



## **European Site Conservation Objectives: Supplementary advice on conserving and restoring site features**

### **Newham Fen Special Area of Conservation (SAC) (UK0012890)**



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## **About this document**

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Newham Fen SAC.

This advice should therefore be read together with the SAC Conservation Objectives available [here](#).

This supplementary advice to the Conservation Objectives describes in more detail the range of ecological attributes which are most likely to contribute to a site's overall integrity and the minimum targets each qualifying feature needs to achieve in order to meet the site's 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.

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 [HDIRConservationObjectives@naturalengland.org.uk](mailto:HDIRConservationObjectives@naturalengland.org.uk)**

## About this site

### European Site information

<b>Name of European Site</b>	Newham Fen Special Area of Conservation
<b>Location</b>	Northumberland
<b>Designation Date</b>	June 1995
<b>Qualifying Features</b>	See below
<b>Designation Area</b>	13.49 hectares
<b>Designation Changes</b>	Not applicable.
<b>Feature Condition Status</b>	Details of the feature condition assessments made at this site can be found using Natural England's <a href="#">Designated Sites System</a>
<b>Names of component Sites of Special Scientific Interest (SSSIs)</b>	Newham Fen SSSI (the two designations (SAC and SSSI) share the same boundary and compartments)
<b>Relationship with other European or International Site designations</b>	Not applicable

### Site background and geography

Covering a total area of 13.49 hectares and situated within the Northumberland Coastal Plain National Character Area (NCA), Newham Fen is a basin fen, developed from the natural hydroseral succession of a small lake which formed at the end of the last glacial period 10,000 years before present.

It is thought that the lake is the remnant of a much larger lake which was infilled over time by a raised mire (Embletons Bog) now largely drained for agriculture and bisected by the main east coast railway line. It occupies part of the western base of a well-defined esker, the Lough Bank, which forms part of the southern extension of the larger glacial deposit known as Bradford Kames, much of which is notified as a geological SSSI.

The peat body overlies Carboniferous limestone and is a product of the development of the late-glacial lake within the larger Embleton's Bog. Peat, mixed with bands of shelly marl, can extend to a depth of 5 metres over much of the site with some bands up to 9 metres deep to the west of the reserve boundary. These may overlie layers of 'gytta', calcareous muds of organic matter.

Fed by rainfall, groundwater and base-rich springs at the foot of the esker Newham Fen is actually an alkaline fen, being one of the best examples of calcareous mires in north-east England. The Willow-Birch-Reed woodland is also the best and most extensive known example of its type in this area. In addition there is the best invertebrate fauna of any fen in Northumberland.

The SAC forms part of Newham Bog National Nature Reserve (NNR).

## 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.

### Habitats:

- **H7230 Alkaline fens**

Alkaline fens generally consist of a complex assemblage of vegetation types characteristic of sites where there is tufa and/or peat formation with a high water table and a calcareous base-rich water supply.

The core vegetation is often characterised by low-growing sedge vegetation and well-marked transitions to a range of other fen vegetation. Alkaline fens may also occur with various types of swamp (such as species-poor stands of great fen-sedge *Cladium mariscus*), wet grasslands (particularly various types of purple moor-grass *Molinia caerulea* grassland) and areas rich in rush *Juncus* species, as well as fen carr and, especially in the uplands, wet heath and acid bogs.

Newham Fen is important as a lowland short sedge fen in north-east England, a part of the UK in which Alkaline fens are rare. The site is an example of basin fen, developed from the hydrosere succession of a small lake.

At this site the main fen community is predominantly the NVC type M13 *Schoenus nigricans* – *Juncus subnodulosus* mire (black bogrush and blunt-flowered rush) and M9 *Carex rostrata* – *Calliergon cuspidatum/giganteum* mire (bottle sedge, pointed spear-moss, giant spear-moss) which are elements of the alkaline fen biotope, and there are transitions to S25 *Phragmites australis* – *Eupatorium cannabinum* tall-herb fen, (reed, hemp-agrimony), MG1 *Arrhenatherum elatius* grassland (false oat grass) and W2 *Salix cinerea* – *Betula pubescens* – *Phragmites australis* woodland (grey willow, downy birch, reed).

A number of rare species occur at this site, including narrow-leaved marsh-orchid (*Dactylorhiza traunsteineri*), coralroot orchid (*Corallorhiza trifida*), dark-leaved willow (*Salix myrsinifolia*) and round-leaved wintergreen (*Pyrola rotundifolia*).

**Table 1: Supplementary Advice for Qualifying Features: H7230 Alkaline fens**

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	Maintain the total extent of the H7230 alkaline fen feature at not less than 1.4 hectares, comprising at least 0.7 ha of M13/M9 vegetation and 0.7 ha of transitional habitat to S25/W2 vegetation	<p>There should be no measurable net reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored.</p> <p>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.</p> <p>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.</p>	<p>Extent derived from data from CORDATA exercise by S. Hedley (English Nature), based on Phase 1 Habitat Survey 30.03.1995.</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">site condition assessments</a>.</p>
	Distribution of the feature	Maintain the current distribution and configuration of the H7230 alkaline fen feature, including its component vegetation types, across the site	<p>A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes.</p> <p>This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat.</p> <p>Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.</p>	National Vegetation Community map held by Natural England
Structure and	Vegetation	Ensure the component	This habitat feature will comprise a number of associated semi-natural	MCCUCHEON,D. &

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
function (including its typical species)	community composition	<p>vegetation communities of the H7230 alkaline fen feature are referable to and characterised by the following National Vegetation Classification type(s);</p> <p>M13 <i>Schoenus nigricans</i> – <i>Juncus subnodulosus</i> mire (black bogrush and blunt-flowered rush)</p> <p>M9 <i>Carex rostrata</i> – <i>Calliergon cuspidatum/giganteum</i> mire (bottle sedge, pointed spear-moss, giant spear-moss)</p> <p>S25 <i>Phragmites australis</i> – <i>Eupatorium cannabinum</i> tall-herb fen (common reed – hemp agrimony)</p>	<p>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.</p> <p>In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature</p>	<p>YOUNG, J. 2000; 2005; 2009.</p> <p>Newham Fen National Nature Reserve</p> <p>Quadrat Survey 2009</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">site condition assessments</a>.</p>
	Invasive, non-native and/or introduced species	Ensure invasive non-native species are either rare or absent components of the H7230 alkaline fen feature.	<p>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 (eg through the use of broad spectrum pesticides).</p> <p>The following invasive non-native species should be absent, or no more than rare if present:  <i>Crassula helmsii</i>, <i>Acorus calamus</i>, <i>Mimulus spp.</i>, <i>Impatiens glandulifera</i>, <i>Fallopia japonica</i>, <i>Heracleum mantegazzianum</i>.</p>	<p>NATURAL ENGLAND.</p> <p>Newham Bog NNR Management plan</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">site condition assessments</a>.</p>
	Presence/cover of woody species	<p>Maintain a low cover of woody species in the open alkaline fen area of not more than 10% scrub/tree cover.</p> <p>No woody species in flushes or springs; low <i>Salix sp</i> acceptable</p>	<p>Native trees and shrubs occur naturally on bog and fen surfaces but an abundance of scrub and trees on bogs and fens is sometimes regarded as detrimental because they are indicators and perpetrators of drying out and may cause damage to vegetation structure through shading effects. Birch, pine, willow and rhododendron (an invasive non-native species) are the main species of concern. The seeds of most invasive woody species are wind dispersed, so trees are able to establish on raised bog and fen</p>	

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
		more than 5m from edge of spring/flush feature.	surfaces.  Scrub and woodland has always been an integral component of the wider site. However invasion by woody species into the designated fen areas may indicate drying out, dereliction, disturbance and/or enrichment. The fen sites are currently kept open through active management. The scrub W2b was seen as an important component of this site, "The Willow-Birch-Reed woodland is also the best and most extensive known example of its type in this area."	
Structure and function (including its typical species)	Browsing and grazing by herbivores	Maintain an appropriate level of grazing within the site	The site is seasonally grazed by Exmoor ponies	
	Typical species: flora and fauna	<p>Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the H7230 Annex 1 habitat;</p> <p><i>Carex diandra</i> (Newham Fen is the only Northumberland location for this species), <i>Carex lasiocarpa</i>,  <i>Eriophorum angustifolium</i>,  <i>Lycopus europaeus</i>,  <i>Sium latifolium</i> (reintroduction),  <i>Stellaria palustris</i>, <i>Potamogeton polygonifolius</i>, <i>P. Coloratus</i>,  <i>Dactylorhiza traunsteineri</i>,  <i>Corallorhiza trifida</i>,  <i>Salix myrsinifolia</i> and  <i>Pyrola rotundifolia</i></p> <p>Assemblage of fenland invertebrates</p>	<p>"The term 'typical species' is used in the Habitats Directive. They are an important and integral component of the structure and function of an Annex I habitat type and should contribute to achieving its overall favourable status across its natural range. However not all such species may be present in every habitat example, and there may be natural fluctuations in their frequency and cover. Similarly, the relative contribution made by each 'typical species' to the overall ecological integrity of a site will vary, and Natural England will provide bespoke advice on this where necessary.</p> <p>Taking account of the principles given in current European Commission guidance, a 'typical species' is broadly described here as being any species (or community of species) which is particularly characteristic of, confined to and/or dependent upon the qualifying Annex I habitat feature at a particular site. This may include those species which;</p> <ul style="list-style-type: none"> <li>• are critical to the composition or structure of an Annex I habitat (e.g. those included as 'positive indicators' used to inform assessment of a habitat's condition and/or define the habitat (such as NVC community constant and preferential species [see also the targets for 'vegetation community composition'])</li> <li>• exert a critical positive influence on the Annex I habitat's structure or function (e.g. a bioturbator (mixer of soil/sediment), grazer, surface borer or predator)</li> <li>• are consistently associated with, and dependent upon, the Annex I habitat feature for specific ecological needs (e.g. feeding, sheltering),</li> </ul>	<p>NEWHAM FEN NNR Restoration Management Plan, 1998 English Nature</p> <p>This attribute is periodically monitored by Natural England to inform condition assessment</p>

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
			<p>completion of life cycle stages (e.g. egg-laying) and/or during certain seasons/times</p> <ul style="list-style-type: none"> <li>• are particularly distinctive or special of the Annex I habitat feature at a particular site</li> </ul> <p>The list of typical species given 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 or if our understanding of the term 'typical species' changes</p> <p style="text-align: center;">"</p>	
Structure and function (including its typical species)	Water chemistry	Maintain irrigating water supplying the H7230 alkaline fen feature with low fertility and is very rich in base ions (alkalinity > 130 mg l <sup>-1</sup> CaCO <sub>3</sub> )	<p>While the water chemistry data is inconclusive for identifying Newham Fen's groundwater source, it does suggest that both the Carboniferous strata and the sands and gravels associated with Lough Bank could provide water that would, chemically, support the alkaline fen communities.</p> <p>Bore hole-the water from the borehole has high EC levels (around 350µS), with moderately high levels of calcium and alkalinity and pH just below 8. Surface water EC levels from across the site are generally higher than the borehole, but vary both spatially and temporally with no apparent pattern. The pH of the surface water is generally lower, with a minimum of 6.</p>	<p>COOTER, S. 2001. Embleton's Bog-wetland restoration plan, English Nature;</p> <p>WHEELER, B.D. &amp; SHAW, S.C. 2005 Eco-hydrological observations on Barelees Pond, Campfield Bog and Newham Bog, Northumberland. Report for English Nature</p> <p>WETHERELL, A. 2013. Newham Fen NNR, Northumberland: Development of a Conceptual Model MSc Thesis (unpublished) Newcastle University</p>
	Hydrology	At a site, unit and/or catchment level (as necessary), maintain natural hydrological processes to provide the conditions necessary to sustain the H7230 alkaline fen feature within the site, including a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations).	<p>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.</p> <p>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.</p> <p>Wheeler et al. (2009) provide range and mean for summer &amp; winter water levels for those wetland NVC types constituting Annex 1 habitats. This provides a rough guide to appropriate levels, but it is critical that individual sites and their needs are considered as there is considerable variation within the NVC communities listed and recorded water levels.</p>	
Supporting processes (on	Air quality	Maintain or restore as necessary the concentrations and	This target has been included because this habitat type is considered sensitive to changes in air quality.	More information about site-relevant

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
which the feature relies)		deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for the H7230 feature of the site on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ).	<p>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.</p> <p>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 (NH<sub>3</sub>), oxides of nitrogen (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>), 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.</p> <p>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.</p>	Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ).
Structure and function (including its typical species)	Adaptation and resilience	Maintain the alkaline fen's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	<p>This recognises the increasing likelihood of natural habitat features to absorb or adapt to wider environmental changes.</p> <p>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 sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site.</p> <p>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.</p> <p>The history and details of drainage of the Embleton's Bog complex is not</p>	WHEELER, B.D. & SHAW, S.C. 2005. As above.

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
			very clear and may have been complicated. In essence, the fields between Newham Bog and the railway appear to have been once quite well drained, with evidence of an extensive tile-drain system (which no longer functions well).	
Structure and function (including its typical species)	Functional connectivity with the wider landscape	Maintain the Winlaw Burn (in terms of its present extent, quality and function as a watercourse) as a supporting feature within the local landscape which has a critical functional connection with the SAC	<p>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.</p> <p>These connections may take the form of landscape 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.</p> <p>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.</p> <p>Winlaw burn flows north-west to join to Waren Burn about 1 km north of Luker and this flows a short distance (c. 3.5 km) to the sea at Budle Bay. This burn is the main outflow from the wider Embleton's Bog and Newham Fen.</p>	WHEELER, B.D. & SHAW, S.C. 2005. As above.
Supporting processes (on which the feature relies)	Conservation measures	Maintain management or other measures (within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the H7230 alkaline fen feature.	<p>Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England.</p> <p>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/or management agreements.</p> <p>The Lough bank, which is thought to be the source of groundwater for the fen, is an esker composed of fluvial sands and gravels. This land is now</p>	<p>NNR Management Plan;</p> <p>Natural England's Views about the Management of the SSSI which underpin this SAC are available from <a href="http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm">http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm</a></p>

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
			managed under Agri-Environment options; HJ6 Preventing erosion or run-off from intensively managed improved grassland and HJ8 Nil fertiliser supplement options offered under Higher Level Stewardship. This is aimed at reducing nutrient input into the area of recharge for the fen that is thought likely to be the main groundwater source.	
<b>Version Control</b> Advice last updated: 19 May 2015  Previous version incorporated into new 2015 document templates; minor edits made.				
<b>Variations from national feature-framework of integrity-guidance:</b>  <i>Exposed substrate and Integrity of tufa features</i> are not found as features on this site and are not applicable.				

Document control information		
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Other notes	Comments also added by Andrew Craggs SRM Newham Bog National Nature Reserve.  This version supercedes previous advice dated 8 April 2014.	
Quality assurance information		
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