass, cross-leaved heath, cranberry, white

beaked-sedge, bog rosemary and bottle sedge. Around the margins of the mire more mesotrophic vegetation can be present, which may include species like greater tussock sedge, cyperus sedge, marsh cinquefoil, bog bean and marsh pennywort. The exact composition of this vegetation depends greatly on the mineral and nutrient status of the groundwater feeding the mire.

Where the water table is at or above ground level for most of the year, swamp vegetation may develop, usually dominated by a single species such as common reed, greater tussock sedge or, rarely, great fen sedge and, whilst other species are often present, they are rarely abundant. Willow carr can be a significant component of basin mire vegetation, particularly where there has been some drainage or peat cutting. Birch and Scots pine can also be a feature of drier parts of basin mires.

A number of birds breed on basin mires, including reed warbler, sedge warbler, reed bunting and snipe. The invertebrate fauna of these mires includes the white-faced darter, variable damselfly, large heath butterfly, raft spider and a number of water beetles.

Key species

The following rare or threatened species are associated with basin mires in Cumbria. Species were selected on the basis that they are UK BAP Priority Species (marked P) or species of County importance in Cumbria. Where species of County importance are *also* UK BAP Species of Conservation Concern, they are marked C.

reed bunting	<i>Emberiza schoeniclus</i>	P
redshank	<i>Tringa totanus</i>	C
great crested newt	<i>Triturus cristatus</i>	P
a reed beetle	<i>Donacia aquatica</i>	P
a water beetle	<i>Hydroporus rufifrons</i>	P
a longhorn beetle	<i>Oberea oculata</i>	P
medicinal leech	<i>Hirudo medicinalis</i>	P
a snail	<i>Vertigo geyeri</i>	P
marsh earwort	<i>Jamesoniella undulifolia</i>	P
Norfolk flapwort	<i>Leiocolea/Lophozia rutheana</i>	P
a moss	<i>Campyliadelphus elodes</i>	
a moss	<i>Calliergon giganteum</i>	
slender green	<i>Hamatocaulis vernicosus</i>	P
feather moss		
a moss	<i>Pseudobryum cinclidioides</i>	

Best management practice

Basin mires are largely self-sustaining systems, requiring little management provided that they have not been subjected to drainage or eutrophication of groundwater supplies. However, the process of natural succession will lead to the development of wet woodland over the mire and, while this is a habitat of nature conservation interest in its own right, in some circumstances scrub clearance may be appropriate to protect uncommon open mere vegetation types and species.

Current issues

Management of the catchment

- Management of the catchment can have profound effects. Enrichment of water entering the site, for example through intensive agricultural use (ploughing, fertilising etc.), will lead to the proliferation of fast-growing, competitive species (eg. nettles and coarse grasses) and development of eutrophic swamp at the expense of the specialist mire communities. Nutrients can be picked up by the peat or locked up in sediments and then slowly released, making the process very difficult to reverse. The hydrological catchment needs to be managed in a way that reduces these impacts, but this needs to be done with the agreement of surrounding landowners.
- Drainage of adjacent agricultural land can change the quantity of water flowing in or out of the mire.
- Drainage of the mire itself to reduce waterlogging or flooding of adjacent agricultural and forestry land.
- Excessive water abstraction could affect the quantity of water reaching the mire. This could also affect water quality by reducing the dilution of pollutants
- Other sources of pollution: agricultural, industrial or domestic effluents.

Natural succession/lack of management

- Scrub (particularly birch, willow and Scots pine) will develop, particularly on drier sites or parts of sites; this may lead to further drying of the mire by evapotranspiration and to the shading out of some elements of the mire vegetation. However, in some situations, these wet woodlands are of value in themselves, so careful thought needs to be given to site objectives before tree/scrub

clearance is carried out. On some sites the vegetation may be changing from fen to ombrotrophic mire. Again, careful thought needs to be given to site objectives before deciding whether or not these changes are desirable.

Other site management issues

- Basin mires generally fall outside agricultural management and so are often not included in agri-environment schemes. The result is that funding for rehabilitation management is often not available in this habitat.
- Afforestation: effects of trees, as above. Also likely to have associated drainage works.
- Basin mires are often divided into numerous strips, each with a different owner. This can cause problems in carrying out management of the site as a whole, particularly in relation to hydrological issues.
- Attempts at reclamation to agriculture: drainage, fertilizer/pesticide application, etc.
- Peat cutting may be damaging, especially if it has adverse impacts on hydrology. However, in very exceptional circumstances, small-scale peat cutting could be beneficial by keeping the vegetation in contact with minerotrophic waters.
- Rubbish dumping. These sites are often of little agricultural use so may become dumping sites for local use.
- Fire.
- Grazing - both overgrazing and undergrazing.
- The creation of pools, to attract waterfowl for example, can lead to the loss of, or changes in, mire vegetation.

Current action

- British and European policy and legislation on water resources/quality is continuing to develop. Relevant developments, which may have important implications for basin mires, include the current Abstraction Licencing Review and the future European Water Framework Directive.
- English Nature's Cumbria Basin Mire Enhancement Project aims to clarify the nature conservation objectives for basin mire SSSIs and implement the management necessary to achieve these objectives, possibly through lottery funding. English Nature would like to carry this forward in conjunction with this local Biodiversity Action Plan, working in partnership with other organizations as far as possible.

Context in relation to other plans:

UK Habitat Action Plans

There is a UK Biodiversity Action Plan for fen habitats, which include basin mires in *Biodiversity: the UK Steering Group Report* (1995), which sets the following UK objectives and targets:

- Identify priority fen sites in critical need of rehabilitation and initiate this by the year 2005. All rich fen and other sites with rare communities should be considered.
- Ensure appropriate water quality and water quantity for the continued existence of all SSSI fens by 2005.

National Lead Agency

English Nature

Local contacts

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Associated plans in the Cumbria BAP

The following Cumbria species/habitat action plans are of relevance to basin mire:

Phase I

- lowland raised mire
- wet woodland
- reedbed
- purple moor-grass and rush pasture
- great crested newt
- bats
- slender green feather-moss
- white-faced darter
- variable damselfly
- Geyer's whorl snail

Phase II

- swamps and tall herb-fen
- springs and flushes
- valley mires
- medicinal leech

Objectives, targets and proposed actions for Basin Mires in Cumbria

Broad Objective A		Identify present distribution of basin mire in Cumbria		
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
I Establish the distribution of all basin mires in Cumbria	1 Survey and map the distribution of all potentially restorable basin mires in Cumbria to establish total resource, as part of SSSI and Wildlife Sites programmes. By 2005.	CWT, EN	M	RM

Broad Objective B		Maintain current area of basin mire in Cumbria		
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
I Ensure that planning and legislative mechanisms protect existing basin mires	1 Review Local Environment Agency Plans (LEAPs) to ensure that they contain adequate policies to protect basin mire habitats and species. Where this is not the case, make amendments at next revision.	EA	O	PL
	2 Keep the extent of SSSI coverage under review and notify sites as necessary to fill gaps in coverage.	EN	O	SS
	3 Identify as Wildlife Sites the most important areas for wildlife in the County outside of statutory sites, including areas of basin mire. By 2005.	CWT	M	SS

Broad Objective C		Ensure the favourable condition of all SSSI sites		
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
I Review objectives for all Cumbrian basin mire sites	1 Identify priority plant communities and species (in Cumbrian context) to be conserved. Consider successional stages of these sites and overall balance of these across the county/natural areas. Consider long-term objectives for these sites.	EN	M	RM

Broad Objective C

Ensure the favourable condition of all SSSI sites

Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
	2 Consider the need to undertake invertebrate surveys where this is necessary for clarifying objectives.	EN	M	RM
2 Identify SSSIs which are not in favourable condition	1 Compare current site condition with the site objectives.	EN	S	RM
	2 Compare current site condition with historical records (where these exist) to attempt to identify changes taking place.	EN	M	RM
	3 Carry out basic hydrological observations/investigations where necessary to characterise problems.	EN, EA	M	RM
	4 Prioritise sites for action.	EN	M	SS
3 Initiate measures to achieve water quality appropriate for favourable condition (initiating rehabilitation on priority sites by the year 2005)	1 Where sites appear to be adversely affected by catchment management, agree workable strategy for each site to ensure that a catchment "buffer zone" is protected (eg. by including catchments in SSSI boundaries and/or management agreements, or by achieving appropriate management through Agri-Environment Schemes).	EN, MAFF, EA	M	SS
	2 Implement these strategies.	EN, MAFF	M	SS
	3 Maintain a list of Basin Mire SSSIs with apparent water quality problems, and identify and implement actions necessary to improve water quality on these sites.	EN, EA, MAFF	M	SS
4 Initiate measures to ensure that all basin mires have appropriate quantities of water to achieve favourable condition (initiating rehabilitation on priority sites by the year 2005)	1 Produce 'Abstraction Management Strategies' and review all abstraction licenses. Amend or revoke licenses as necessary to prevent damage to SSSIs. (As detailed in the Government's Abstraction Licensing Review and the legislation which is to follow).	EA	Timescale dependent on legislation	SS

Broad Objective C	Ensure the favourable condition of all SSSI sites			
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
	2 Carry out hydrological surveys where necessary to understand water budgets on sites. Also ascertain possible hydrological effects on adjacent land of any remedial works proposed on the mire. (EA contribution dependent upon Abstraction Management Strategies).	EN, EA	M	RM
	3 Prepare and implement Water Level Management Plans for the 3 basin mires on the agreed list.	EA, DCs, EN	M	SS
	4 Where appropriate, ensure that water levels are maintained by implementing programmes of ditch damming and sluice control. Address any associated problems or concerns on adjacent land.	EN, EA	M	SS
5 Initiate other management necessary to achieve favourable condition (Identifying priority sites in critical need of, and initiating rehabilitation by the year 2005)	1 Where appropriate, plan and implement scrub clearance.	EN	M	SS
	2 Consider reintroduction of small-scale peat cutting to maintain or restore minerotrophic conditions on some fen sites.	EN	M	SS
6 Monitor changes in the extent and quality of basin mires in Cumbria so that an assessment can be made of the effectiveness of conservation action	1 Monitor and report on the condition of basin mires in SSSIs every 5 years.	EN	O	RM
	2 Monitor water quality/water quantity where changes in vegetation indicate a need.	EN, EA	O	RM
7 Foster increased awareness and understanding of the importance of basin mires and their management needs	1 Complete Site Management Statements on all SSSIs with basin mires by end 2000. Review as necessary as vehicle for consultation with Owners and Occupiers and to summarise agreed management.	EN	S	SS
	2 Carry out appropriate consultation/negotiation with owners and occupiers of sites (and of any other adjacent land which might be affected) before planning any management works.	EN	M	SS

Broad Objective C		Ensure the favourable condition of all SSSI sites		
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
	3 Carry out appropriate consultations with interested members of the public (particularly where there is significant public access) before carrying out any major management works.	EN	M	CP/SS
	4 Provide information and advice, via key organisations, to all appropriate landowners/managers with land on or adjacent to basin mires on their importance and management, linked to agreed habitat management needs.	EN, EA, LAs	M	CP

Broad Objective D		Ensure the favourable condition of non-SSSI basin mires		
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
I Initiate rehabilitation management to achieve favourable condition status of priority non-SSSI basin mires. By 2005	1 Ensure basin mires are considered in the setting up of new agri-environment agreements and in any revision of existing agreements to ensure that, where possible, the habitat is brought into favourable management to contribute to national BAP and local Natural Area targets for the habitat.	MAFF, EN, CWT	M/L	SS
	2 Assess the effectiveness of agri-environment schemes and other funding mechanisms in addressing basin mire conservation.	EN	M	SS
	3 Provide advice to owners and occupiers of basin mire Wildlife Sites. By 2008.	CWT	L	SS/CP
	4 Develop a strategy for the restoration of priority non-SSSI basin mires. By 2005.	CWT, EN	M	SS

Broad Objective D	Ensure the favourable condition of non-SSSI basin mires			
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
2 Monitor changes in the extent and quality of basin mires in Cumbria so that an assessment can be made of the effectiveness of conservation action	1. Devise a strategy to monitor and report on the condition of non-SSSI basin mires. By 2005.	CWT	M	RM

Key to Tables

Suggested organisational involvement: Key Deliverers in bold type; Partners in plain type.

CWT = Cumbria Wildlife Trust; EA = Environment Agency; EN = English Nature; LAs = Local Authorities; MAFF = Ministry of Agriculture, Fisheries and Food.

Timescale: O=ongoing; S=short term (2000-2001); M=medium (2002-2005); L=long (2006-2010).

Type: Type of action; PL=Policy & Legislation; SS=Site Safeguard & Management; SP=Species Management and Protection (species plans only); A=Advisory; RM=Research & Monitoring; CP=Communications and Publicity.