European Site Conservation Objectives: Supplementary Advice on Conserving and Restoring Site Features

Manchester Mosses Special Area of Conservation (SAC)
Site code: UK0030200

Risley Moss/ P. Thomas©Natural England

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Manchester Mosses SAC. This advice should therefore be read together with the SAC Conservation Objectives.

You should use the Conservation Objectives, this Supplementary Advice and any case-specific advice given by Natural England, when developing, proposing or assessing an activity, plan or project that may affect this site. Any proposals or operations which may affect the site or its qualifying features should be designed so they do not adversely affect any of the attributes listed in the objectives and supplementary advice.

This supplementary advice to the Conservation Objectives describes in more detail the range of ecological attributes on which the qualifying features will depend and which are most likely to contribute to a site's overall integrity. It sets out minimum targets for each qualifying feature to achieve in order to meet the site's objectives.

The tables provided below bring together the findings of the best available scientific evidence relating to the site's qualifying features, which may be updated or supplemented in further publications from Natural England and other sources. The local evidence used in preparing this supplementary advice has been cited. The references to the national evidence used are available on request. Where evidence and references have not been indicated, Natural England has applied ecological knowledge and expert judgement. You may decide to use other additional sources of information.

In many cases, the attribute targets shown in the tables indicate whether the current objective is to 'maintain' or 'restore' the attribute. This is based on the best available information, including that gathered during monitoring of the feature's current condition. As new information on feature condition becomes available, this will be added so that the advice remains up to date.

The targets given for each attribute do not represent thresholds to assess the significance of any given impact in Habitats Regulations Assessments. You will need to assess this on a case-by-case basis using the most current information available.

Some, but not all, of these attributes can also be used for regular monitoring of the actual condition of the designated features. The attributes selected for monitoring the features, and the standards used to assess their condition, are listed in separate monitoring documents, which will be available from Natural England.

These tables do not give advice about SSSI features or other legally protected species which may also be present within the European Site.

If you have any comments or queries about this Supplementary Advice document please contact your local Natural England adviser or email HDIRConservationObjectivesNE@naturalengland.org.uk

About this site

European Site information

Name of European Site	Manchester Mosses Special Area of Conservation (SAC)
Location	Warrington; Wigan
Site maps	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	172.81 ha
Designation Changes	N/A
Feature Condition Status	Condition assessment information relating to this site can be found using Natural England's Designated Sites search tool.
Names of component Sites of Special Scientific Interest (SSSIs)	Astley and Bedford Mosses SSSI Holcroft Moss SSSI Risley Moss SSSI
Relationship with other European or International Site designations	N/A
Further information	Natura 2000 Standard Data Form for Manchester Mosses

Site background and geography

The Mersey floodplain was once covered by a complex of large lowland raised bogs covering over 3500 ha with peat up to 9m deep. While most of this bog has been converted to agriculture or lost to development, several examples have survived as degraded raised bog within the Mersey Valley National Character Area (NCA); the largest and best preserved examples at Risley Moss, Astley & Bedford Mosses and Holcroft Moss make up the component SSSI of the Manchester Mosses SAC.

Most of the Manchester mosses, with the exception of Holcroft Moss, have been directly impacted by peat cutting in the early 20th century. All the component sites have been impacted by drainage and hydrological effects from this peat cutting; as a consequence of this by the 1980s the vegetation of the mosses was largely dominated by purple moor grass *Molinia caerulea* with, bracken *Pteridium aquilinum* and birch *Betula* species.

Despite the historical removal of peat, the mosses have still remained elevated above the land around them with an average peat depth of 2.5m still remaining. Within flooded peat cuttings localised relic areas of wet bog survived providing a refuge for Sphagnum mosses and cotton grass. Today the mosses have been re-wet and vegetation more typical of unmodified bog is starting to develop over large areas of the sites. At Holcroft Moss about 8.6 ha has started to develop towards active bog, with a further 34.5 ha at Astley and Bedford Mosses and 30 ha at Risley Moss. There are still areas of Molinia dominated

mossland at Risley Moss 4.5 ha and at Astley and Bedford Mosses 31 ha that are still in the process of being re-wet and are restorable back to bog. The remaining areas along the edges of the mosses and on shallower peats support wet woodland and fen. This habitat is critical to the integrity of the bog as it supports the hydrology of the core areas of bog habitat.

About the qualifying features of the SAC

The following section gives you additional, site-specific information about this SAC's qualifying features. These are the natural habitats and/or species for which this SAC has been designated.

Qualifying habitats:

- **H7120 Degraded raised bogs still capable of natural regeneration**

Degraded raised bogs occur where there has been widespread disruption to the structure and function of the bog's peat body. This can involve changes to the hydrology, vegetation, and physical structure of the bog, leading to peat desiccation and oxidation and the loss of characteristic species or changes in the balance of the species composition. In contrast to the H7110 active raised bog habitat, peat is not currently forming in degraded bog. These examples are however considered capable of natural regeneration through repair and management.

This SAC supports an example of Degraded raised bogs still capable of natural regeneration. The deep acid peat still supports species typical of raised bogs, with a distinctive and specialised flora. This site is included as Natura 2000 sites to provide an example of the habitat type under restoration back to active bog.

This raised bog vegetation corresponds to the UK NVC types; M2 *Sphagnum cuspidatum/recurvum (fallax)* bog pool community, M3 *Eriophorum angustifolium* bog pool community, M20 *Eriophorum vaginatum* blanket and raised mire and M25 - *Molinia caerulea - Potentilla erecta* mire (Rodwell, 1991).

Floristically the re-wet mosses are developing a community typical of lowland raised bog with an abundance of common cotton grass *Eriophorum angustifolium,* hare's-tail cotton grass *Eriophorum vaginatum* and bog mosses such *Sphagnum fallax, Sphagnum cuspidatum and Sphagnum palustre* now established over large areas. The lawns of *Sphagnum* are providing habitat for sundew *Drosera rotundifolia,* cross leaved heath *Erica tetralix,* bog myrtle *Myrica gale,* cranberry *Vaccinium oxycoccus* and bog rosemary *Andromeda polifolia.* Also present at currently low levels within the areas of well-established bog are *Sphagnum palustre, Sphagnum magellanicum and Spahagnum capillifolium.*

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Qualifying Species:

Not applicable

References:

RODWELL, J.S. (ed.) 1991. *British Plant Communities. Volume 2. Mires and heath*. Cambridge University Press.

Table 1: Supplementary Advice for Qualifying Features: H7120 Degraded raised bogs still capable of natural regeneration

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	Avoid the further degradation of the extent of the H7120 feature, whilst restoring 172.81 of the H7120 feature to H7110 Active Raised Bog by 2035	'Degraded raised bogs' only includes examples which are 'capable of natural regeneration', i.e. "*where the hydrology can be repaired and where, with appropriate rehabilitiation management there is a reasonable expectation of re-establishing vegetation with peat-forming capability within 30 years*" (European Commission, 2013). There should be no measurable increase in the extent and area of this feature, and in most cases, the full extent of the feature should be restored to H7110 Active Raised Bog. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis. For this feature, 'Bog' is taken here to be the peat deposit together with typical bog vegetation, irrespective of the precise nature and condition of that vegetation. 'Lagg fen' comprises both peat deposit and vegetation, irrespective of nature and condition. Approximately 106ha of the site supports the SAC feature in a Degraded raised bogs still capable of natural regeneration. The remainder of the site comprises approximately 66.81 ha of W4 and W2 wet woodland on peat critical to the hydrological integrity of the bog. At Holcroft Moss about 8.6 ha has started to develop towards active bog, with a further 34.5 ha at Astley and Bedford Mosses and 30 ha at Risley	EUROPEAN COMMISSION, 2013. NATURAL ENGLAND, 2005, 2008, 2014. ENGLISH NATURE, 2005. NATURAL ENGLAND, 2010a. NATURAL ENGLAND, 2010b. NATURAL ENGLAND, 2008.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Moss. There are still areas of *Molinia*-dominated mossland at Risley Moss 4.5 ha and at Astley and Bedford Mosses 31 ha that are still in the process of being re-wet and are restorable back to bog.	
Structure and function (including its typical species)	Vegetation community composition	Restore the component vegetation communities of the H7210 feature to those resembling and characterised by the following National Vegetation Classification type(s) typical of H7110 Active Raised Bog; M2 *Sphagnum cuspidatum/fallax* bog pool community, M3 *Eriophorum angustifolium* bog pool community, M20 *Eriophorum vaginatum* raised and blanket mire and M25 *Molinia caerulea – Potentilla erecta* mire M18 *Erica tetralix – Sphagnum papillosum* raised & blanket mire	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Restoring degraded vegetation to characteristic and distinctive active bog vegetation types, and the range of types as appropriate, will be important to restoring the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations).	NATURAL ENGLAND, 2005, 2008, 2014. ENGLISH NATURE, 2005. NATURAL ENGLAND, 2010a. NATURAL ENGLAND, 2010b. NATURAL ENGLAND, 2008. This attribute will be periodically monitored as part of Natural England's site condition assessments.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		(note that this is the target community for this site and is not yet present, though some of the developing habitat is starting to show affinities to this community)		
Structure and function (including its typical species)	Structural diversity	Restore the full range of typical structural features associated with active bogs at this site, e.g. vegetation cover, surface patterning and hydrological zonations There should be reduction in extent of micro-topographic features (e.g. bog pools) and no obvious modification to structural features (e.g. vegetation cover, surface patterning and natural drainage), in relation to the established baseline.	Active raised bogs in particular show varying degrees of structural variation and surface patterning reflecting hydrological gradations (which may be natural or the result of previous damage). These can occur at both macro and micro scales across the habitat and include alternative aquatic and terrestrial surface features, such as pools and hummocks, and terrestrial features such as ridges and hollows. These features will support distinctive patterns of bog vegetation, and so will be sensitive to changes in topography and hydrology. These can be modified or disrupted by activities such as drainage, burning, grazing, vehicular access and peat digging.	
Structure and function (including its typical species)	Key structural, influential and distinctive species	Restore the abundance of the species listed below to enable each of them to be a viable component of the Annex 1 habitat; Assemblage of bog-mosses including *Sphagnum capillifolium*, *S. magellanicum*, *S. papillosum, S. tenellum, S. cuspidatum* , *S. pulchrum*	Some plant or animal species (or related groups of such species) make a particularly important contribution to the structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; – **Structural species** which form a key part of the habitat's structure or help to define an Annex I habitat on a site (see also the attribute for 'vegetation community composition'). – **Influential species** which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat). – **Site-distinctive species** which are considered to be a particularly	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Heather Calluna vulgaris, cross-leaved heath *Erica tetralix*, common cotton-grass *Eriophorum angustifolium*, Hare's-tail cotton-grass *E. vaginatum,* deer-grass *Trichophorum cespitosum* Bog rosemary *Andromeda polifolia*, sundew *Drosera rotundifolia,* crowberry *Empetrum nigrum*, bog asphodel *Narthecium ossifragum* and cranberry *Vaccinium oxycoccos*	special and distinguishing component of an Annex I habitat on a particular site. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available. For this feature, the vegetation of the mire expanse should comprise an inter-mix of typical bryophytes (predominantly *Sphagnum* species), grasses and dwarf shrubs, with no one group dominating at the expense of others on 'active' sites. Although *Sphagnum* may predominate on hyper-oceanic sites, purple moor-grass *Molinia* may be typical and abundant on the bog margin ('rand') of active sites and more widely on degraded sites.	
Structure and function (including its typical species)	Invasive, non-native and/or introduced species	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the H7210 feature	Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides).	This attribute will be periodically monitored as part of Natural England's
	Supporting off-site habitat	Restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support either the current H7210 feature or a H7110 active bog feature.	Include only where applicable. The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment. For this feature the protection and management of peripheral peat and the land	NATURAL ENGLAND, 2004, 2008, 2014 2007-2015 rewetting programme (held by Natural England) LEAH. M.D. et al. 1997. HALL et al. 1995.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			immediately around the peat body will be of critical functional importance to the restoration or maintenance of the hydrology of active bog and its management must also be compatible with long-term maintenance of the bog. Land adjacent to Bedford moss at Windy bank farm and next to Astley moss has been re-wet and supports the hydrology of the SAC. Risley moss supports wet woodland and relic bog that is directly hydrological linked to the SAC. Restoration/ re wetting works at Little Woolden Moss are critical to reducing the fragmentation of the SAC. This is part of the Manchester wetland partnership project.	Deeper borehole logs held by BGS http://mapapps.bgs.ac.uk/boreholescans_mobile/MobileBoreholeScans.html#/boreholescans_mobile/MobileBoreholeScans.html&ui-state=dialog LANCASHIRE WILDLIFE TRUST & NATURAL ENGLAND (2010)
Structure and function (including its typical species)	Hydrology	At a site, unit and/or catchment level restore natural hydrological processes to provide the conditions necessary to sustain the current H7210 feature and a H7110 active bog within the site.	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts.	LEAH. M.D. et al. 1997. HALL et al. 1995. Deeper borehole logs held by BGS http://mapapps.bgs.ac.uk/boreholescans_mobile/MobileBoreholeScans.html#/boreholescans_mobile/MobileBoreholeScans.html&ui-state=dialog This attribute will be periodically monitored as part of Natural England's site condition assessments.
Structure and function	Water chemistry	Restore the surface water and groundwater supporting the	This habitat type is predominantly rain-fed and should be naturally low in nutrients to sustain its characteristic bog communities and associated typical	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(including its typical species)		hydrology of the rain-fed bog at a low nutrient status.	species. Any sources of water which contributes to supporting the bog habitat, including the margins of the bog and the lagg (the peripheral zone around the bog), should similarly be lacking in nutrients.	
	Soils, substrate and nutrient cycling	Avoid further degradation of the peat substrate of the H7120 feature and restore its properties, including its structure, bulk density, total carbon, pH, soil nutrient status and fungal/bacterial ratio, to within typical values for H7110 Active Raised Bog habitat.	Changes to natural peat properties may affect the ecological structure, function and processes associated with this Annex I feature. The typical substrate for this feature is acidic and nutrient-poor peat. Peat is distinguished from other soil types by its high content of organic matter, which results from plant growth and waterlogging combining to reduce decomposition rates and allow a build-up, over time, of semi-decomposed plant material to form peat. Peat is naturally lacking in nutrients with typically low values of calcium, phosphate, nitrate and pH. The surface of a restored bog should be made up of two distinct layers; an acrotelm and a catotelm. The thin upper layer, or 'acrotelm', is typically up to 30cms deep, aerobic and consists of living and dead plant material. Below this is the 'catotelm', a much thicker layer of peat (up to 10 metres), which comprises an accumulation of partially decayed plant material in anaerobic and saturated conditions.. The surface acrotelm layer of degraded raised bogs affected by past drainage or burning may be replaced with a single layer of damaged catotelm ('haplotelm').	
Structure and function (including its typical species)	Adaptation and resilience	Restore the H7210 feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of natural habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability.	NATURAL ENGLAND, 2015. LANCASHIRE WILDLIFE TRUST AND NATURAL ENGLAND. Greater Manchester Wetland project and the Carbon Landscape project (information held by Lancashire Wildlife trust and Natural England)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being *moderate*, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that some adaptation action for specific issues may be required, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be required. The Greater Manchester Wetland project and the Carbon Landscape project aim to create a biological network to help link and buffer the SAC.	
Supporting processes (on which the feature relies)	Air quality	Restore as necessary the concentrations and deposition of air pollutants to below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	This habitat type is considered sensitive to changes in air quality, especially acidity and nitrogen. Critical values are currently being exceeded at this SAC (APIS, 2016). Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (APIS)
Supporting processes (on which the	Functional connectivity with wider	Restore the overall extent, quality and function of any supporting features within the local	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape	More information about restoration of the local mossland

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature relies)	landscape	landscape which provide a critical functional connection with the site.	features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis. Great Manchester Wetlands is undertaking study on ecological network and are using this data to target habitat restoration works across all of the Manchester Mosses and Wigan flashes wetland complex.	landscape and the development of an ecological network can be found at Great Manchester Wetlands (information held by Lancashire Wildlife Trust and Natural England (April 2016)
Supporting processes (on which the feature relies)	Conservation measures	Maintain the management measures within and outside the site boundary which are necessary to restore the structure, functions and supporting processes associated with the H7120 feature to H7110 Active Raised Bog	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site and to restore it to H7110 Active Raised Bog habitat. Usually, raised bog restoration measures will aim to elevate and stabilise the underlying water table and re-establish waterlogged conditions, so the bog can re-grow and regain its characteristic structural features (e.g. bog pools) and its typical plant assemblages Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and management agreements.	NATURAL ENGLAND, 2014. ENGLISH NATURE, 2005.
Version Control: not applicable				
Variations from national feature-framework of integrity-guidance: Not applicable				

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