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

Broadland
Special Protection Area (SPA)
Site Code: UK9009253

Halvergate Marshes Natural England

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About this document

This document provides Natural England's supplementary advice for the European Site Conservation Objectives relating to Broadland SPA. This advice should therefore be read together with the SPA Conservation Objectives available here.

Where this site overlaps with other European Site(s), you should also refer to the separate European Site Conservation Objectives and Supplementary Advice (where available) provided for those sites. The Broadland SPA overlaps to a large extent with The Broads SAC.

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

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.

This Supplementary Advice to the Conservation Objectives presents attributes which are ecological characteristics of the designated species and habitats within a site. The listed attributes are considered to be those that best describe the site's ecological integrity and which, if safeguarded, will enable achievement of the Conservation Objectives. Each attribute has a target which is either quantified or qualitative depending on the available evidence. The target identifies as far as possible the desired state to be achieved for the attribute.

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	Broadland Special Protection Area (SPA)
Location	Norfolk and Suffolk
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	21 September 1994. Site extension classified June 1998.
Qualifying Features	See section below
Designation Area	5502.338 ha
Designation Changes	A site extension was classified in June 1998
Feature Condition Status	Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	*Alderfen Broad SSSI* *Ant Broads and Marshes SSSI* *Barnby Broad & Marshes SSSI* *Broad Fen, Dilham SSSI* *Bure Broads and Marshes SSSI* *Burgh Common and Muckfleet Marshes SSSI* *Calthorpe Broad SSSI* *Cantley Marshes SSSI* *Crostwick Marsh SSSI* *Decoy Carr, Acle SSSI* *Ducan's Marsh, Claxton SSSI* *Geldeston Meadows SSSI* *Hall Farm Fen, Hemsby SSSI* *Halvergate Marshes SSSI* *Hardley Flood SSSI* *Limpenhoe Meadows SSSI* *Ludham - Potter Heigham Marshes SSSI* *Poplar Farm Meadows, Langley SSSI* *Priory Meadows, Hickling SSSI* *Shallam Dyke Marshes, Thurne SSSI* *Smallburgh Fen SSSI* *Sprat's Water and Marshes, Carlton Colville SSSI* *Stanley and Alder Carrs, Aldeby SSSI* *Upper Thurne Broads and Marshes SSSI* *Upton Broad & Marshes SSSI* *Yare Broads and Marshes SSSI*
Relationship with other European or International Site designations	Broadland Ramsar - UK11010 and The Broads SAC overlie much of Broadland SPA.

Site background and geography

Broadland is a low-lying wetland complex straddling the boundaries between east Norfolk and northern Suffolk in eastern England. The Broads are a series of flooded medieval peat cuttings. They lie within the floodplains of five principal river systems, known as Broadland. The area includes the river valley systems of the Bure, Yare and Waveney and their major tributaries. The distinctive open landscape comprises a complex and interlinked mosaic of wetland habitats including open water, reedbeds, carr woodland, grazing marsh, tall herb fen, transition mire and fen meadow, forming one of the finest marshland complexes in the UK. The differing types of management of the vegetation for reed, sedge and marsh hay, coupled with variations in hydrology and substrate, support an extremely diverse range of plant communities. The area is of international importance for a variety of wintering and breeding raptors and waterbirds associated with extensive lowland marshes.

The estuary at the mouth of Broadland is Breydon Water SPA, and the two sites adjoin each other at Halvergate Marshes. Breeding and wintering raptors, and wintering waterbirds spend time on feeding areas outside the SPA boundary.

Broadland is situated within the Broads National Character Area (NCA) which is situated on the eastern edge of East Anglia and is located predominantly in the county of Norfolk together with a small part of north Suffolk, between the peripheral urban areas of Norwich in the west and Great Yarmouth and Lowestoft in the east. Further information on the Broads NCA can be found here.

About the qualifying features of the SPA

The following section gives you additional, site-specific information about this SPA's qualifying features. These are the individual species of wild birds listed on Annex I of the European Wild Birds Directive, and/or the individual regularly-occurring migratory species, and/or the assemblages (groups of different species occurring together) of wild birds for which the SPA was classified for.

- **Qualifying individual species listed in Annex I of the Wild Birds Directive (Article 4.1)**

During the **breeding season** the SPA regularly supports

- **A021 *Botaurus stellaris*; Great bittern (Breeding)**

The Great bittern is a bird of wetlands, typically associated with reedbed habitat. It flies on broad, rounded, bowed wings. A secretive bird, very difficult to see, as it moves silently through reeds at the water's edge, looking for fish. The males make a remarkable far-carrying, booming sound in spring. See table below for population data.

- **A081 *Circus aeruginosus*; Eurasian marsh harrier (Breeding)**

One of the largest of the harriers, the marsh harrier can be recognised by its long tail and light flight with wings held in a shallow 'V'. Within the Broadlands, marsh harriers are mainly found in areas of reed bed, nesting on the ground within this habitat. Breeding pairs carry out impressive displays of aerobatics, tumbling through the air with the male dropping food for the female to catch in mid-air. See table below for population data.

During the **non-breeding season** the SPA regularly supports

- **A037 *Cygnus columbianus bewickii*; Bewick's swan (Non-breeding)**

Bewick's are the smallest swans to visit Europe from their breeding grounds in Russia. Bewick's swan adults are white all over and young birds greyish with a pinkish bill. In and around the Broadlands region Bewick's swans feed in fields on leftover potatoes and grain. See table below for population data.

- **A038 *Cygnus cygnus*; Whooper swan (Non-breeding)**

The whooper swan is a large white swan, bigger than a Bewick's swan. It has a long thin neck, which it usually holds erect, and black legs. Its black bill has a large triangular patch of yellow on it. It is mainly a winter visitor to the UK from Iceland, although a small number of pairs nest in the north of the country. See table below for population data.

- **A082 Circus cyaneus*; Hen harrier (Non-breeding)***

Male Hen harriers are a pale grey colour, females and immatures are brown with a white rump and a long, barred tail which give them the name 'ringtail'. They fly with wings held in a shallow 'V', gliding low in search of food. These harrier visit the Broadland SPA in winter to feed on small mammals and birds within the areas reed and grassy habitats. See table below for population data.

- **A151 *Philomachus pugnax*; Ruff (Non-breeding)**

The ruff is a medium-sized wading bird. It has a long neck, a small head, a rather short slightly droopy bill and medium-long orange or reddish legs. This species visits the Broadland SPA in winter feeding on insects, small fish and larvae within the reedbed and wetland fringe habitats. See table below for population data.

(Table a) Site used regularly by 1% or more of the GB population of a species listed on Annex 1 of the Birds Directive (79/409/EEC) in any season:

Annex 1 species	**5-yr peak mean from 1987/88-1991/2***	**1996/1997**
Bittern *Botaurus stellaris*	2-3 (10-15% GB) [M]	
Bewick's Swan *Cygnus columbianus bewickii*	495 (7.1% GB) [I]	> 600 8.6% GB) [I]
Whooper Swan *Cygnus cygnus*	121 (2% GB) [I]	100 (1.8% GB) [I]
Marsh Harrier *Circus aeruginosus*	16 (16% GB) [F]	
Hen Harrier *Circus cyaneus*	22 (3% GB)	
Ruff *Philomachus pugnax*	96 (6.4% GB)	

Units of population size: M - booming males, F - breeding females, I - individual birds wintering
*Figures relate to the SPA boundary classified in 1994

- **Qualifying individual species not listed in Annex I of the Wild Birds Directive (Article 4.2)**

During the **non-breeding season** the SPA regularly supports

- **A050 *Anas penelope*; Eurasian wigeon (Non-breeding)**

The Eurasian wigeon is a bird of open wetlands, and usually feeds by dabbling for plant food or grazing, which it does very readily within the Broadlands wetland habitats. The species feeds on grassland within and adjacent to the site. See table below for population data.

- **A051 *Anas strepera*; Gadwall (Non-breeding)**

Gadwall require generally undisturbed, still, eutrophic waters that have a combination of open water and emergent vegetation. Gadwall eat mostly submerged aquatic vegetation such as algae, grasses, rushes, sedges, pondweed, widgeon grass, and water milfoil, including leaves, stems, roots, and seeds. They also eat snails, midges, water beetles, and other invertebrates. During the winter they visit the Broadlands SPA and predominantly eat plant life with a small amount of animal life. See table below for population data.

- **A056 *Anas clypeata*; Northern shoveler (Non-breeding)**

Shoveler are surface feeing ducks with huge spatulate bills. Males have dark green heads, with white breasts and chestnut flanks. Females are mottled brown. Shoveler prefer poorly drained treeless meadows interspersed with eutrophic shallow, stagnant freshwater pools and lakes, rivers with undisturbed creeks and muddy bottoms usually processing lush emergent and floating vegetation. See table below for population data.

(Table b) Site used regularly by 1% or more of the biogeographic population of a regularly occurring migratory species (other than those listed on Annex 1) in any season:

Non-Annex 1 migratory bird species	**5-yr peak mean from 1987/88-1991/92***	**5-yr peak mean from 1990/91-1995/96**
Wigeon *Anas penelope*	8,966 (l.2% NW Europe) [I]	10,071 (1.34% NW Europe) [I]
Gadwall *Anas strepera*	486 (4% NW Europe) [I]	240 (0.96% NW Europe) [I]
Shoveler *Anas clypeata*	675 (1.7% NW Europe) [I]	< 1% N W Europe [I]

Units of population size: I - individual birds wintering
*Figures relate to the SPA boundary classified in 1994

Data sources

Babbs, S., Cook, A.S. & Durdin, C. (1997). Broads ESA Wintering Waterfowl Survey 1996/97. RSPB unpublished report, Norwich.
Carter, I. & Tolhurst, S. (1994). Broadland Ramsar site citation
Carter, I. & Tolhurst, S. (1994). Broadland SPA citation
RSPB website used for species characteristics and behaviours within accompanied species text
The Wetland Bird Survey: Wildfowl and Wader counts 1990/91 to 1995/96

Site-specific seasonality of SPA features

The table below highlights in grey those months in which significant numbers of each mobile qualifying feature are most likely to be present at the SPA during a typical calendar year. This table is provided as a general guide only.

Unless otherwise indicated, the months shown below are primarily based on information relating to the general months of occurrence of the feature in the UK. Where site-based evidence is available and has been used to indicate below that significant numbers of the feature are typically present at this SPA outside of the general period, the site-specific references have been added to indicate this.

Applicants considering projects and plans scheduled in the periods highlighted in grey would benefit from early consultation with Natural England given the greater scope for there to be likely significant effects that require consideration of mitigation to minimise impacts to qualifying bird features during the principal periods of site usage by those features. The months which are *not* highlighted in grey are not ones in which the features are necessarily absent, rather that features may be present in less significant numbers in typical years. Furthermore, in any given year, features may occur in significant numbers in months in which typically they do not. Thus, applicants should not conclude that projects or plans scheduled in months not highlighted in grey cannot have a significant effect on the features. There may be a lower likelihood of significant effects in those months which nonetheless will also require prior consideration.

Any assessment of potential impacts on the features must be based on up-to-date count data and take account of population trends evident from these data and any other available information. Additional site-based surveys may be required. Non-breeding water bird monthly maxima data gathered for this site through the Wetland Bird Survey ('WeBS') may be available upon request from the British Trust for Ornithology.

Feature	Season	Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Site-specific references where available
Bittern *Botaurus stellaris*	*Breeding*	*Summer*													
Bewick's Swan *Cygnus columbianus bewickii*	*Non-breeding*	*Winter*													*Includes analysis of SPA WeBS Counts (available from BTO)*
Eurasian Wigeon *Anas penelope*	*Non-breeding*	*Winter*													
Gadwall *Anas strepera*	*Non-breeding*	*Winter*													
Marsh Harrier *Circus aeruginosus*	*Breeding*	*Summer*													
Northern Shoveler *Anas clypeata*	*Non-breeding*	*Winter*													

Feature	Season	Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Site-specific references where available
Ruff *Philomachus pugnax*	*Non-breeding*	*Winter*													*Includes analysis of data from SPA's WeBS Counts (available from BTO)*
Whooper Swan *Cygnus cygnus*	*Non-breeding*	*Winter*													

Guide to terms:
Breeding – present on a site during the normal breeding period for that species
Non-breeding - present on a site outside of the normal breeding period for that species (includes passage and winter periods).
Summer – the period generally from April to July inclusive
Passage - the periods during the autumn and spring when migratory birds are moving between breeding areas and wintering areas. These periods are not strictly defined but generally include the months of July – October inclusive (autumn passage) and March – April inclusive (spring passage).
Winter - the period generally from November to February inclusive.

Table 1: Supplementary Advice for Qualifying Features: A021. *Botaurus stellaris*; Great bittern (Breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Breeding population	**Population abundance**	Maintain the size of the breeding population to a level which is above the peak mean numbers for 1987/88-1991, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or 1987 – 91 baseline: **2-3 booming males** (10-15% GB),	This will sustain the site's population and ensures it contributes to a viable local, national and bio-geographic population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the abundance of this feature is considered to be the minimum standard for conservation/ restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current abundance of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is classified, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account. Maintaining or restoring bird abundance depends on the suitability of the site. However, factors affecting suitability can also determine other demographic rates of birds using the site including survival (dependent on factors such as body condition which influences the ability to breed or make foraging and / or migration movements) and breeding productivity. Adverse anthropogenic impacts on either of these rates may precede changes in population abundance (e.g. by changing	Link to citation for reference: http://publications.naturalengland.org.uk/publication/5310905998901248 Taylor, M, & Marchant, J. 2011. The Norfolk Bird Atlas: 1999-2007. British Trust for Ornithology Annual UK Bittern Monitoring (RSPB)

<table>
<tr><th colspan="2">Attributes</th><th>Targets</th><th>Supporting and Explanatory Notes</th><th>Sources of site-based evidence (where available)</th></tr>
<tr><td></td><td></td><td></td><td>proportions of birds of different ages) but eventually may negatively affect abundance. These rates can be measured/estimated to inform judgements of likely impacts on abundance targets. Unless otherwise stated, the population size will be that measured using standard methods such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise on whether the figures stated are the best available.

The following data gives the minimum and maximum number of booming males in the Broads over recent years. It is difficult to measure breeding attempts and success, hence booming males is generally taken as a consistent measure of breeding activity.

<table>
<tr><th>Year</th><th>Min. no. of pairs</th><th>Max. no. of pairs</th></tr>
<tr><td>2006</td><td>10</td><td>12</td></tr>
<tr><td>2007</td><td>10</td><td>17</td></tr>
<tr><td>2008</td><td>21</td><td>25</td></tr>
<tr><td>2009</td><td>19</td><td>23</td></tr>
<tr><td>2010</td><td>17</td><td>20</td></tr>
<tr><td>2011</td><td>20</td><td>25</td></tr>
<tr><td>2012</td><td>13</td><td>15</td></tr>
<tr><td>2013</td><td>19</td><td>19</td></tr>
<tr><td>2014</td><td>18</td><td>20</td></tr>
<tr><td>2015</td><td>21</td><td>22</td></tr>
<tr><td>2016</td><td>17</td><td>22</td></tr>
<tr><td>2017</td><td>16</td><td>17</td></tr>
<tr><td>2018</td><td>23</td><td>29</td></tr>
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Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting breeding habitat**	Maintain and restore the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding): Wetland habitats including open water (shallow/wading areas), reedbed, grazing marsh and fen meadow.	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target will apply to any supporting habitat which is known to occur outside the site boundary.	JNCC (2005) http://jncc.defra.gov.uk/page-2022-theme=default
Supporting habitat (both within and outside the SPA): function/ supporting process	**Air quality**	Reduce concentrations and deposition of air pollutants for a site-relevant Critical Load or Level. Values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The structure and function of the habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy 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. 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. 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.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain and restore the safe passage of birds moving between nesting, roosting and feeding areas	The ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. Targets will be developed for the DEFRA 25 year plan Nature Recovery Network Initiatives to ensure landscape work is delivered across the Broadland SPA specifically aimed at management for Bittern.	HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain and restore management or other measures within and outside the site boundary as appropriate Maintain the structure, function and the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore the feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by 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/or management agreements. An example of a conservation measures for Broadland SPA can be found within the Yare Broads and Marshes SSSI Views About Management Document: Ditch management, fen restoration and reedbed cutting rotations to enhance quality and create a mosaic of habitats.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336 English Nature (2005) Views About Management. Yare Broads & Marshes SSSI Available from https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1001231.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items (e.g. Eel, rudd, roach, frogs, toads) at preferred prey sizes (e.g. roach of 6-35 cm).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	This attribute will be periodically monitored by the Environment Agency

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Salinity**	Restore water salinity at or to <0.5% (or <5ppt (parts per thousand)).	This feature is known to be particularly susceptible to changes in the salinity (concentration of salt) of its shallow brackish/fresh water habitat; Salinity is a major factor determining the distribution and composition of communities of fish, amphibians and aquatic invertebrates such as insects, crustaceans and worms on which this feature feeds. High levels of salinity may adversely affect fish and invertebrate food for adults and chicks. The principal factors governing the temporal and spatial nature of the salinity regime of coastal sites are the diurnal incursion of the tide and fresh water flow from the river(s). Any activity changing either of these factors can result in a change to the salinity regime. In the Broads, freshwater flows, particularly in the rivers are key to buffering saline incursion into the river systems and optimising the speed of recovery. Maintaining and restoring freshwater flows is key to supporting bittern populations.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water area**	Restore the number of open waterbodies of optimal size (>0.5 ha), and the percentage cover of pools overall, with shallow water extending at least 30 m landward into surrounding dense vegetation.	This feature depends on the presence and continuity of open water habitat; often requiring water bodies of a particular size to in order to successfully nest, rear their young, feed and/or roost. Changes in water area, and associated marginal habitat, can adversely affect the suitability of supporting open water habitat.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water depth**	Maintain the overall depth of swamp and marginal water which is typically between 30–100 cm, and/or within pools and dykes at typically 200-400 cm deep.	This feature is known to require extensive areas of water in which to feed. Birds are visual predators, with some having the ability to dive or to feed from the surface. As they will rely on detecting their prey within the water to hunt, the depth of water at critical times of year may be paramount for successful feeding and therefore their fitness and survival. Deep water surrounding nesting sites may also be important to deterring predators.	
Supporting habitat (both within and outside	**Water quality /quantity**	Where the supporting habitats of the SPA feature are dependent on surface water, maintain water quality and quantity at a standard	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
the SPA): function/ supporting process		which provides the necessary conditions to support the feature of Broadland SPA for Great Bittern, helping to improve wading habitats within reedbeds and wetland areas.	quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA. Diffuse water pollution (DWP) is a key issue potentially affecting all Broads sites and remains one of the priority issues to address in the Broads. There are a variety of sources, pathways and effects, and interactions with climate change. Hence, a variety of solutions is required to address the problem. In many cases measures are required throughout the catchment, rather than within the site or adjacent to the site. For many years Natural England have been working towards reducing levels of phosphates, sediment, nitrogen etc. Working with the public, land owners, farmers and the Environment Agency to improve sewage treatment works and water quality within both agricultural and urban areas. Natural England have Diffuse Water Pollution and Catchment Sensitive Farming Plans and initiatives in place to address these issues. The SIP (Site Improvement Plan) which have been developed for each Natura 2000 Site includes the priorities and new measures required to achieve water-dependent Natura 2000 objectives under the Water Framework Directive. The actions in the SIP for the water dependent (excluding non-water dependent) habitats inform part of the River Basin Management Plan and its consultation. Supply of sufficient good quality water is also key to supporting the bittern population. Natural England works with landowners, the Environment Agency and other parties to improve within site water management and within the catchment to improve water supply.	org.uk/publication/5444118129934336

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): minimising disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting nesting, roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling and presence of people, animals and structures.	
Supporting habitat (both within and outside the SPA): predation	**Predation**	Reduce predation and disturbance caused by native and non-native predators.	This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature. Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults and also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing and scaring or by direct control. Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features.	
Supporting habitat (both within and outside the SPA): structure	**Landform**	Maintain the extent of wet ditches and/or pools with suitable profiles (typically, with a deep central channel of 1.5-2.5 m deep and one or more 1 m deep with 5 m wide shallow margins).	The physical topography and landform of a site will strongly influence the quality and extent of supporting habitats used by this feature for nesting/rearing, feeding and/or roosting as appropriate. This will also influence the interactions with underlying supporting processes on which the supporting habitat may rely. Any changes or modifications to site topography may adversely affect the ability of the supporting habitats to support and sustain this feature.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain an open and unobstructed terrain which provides safe passage for birds moving between breeding, roosting and feeding areas across the site.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat. Other habitats within the Broadland SPA meet the requirements of large areas and open terrain such as, grazing marsh and open areas of reedbed where common reed has been cut to expose open wading areas for Bittern, for example in places like the RSPB Strumpshaw Fen Reserve within the Yare Broads and Marshes SSSI reedbed management and specific techniques for reedbed habitats are carried out here.	Yare Broads and Marshes SSSI Notification document. Available here: https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1001231.pdf
Supporting habitat (both within and outside the SPA): structure	**Vegetation characteristics**	Maintain the cover of scrub-free areas of reed-bed with common reed Phragmites australis at or above 90% cover and with a diverse age structure (typically at least 30% of the reedbed should be uncut with the remainder <7 years old with <20% cut in any year).	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing/ feeding/ concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature. Specific management plans and option prescriptions for Higher Level Stewardship (HLS) and Countryside Stewardship (CS) Schemes for these habitats ensure reedbed and commercial sedge is cut according to specific rotation regimes creating a variety in reedbed structure and reaching targets for appropriate vegetation characteristics for Bittern.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 2: Supplementary Advice for Qualifying Features: A037. *Cygnus columbianus bewickii*; Bewick swan (Non-breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Non-breeding population	**Population abundance**	Restore the size of the non-breeding population to a level which is above the 1987-1991 population, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. 1987/88– 1991/92 baseline population**: 495 individuals** (7.1% GB population) 1998 extension **>600 individuals** (8.6% GB population)	See explanatory notes for this attribute in Table 1.	Broadland SPA Citation Document can be found here for reference: http://publications.naturalengland.org.uk/publication/5310905998901248
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting non-breeding habitat**	Maintain and restore the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, and feeding). Habitats include low-lying wetland, floodplains, and wetland habitats including open water, reedbed and grazing marsh.	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target may apply to supporting habitat which also lies outside the site boundary. The Bewick's Swan is a migratory bird from Siberia. They usually feed on open arable fields and fly to an ideal open water habitat to roost for the winter. Overwintered stubble fields will provide a good food source and habitats for this bird feature, whilst the open broadland habitats within the SPA such as Ranworth Broad within the Bure Broads and Marshes SSSI provides a good roosting habitat.	JNCC (2005) http://jncc.defra.gov.uk/page-2022-theme=default The Wildlife Trust, webpage Available here: https://www.wildlifetrusts.org/wildlife-explorer/birds/waterfowl/bewicks-swan Bure Broads and Marshes SSSI citation available here: https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1000880.pdf
Supporting habitat	**Air quality**	Reduce concentrations and deposition of air pollutants to at	See explanatory notes for this attribute in Table 1.	More information about site-relevant Critical Loads and Levels

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(both within and outside the SPA): function/ supporting process		or 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).		for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain the safe passage of birds moving between roosting and feeding areas	The ability of the feature to safely and successfully move to and from feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. Targets will be developed as part of DEFRA 25 year plan Nature Recovery Network Initiatives to ensure landscape work is delivered across the Broadland SPA specifically aimed at Bewick Swan,	HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site 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.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336 English Nature (2005) Views About Management. Available from https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1001231.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Restore cover/abundance of preferred food plants (e.g. *Potamogeton, Ceratophylum, Zannichellia, Myriophyllum, Chara spp*.).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of food supply may adversely affect the population.	Aquatic macrophyte monitoring is principally carried out annually by the Broads' Authority.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain the availability of cereal grains, rape, potatoes and sugar beet, where these sources are locally important to feeding flocks,	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of food supply may adversely affect the population. To work with farmers and land owners through Entry and Higher Level Stewardship and Countryside Stewardship agreements to achieve a balanced farm environment where appropriate food sources are provided for the Broadland SPA bird feature: Bewick Swan.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain cover/abundance of preferred food plants (e.g. *Lolium perenne, Glyceria fluitans, Phleum pratense, Rorippa amphibia, Alopecurus geniculatus*).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of food supply may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Hydrology/ flow**	Restore the hydrology of a waterbody used as a feeding site such that water levels continue to fluctuate by 5-15% each month.	Changes in source, depth, duration, frequency, magnitude and timing of water supply or flow can have important implications for this feature. Such changes may affect the quality and suitability of habitats used by birds for nesting, drinking, preening, rearing, feeding or roosting. Unless these have already been undertaken, further site-specific investigations may be required to fully inform conservation measures for this feature and/or the likelihood of impacts on this attribute. Water level management is key to the maintenance of features throughout the Broads. As such, it is essential that the correct water management infrastructure and operating protocols are in place to deliver the optimum hydrological regime for the features of interest at a site, also in the context of a changing climate.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336
Supporting habitat (both within and outside the SPA):	**Hydrology/ flow**	Maintain hydrological processes to ensure water availability in feeding sites, with visible areas of standing shallow water.	Changes in source, depth, duration, frequency, magnitude and timing of water supply or flow can have important implications for this feature. Such changes may affect the quality and suitability of habitats used by birds for nesting, drinking, preening, rearing, feeding or roosting. Unless these have	Broadland SPA Citation Document can be found here for reference: http://publications.naturalengland.org.uk/publication/531090599890

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function/ supporting process			already been undertaken, further site-specific investigations may be required to fully inform conservation measures for this feature and/or the likelihood of impacts on this attribute.	1248
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water area**	Restore the number of large waterbodies of optimal size (typically >10 ha).	This feature depends on the presence and continuity of open water habitat; often requiring water bodies of a particular size to in order to successfully nest, rear their young, feed and/or roost. Changes in water area, and associated marginal habitat, can adversely affect the suitability of supporting open water habitat.	Hoveton Great Broad Restoration Project (2018) information available form: https://hovetongreatbroad.org.uk/
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water depth**	Maintain the availability of standing water of <1 m deep, over at least 50% of the total standing water area.	Entry Level and Higher Level Stewardship/Countryside Stewardship agreements overlapping with SPA sites (SSSIs) are supporting the management and maintenance of the features outlined in the Broadland SPA Citation and the wider wetland habitat including hydrological processes and water quality targets.	Broadland SPA Citation Document can be found here for reference: http://publications.naturalengland.org.uk/publication/5310905998901248
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water ensure water quality and quantity is restored to a standard which provides the necessary conditions to support the feature.	See explanatory notes for this attribute in Table 1.	Broadland SPA Citation Document can be found here for reference: http://publications.naturalengland.org.uk/publication/5310905998901248 Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336
Supporting habitat (both within and outside the SPA):	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance within close proximity of affecting roosting, foraging, feeding, moulting and/or loafing birds so	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour,	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
minimising disturbance		that the feature is not significantly disturbed	increases in energy expenditure due to increased flight, and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, and presence of people, animals and structures.	
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain open and unobstructed terrain within and around roosting and feeding areas, with no overall decrease in field sizes	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within feeding and roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat. Please refer to notes from Connectivity with Supporting Habitats Section.	
Supporting habitat (both within and outside the SPA): structure	Vegetation characteristics	Maintain the extent and distribution of predominantly short (<10 cm) grassland swards in areas used for feeding.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful foraging. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	JNCC (2005) http://jncc.defra.gov.uk/page-2022-theme=default The Wildlife Trust Webpage available form: https://www.norfolkwildlifetrust.org.uk/wildlife-in-norfolk/species-explorer/plants
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: The attribute for **removal of cover / abundance of preferred food plant** has been removed				

Table 3: Supplementary Advice for Qualifying Features: A038. *Cygnus cygnus*; Whooper swan (Non-breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Non-breeding population	**Population abundance**	Maintain the size of the non-breeding population at a level which is above the peak mean numbers for 1987/88-1991/92 period, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent: 1987/88 – 1991 baseline population **121 individuals** (2% GB population) 1998 extension > **100 individuals** (1.% GB population)	See explanatory notes for this attribute in Table 1. WeBS data for Broadland SPA currently covers only half of the whole area of the SPA.	Link to Broadland SPA citation for reference: http://publications.naturalengland.org.uk/publication/5310905998901248
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting non-breeding habitat**	Restore the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) Habitats include low-lying wetland, floodplain fen, wetland habitats including open water, reedbed and grazing marsh.	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target may apply to supporting habitat which also lies outside the site boundary As the Whooper Swan is a migratory bird from Iceland, they will usually feed on open arable fields and fly to an ideal open water habitat to roost for the winter. Overwintered stubble fields will provide a good food source and habitats for this bird feature, whilst the open broadland habitats within the SPA such as Ranworth Broad and the Bure Broads and Marshes SSSI provides a good roosting habitat.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Air quality**	Reduce concentrations and deposition of air pollutants to at or 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).	See explanatory notes for this attribute in Table 1.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain and restore the safe passage of birds moving between roosting and feeding areas	The ability of the feature to safely and successfully move to and from feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. Targets will be developed for the DEFRA 25 year plan Nature Recovery Network Initiatives to ensure landscape work is delivered across the Broadland SPA specifically aimed at Whooper Swan,	HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to restore the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site 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. Sympathetic management of water levels is necessary for the maintenance of optimal water depths throughout the year, according to the requirements of the plant and animal species present. The presence of extensive shallow water and wet marginal substrates will provide the feeding conditions required by a variety of wintering, birds. Water level management should take into account the requirements of submerged aquatic	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336 English Nature (2005) Views About Management. Available from https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1001231.pdf

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			plants that are restricted to areas where there is sufficient light for growth and minimal wave action.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Restore the cover/abundance of preferred food plants (e.g. *Potamogeton, Ranunculus, Chara* spp., Elodea).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of food supply may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain and restore the availability of cereal grains, rape, potatoes and turnips, where these sources are locally important to feeding flocks,	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of food supply may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Restore the cover/abundance of preferred food plants (e.g. *Lolium perenne, Alopecurus geniculatus, Phleum pratense*).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Hydrology/ flow**	Maintain the hydrology of waterbodies used as a feeding site such that water levels are able to fluctuate.	Changes in source, depth, duration, frequency, magnitude and timing of water supply or flow can have important implications for this feature. Such changes may affect the quality and suitability of habitats used by birds for nesting, drinking, preening, rearing, feeding or roosting. Unless these have already been undertaken, further site-specific investigations may be required to fully inform conservation measures for this feature and/or the likelihood of impacts on this attribute. Entry Level and Higher Level Stewardship/Countryside Stewardship agreements overlapping with SPA sites (SSSIs)	Broadland SPA Citation Document can be found here for reference: http://publications.naturalengland.org.uk/publication/5310905998901248 Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/544411812993

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			are supporting the management and maintenance of the features outlined in the Broadland SPA Citation and the wider wetland habitat including hydrological processes and water quality targets for Whooper Swan, Water level management is key to the maintenance of features throughout the Broads. As such, it is essential that the correct water management infrastructure and operating protocols are in place to deliver the optimum hydrological regime for the features of interest at a site, also in the context of a changing climate. The SIP (Site Improvement Plan) which has been developed for each Natura 2000 Site includes the priorities and new measures required to achieve water-dependent Natura 2000 objectives under the Water Framework Directive. The actions in the SIP for the water dependent (excluding non-water dependent) habitats inform part of the River Basin Management Plan and its consultation.	4336 http://publications.naturalengland.org.uk/publication/5444118129934336?category=4873023563759616
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water area**	Restore the number of large open waterbodies of optimal size (typically >10 ha).	This feature depends on the presence and continuity of open water habitat; often requiring water bodies of a particular size to in order to successfully nest, rear their young, feed and/or roost. Changes in water area, and associated marginal habitat, can adversely affect the suitability of supporting open water habitat.	Hoveton Great Broad Restoration Project (2018) information available form: https://hovetongreatbroad.org.uk/
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water depth**	Maintain the availability of standing water at optimal depths, typically <1 m deep, over at least 50% of the total standing water area.	This feature is known to require extensive areas of water in which to feed or roost. Birds are visual predators, with some having the ability to dive or to feed from the surface. As they will rely on detecting their prey within the water to hunt, the depth of water at critical times of year may be paramount for successful feeding and therefore their fitness and survival.	
Supporting habitat (both within and outside	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water ensure water quality and	See explanatory notes for this attribute in Table 1.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
the SPA): function/ supporting process		quantity is restored to a standard which provides the necessary conditions to support the feature.		org.uk/publication/5444118129934336
Supporting habitat (both within and outside the SPA): minimising disturbance	Minimising disturbance caused by human activity	Reduce the frequency, duration and/or intensity of disturbance affecting roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, and presence of people, animals and structures.	
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain open and unobstructed terrain within and around feeding and roosting areas.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within feeding and roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat. Please refer to notes from Connectivity with Supporting Habitats Section.	
Supporting habitat (both within and outside the SPA): structure	**Vegetation characteristics**	Maintain the extent and distribution of predominantly short (<10 cm) grassland swards in areas used for feeding	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing/ concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 4: Supplementary Advice for Qualifying Features: A050. *Anas penelope*; Eurasian wigeon (Non-breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Non-breeding population	**Population abundance**	Maintain the size of the non-breeding population at a level which is above the peak mean numbers for 1987/88-1991/92 period, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent: 1987/88 – 1991 baseline population **8,966 individuals** (1.2% of NW European population) (Figures relate to 1994 boundary) .	See explanatory notes for this attribute in Table 1. 5-yr peak mean from 1990/91-1995/96 (counts during 1998 site extension) was 10,071	Broadland Citation available here: http://publications.naturalengland.org.uk/publication/5310905998901248
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting non-breeding habitat**	Restore the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) Habitats include, wet grasslands, floodplain meadows, flooded gravel pits and reservoirs with gently sloping edges where they can easily get out onto the grassy banks.	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target may apply to supporting habitat which also lies outside the site boundary.	
Supporting habitat (both within	**Air quality**	Reduce concentrations and deposition of air pollutants to at or below the site-relevant	See explanatory notes for this attribute in Table 1.	More information about site-relevant Critical Loads and Levels for this SPA is available by using

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
and outside the SPA): function/ supporting process		Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).		the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain the availability of grasslands in close proximity (typically <50 m) to open water bodies.	The ability of the feature to safely and successfully move to and from feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain the safe passage of birds moving between roosting and feeding areas	The ability of the feature to safely and successfully move to and from feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. Eurasian Wigeon can be found on wet grasslands, floodplain meadows and open water habitats throughout the winter months. As this species roosts and feeds within these habitats and moves between each specific habitat it is important to ensure connectivity between them. Targets will be developed for the DEFRA 25 year plan Nature Recovery Network Initiatives to ensure landscape work is delivered across the Broadland SPA specifically aimed at the Eurasian Wigeon.	HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	Conservation measures	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to restore the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site 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.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336 English Nature (2005) Views About Management. Available from

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1001231.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Restore high cover/abundance of preferred food plants (e.g. *Polygonum, Eleocharis, Rumex, Ranunculus*).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	Hoveton Great Broad Restoration Project (2018) information available form: https://hovetongreatbroad.org.uk/
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water ensure water quality and quantity is restored to a standard which provides the necessary conditions to support the feature.	See explanatory notes for this attribute in Table 1.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336
Supporting habitat (both within and outside the SPA): minimising disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling and presence of people, animals and structures.	
Supporting habitat (both within and outside the SPA):	**Landscape**	Maintain open and unobstructed terrain within and around feeding and roosting areas.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within feeding and roosting habitat to detect approaching predators, or to ensure visibility of	.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
structure			displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat. Please refer to notes from Connectivity with Supporting Habitats Section.	
Supporting habitat (both within and outside the SPA): structure	**Vegetation characteristics**	Maintain the extent and distribution of predominantly short (<5 cm) swards in areas used for feeding.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: References to intertidal habitats and species have been removed as this is a freshwater site.				

Table 5: Supplementary Advice for Qualifying Features: A051. *Anas strepera*; Gadwall (Non-breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Non-breeding population	**Population abundance**	Restore the size of the non-breeding population at a level which is above the peak mean numbers for 1987/88-1991/92 period, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent: 1987/88-1991/92* baseline population: **486 individuals** (4% of the NW European population)	See explanatory notes for this attribute in Table 1. 5-yr peak mean from 1990/91-1995/96 (counts used during 1998 site extension): 240 individuals (0.96% of the NW European population) whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting non-breeding habitat**	Restore the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) Habitats include, freshwater lakes with lots of vegetation, reservoirs and flooded gravel pits.	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target may apply to supporting habitat which also lies outside the site boundary.	The Wildlife Trust Webpage Available from: https://www.wildlifetrusts.org/wildlife-explorer/birds/waterfowl/gadwall
Supporting habitat (both within and outside the SPA): function/ supporting process	**Air quality**	Reduce concentrations and deposition of air pollutants to at or 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).	See explanatory notes for this attribute in Table 1.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting habitat	**Conservation measures**	Restore management or other measures (whether within and/or	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other	Site Improvement Plan: Broadland (SIP030) Available

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(both within and outside the SPA): function/ supporting process		outside the site boundary as appropriate) necessary to Maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site 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.	from: http://publications.naturalengland.org.uk/publication/5444118129934336 English Nature (2005) Views About Management. Available from https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1001231.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Restore a high cover/abundance of preferred food plants (e.g., *Chara, Potamogeton, Ceratophylum spp., Ruppia*).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population. As Gadwall mainly feed on freshwater lakes it is important to ensure there is a high amount of vegetation, including 'algae, grasses, rushes, sedges, pondweed, and water milfoil, including leaves, stems, roots, and seeds. They also eat snails, midges, water beetles, and other invertebrates'	Cornell University (2017) https://www.allaboutbirds.org/guide/Gadwall/lifehistory# Hoveton Great Broad Restoration Project (2018) information available form: https://hovetongreatbroad.org.uk/
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water depth**	Maintain the availability of standing water of optimal depth, typically <0.25 m deep, over at least 50% of the total standing water area.	This feature is known to require extensive areas of water in which to feed. Birds are visual predators, with some having the ability to dive or to feed from the surface. As they will rely on detecting their prey within the water to hunt, the depth of water at critical times of year may be paramount for successful feeding and therefore their fitness and survival.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water ensure water quality and quantity is maintained and where necessary restored to a standard which provides the necessary conditions to support the feature.	See explanatory notes for this attribute in Table 1.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): minimising disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling and presence of people, animals and structures.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 6: Supplementary Advice for Qualifying Features: A056. *Anas clypeata*; Northern shoveler (Non-breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Non-breeding population	**Population abundance**	Restore the size of the non-breeding population at a level which is above the peak mean numbers for 1987/88-1991/92 period, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent: 1987/88-1991/92* baseline population: **675 individuals** (1.7% of NW European population)	See explanatory notes for this attribute in Table 1.	
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting non-breeding habitat**	Restore the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) Habitats include: Freshwater and wetland.	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target may apply to supporting habitat which also lies outside the site boundary.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Air quality**	Reduce concentrations and deposition of air pollutants to at or 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).	See explanatory notes for this attribute in Table 1.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting habitat	**Connectivity with**	Restore the safe passage of birds moving between roosting	The ability of the feature to safely and successfully move to and from feeding and roosting areas is critical to their breeding	HM Government (2018) A Green Future: Our 25 Year Plan to

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(both within and outside the SPA): function/ supporting process	**supporting habitats**	and feeding areas	success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. Targets will be developed for the DEFRA 25 year plan Nature Recovery Network Initiatives to ensure landscape work is delivered across the Broadland SPA specifically aimed at the Northern Shoveler,	Improve the Environment. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to Restore the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site 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.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336 English Nature (2005) Views About Management. Available from https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1001231.pdf The Wildlife Trust Webpage available from: https://www.wildlifetrusts.org/wildlife-explorer/birds/waterfowl/shoveler
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Restore high cover/abundance of preferred food plants (e.g. *Scirpus, Eleocharis, Carex, Potamogeton, Glyceria,* surface plankton).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	
Supporting habitat (both within and outside	**Food availability within supporting**	Restore the distribution, abundance and availability of key prey items (e.g. Hydrobia, crustaceans, caddisflies, diptera,	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
the SPA): function/ supporting process	**habitat**	beetles) at preferred prey sizes.	may affect the distribution, abundance and availability of prey may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water depth**	Maintain the availability of standing water at optimal depth, typically <0.3 m deep, over at least 50% of the total standing water area.	This feature is known to require extensive areas of water in which to feed. Birds are visual predators, with some having the ability to dive or to feed from the surface. As they will rely on detecting their prey within the water to hunt, the depth of water at critical times of year may be paramount for successful feeding and therefore their fitness and survival.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water ensure water quality and quantity is maintained and restored to a standard which provides the necessary conditions to support the feature.	See explanatory notes for this attribute in Table 1.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336
Supporting habitat (both within and outside the SPA): minimising disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling and presence of people, animals and structures.	
Version Control Advice last updated: NA				
Variations from national feature-framework of integrity-guidance: N/A				

Table 7: Supplementary Advice for Qualifying Features: A081. *Circus aeruginosus*; Eurasian marsh harrier (Breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Breeding population	**Population abundance**	Maintain the size of the breeding population to a level which is above: **16 pairs** (16% GB), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	See explanatory notes for this attribute in Table 1.	
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting breeding habitat**	Restore the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding): Habitats include: Large open areas of reedbed, farmland, grassland and freshwater.	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target will apply to any supporting habitat which is known to occur outside the site boundary. Marsh Harrier nest within large open areas of reedbed	The Wildlife Trust webpage. Available from: https://www.wildlifetrusts.org/wildlife-explorer/birds/birds-prey/marsh-harrier
Supporting habitat (both within and outside the SPA): function/ supporting process	**Air quality**	Reduce concentrations and deposition of air pollutants to at or 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).	See explanatory notes for this attribute in Table 1.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System. (www.apis.ac.uk).
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain the safe passage of birds moving between nesting, feeding and roosting areas	The ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. The home range of marsh harriers can extend several kilometres from their nesting territory, often hunting over nearby arable farmland, saltmarshes, reedbeds and grasslands. At the end of the breeding season, young and adult birds often congregate overnight at communal roost sites before migrating.	HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Targets will be developed for the DEFRA 25 year plan Nature Recovery Network Initiatives to ensure landscape work is delivered across the Broadland SPA specifically aimed at the Eurasian Marsh Harrier,	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain and Restore management or other measures (whether within and/or outside the site boundary as appropriate) necessary to Maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by 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/or management agreements.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336 English Nature (2005) Views About Management. Available from https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1001231.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items (e.g. mammals, birds) of preferred prey sizes (e.g. voles, mice, rabbit; birds of pipit to duck size).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water, restore water quality and quantity to a standard which provides the necessary conditions to support the feature.	See explanatory notes for this attribute in Table 1.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336
Supporting habitat (both within and outside the SPA): minimising	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting nesting, roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight,	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
disturbance		disturbed	abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling and presence of people, animals and structures.	
Supporting habitat (both within and outside the SPA): predation	**Predation**	Reduce predation and disturbance caused by native and non-native predators.	This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature. Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults and also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing and scaring or by direct control. Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features.	
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Restore continuous reed cover over large areas avoiding fragmentation of extensive reedbeds.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat. Please refer to notes from Connectivity with Supporting Habitats Section.	
Supporting habitat (both within and outside the SPA):	**Vegetation characteristics**	Restore the continuity and availability of areas of dense reed stands as nesting cover.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing/ concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain,	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
structure			for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature. Particularly in reedbed habitats where predation of eggs/pulli/juvenile occurs it is vital to ensure vegetation is varied – open areas, open water, dense areas of reed and some small areas of scrub around the edge to allow the marsh harrier to be able to find a food source and have a good amount of concealment for their eggs/pulli/juvenile.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: The attribute relating to **water depth** has been removed as this is not relevant for this feature.				

Table 8: Supplementary Advice for Qualifying Features: A082. *Circus cyaneus*; Hen harrier (Non-breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Non-breeding population	**Population abundance**	Restore the size of the non-breeding population at a level which is above the peak mean numbers for 1987/88-1991/92 period, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent: 1987/88-1991/92* baseline population: **22 individuals** (3% GB population)	See explanatory notes for this attribute in Table 1.	
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting non-breeding habitat**	Maintain and Restore the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) Habitats include: Wetlands including, grazing marsh, farmlands and woodland.	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target may apply to supporting habitat which also lies outside the site boundary. A number of roost sites are present within the Broadland SPA.	The Wildlife Trust Webpage. Available from: https://www.wildlifetrusts.org/wildlife-explorer/birds/birds-prey/hen-harrier
Supporting habitat (both within and outside the SPA): function/ supporting process	**Air quality**	Reduce concentrations and deposition of air pollutants to at or 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).	See explanatory notes for this attribute in Table 1.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting habitat (both within	**Connectivity with supporting**	Restore the safe passage of birds moving between nesting, feeding and/or roosting areas	The ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This	HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
and outside the SPA): function/ supporting process	**habitats**		target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. The home range of hen harriers can extend several kilometres from their nesting territory. During winter, Hen Harriers can gather at coastal sites and form communal roosts at night. These can hold significant numbers of individuals and roosting habitat can include carr woodland, marshes and reedbeds. Targets will be developed for the DEFRA 25 year plan Nature Recovery Network Initiatives to ensure landscape work is delivered across the Broadland SPA specifically aimed at the Hen harrier.	Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain and restore management or other measures (whether within and/or outside the site boundary as appropriate) necessary to Maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site 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.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Restore the distribution, abundance and availability of key prey items at preferred prey sizes (pipits to gamebirds; voles to young rabbit size).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population. Hen Harriers sometimes feed on open farmland habitats on prey such as gamebirds, but also small mammals such as rabbits.	https://www.wildlifetrusts.org/wildlife-explorer/birds/birds-prey/hen-harrier
Supporting habitat (both within and outside	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water ensure water quality and	See explanatory notes for this attribute in Table 1.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
the SPA): function/ supporting process		quantity is maintained to a standard which provides the necessary conditions to support the feature.		org.uk/publication/5444118129934336
Supporting habitat (both within and outside the SPA): minimising disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting, roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling and presence of people, animals and structures.	
Supporting habitat (both within and outside the SPA): structure	**Vegetation characteristics**	Maintain an optimal mix of vegetation (flat or gently sloping areas with wet rush, heather, cotton grass, *Juncus* or other wetland vegetation) in areas used for roosting.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 9: Supplementary Advice for Qualifying Features: A151. *Philomachus pugnax*; Ruff (Non-breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Non-breeding population	**Population abundance**	Maintain the size of the non-breeding population at a level which is above the peak mean numbers for 1987/88-1991/92 period, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent: 1987/88-1991/92* baseline population: **96 individuals** (6.4% GB population)	See explanatory notes for this attribute in Table 1.	
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting non-breeding habitat**	Maintain the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) Habitats include: Freshwater, wetland including reedbed and grassland.	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target may apply to supporting habitat which also lies outside the site boundary. As the Ruff is a wading bird, open shallow water and reedbed habitats for example are ideal for this species, enabling them to find shelter within the reeds but also forage in the shallow waters. Having connecting wet grassland habitats where ruff can continue to forage whilst also keeping a variety of sward height for concealment from predators is also key.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Air quality**	Reduce concentrations and deposition of air pollutants to at or 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).	See explanatory notes for this attribute in Table 1.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain the safe passage of birds moving between roosting and feeding areas	The ability of the feature to safely and successfully move to and from feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. Targets will be developed for the DEFRA 25 year plan Nature Recovery Network Initiatives to ensure landscape work is delivered across the Broadland SPA specifically aimed management for Ruff.	HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to restore the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site 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.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Restore availability of key prey species (e.g. dipteran flies, beetles, earthworms) at preferred prey sizes.	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Restore the availability of key prey species (e.g. Caddis flies, crustaceans, molluscs and worms) of preferred prey sizes.	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	
Supporting	**Water depth**	Maintain the availability of water	This feature is known to require extensive areas of water in	Halvergate Marshes SSSI

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat (both within and outside the SPA): function/ supporting process		at optimal depths, typically 1-3 cm deep, over at least 50% of the total water area.	which to feed. Birds are visual predators, with some having the ability to dive or to feed from the surface. As they will rely on detecting their prey within the water to hunt, the depth of water at critical times of year may be paramount for successful feeding and therefore their fitness and survival.	Citation document. Available from: https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1002542.pdf
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water ensure water quality and quantity is restored to a standard which provides the necessary conditions to support the feature.	See explanatory notes for this attribute in Table 1.	Site Improvement Plan: Broadland (SIP030) Available from: http://publications.naturalengland.org.uk/publication/5444118129934336
Supporting habitat (both within and outside the SPA): minimising disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling and presence of people, animals and structures.	
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain open and unobstructed terrain within and around nesting, roosting and feeding areas	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Please refer to notes from Connectivity with Supporting Habitats Section.	
Supporting habitat (both within and outside the SPA): structure	**Vegetation characteristics**	Maintain a vegetation structure of key roost sites dominated by bare ground or a short sparsely-vegetated sward.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing/ concealment/ roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				