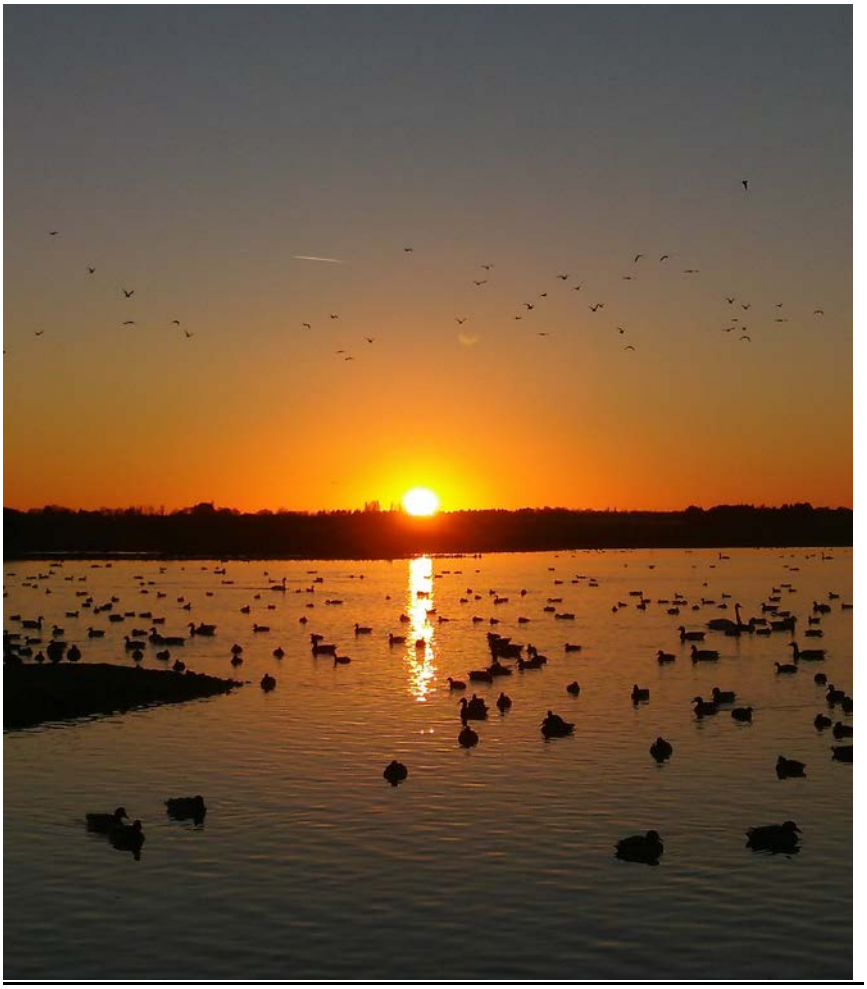
European Site Conservation Objectives: Supplementary advice on conserving and restoring site features

Martin Mere
Special Protection Area (SPA)
Site Code: UK9005111



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About this document

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

This advice replaces a draft version dated 7 February 2019 following the receipt of comments from the site's stakeholders.

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.

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.

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

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

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

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

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

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

About this site

European Site information

Name of European Site	Martin Mere Special Protection Area (SPA)
Location	Lancashire
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	30th January 1996
Qualifying Features	See section below
Designation Area	119.89ha
Designation Changes	N/A
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)	Martin Mere, Burscough SSSI
Relationship with other European or International Site designations	Martin Mere Ramsar UK11039

Site background and geography

Martin Mere is located north of Ormskirk in West Lancashire, north-west England. The site is situated within the Lancashire and Amounderness Plain National Character Area (NCA), which is an area of high-grade agricultural land, bounded by Morecambe Bay in the north and Liverpool in the south. The eastern boundary is contained by the Bowland Fringe. The plain is made up of a series of low-lying landscape types: in the east, undulating lowland farmland on the highly productive coastal plain, and in the west, the former mosslands and their remnant sites, and the coastal marshes and dunes. More information on the NCA can be found here.

Martin Mere occupies part of a former lake and mire that extended over some 1,300 ha of the Lancashire Coastal Plain during the 17th century and currently sits within a heavily modified waterbody. Martin Mere is a vast marsh that was, until it was drained, the largest body of freshwater in England. It was formed at the end of the last ice age when water filled a depression in glacial drift. Since then its size has varied as water levels have risen and fallen. The original giant lake can be seen on Christopher Saxton's map from 1579 and stretched from Rufford in the east to Church Town in the west. The mere originally drained out in two places; at the western end the arm of the mere known as the Wyke it drained into the Pool (or Old Pool) at what is now Crowland Street, Blowick, at its eastern end it flowed into the River Douglas at Rufford.

Drainage by gravity flow to the River Aslan / Douglas worked well until the 1920s. The gravity system then no longer worked due to land shrinkage around the drainage network, and siltation of the estuary. Pumps were then required to move water through the network of watercourses. Crossens pump station has been in operation since the 1920s. Martin Mere SPA – part of the old mere, is now fully pump drained via Boat House Sluice to and out of Crossens.

Active management of the mere began in 1692. Most of the rest is now in agricultural use. Land levels have dropped as a result of 300+ years of accelerated land drainage and associated peat shrinkage - as much as 4 meters in places over the last 100 years.

Currently, the complex site comprises open water, seasonally flooded marsh and damp, neutral hay meadows overlying deep peat. It includes a wildfowl refuge of international importance, with a large and diverse wintering, passage and breeding bird community. In particular, there are significant wintering populations of Bewick's Swan *Cygnus columbianus bewickii* and Whooper Swan *Cygnus cygnus*, Pink-footed Goose *Anser brachyrhynchus* and Pintail *Anas acuta*. There is considerable movement of wintering birds between this site and nearby coastal and estuarine sites.

Martin Mere's protected use is agriculture. The pumped drainage system is complex, with high and low level carriers that keep low lying agricultural land adjacent to Martin Mere SPA dry – some of this land is now below sea level. The pump drainage regime results in perched waterbodies disconnected from their natural floodplain adjacent to low lying land. This puts additional pressure on retaining banks, and increases the possible risk of failure on the boundaries of the two levels. These may be vulnerable to blow out if not positively maintained into the future.

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 non-breeding season the SPA regularly supports:

- **A037 Bewick's Swan *Cygnus columbianus bewickii* (non-breeding)**

This site supports internationally significant numbers of Bewick's swan with 449 individuals representing at least 6.4% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6). Populations of both the NW European Berwick's and numbers occurring within Britain have declined during the last 20 years. Populations can also fluctuate year to year depending on the harshness of winters in Europe. Fewer birds will cross the North Sea during mild winters and might explain recent declines in numbers visiting. They feed by day in fields of grass, in the SPA and surrounding farmland, then roost on open water areas at night. Roosting sites can be dependent on water levels and will change throughout the season.

- **A038 Whooper Swan *Cygnus Cygnus (*non-breeding)**

This site supports internationally significant numbers of Whooper Swan with 621 individuals representing at least 11.3% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6). In recent years a 5 year mean peak of 1,504 swans were counted between 2012/13-2016/17 (WeBS data from the BTO). It is mainly a winter visitor to the UK from Iceland and a number of birds flock to Martin Mere, attracted by safe roosting areas and abundance of food. They feed by day in fields of grass, in the SPA and surrounding farmland, then roost on open water areas at night. Roosting sites can be dependent on water levels and will change throughout the season.

- **A040 Pint-footed goose *Anser brachyrhynchus;*(non-breeding)**

This site supports internationally significant numbers of Pink-footed Goose with 25,779 individuals representing at least 11.5% of the wintering Eastern Greenland/Iceland/UK population (5 year peak mean 1991/2 - 1995/6). In recent years a 5 year mean peak of 25,178 pink-footed geese were counted between 2012/13-2016/17 (WeBS data from the BTO). Thousands of pink-footed geese are seen throughout this area and in the Northwest as they stop to feed and then continue their migration from Iceland and Greenland, into more southern areas of the UK and mainland Europe. They feed by day in fields of grass, in the SPA and surrounding farmland, then roost on open water areas at night. Roosting sites can be dependent on water levels and will change throughout the season.

- **A052 Eurasian teal *Anas crecca;***

This site supports internationally significant numbers of Eurasian teal with 3,282 individuals representing at least 1% of the NW European population (5 year peak mean 1991/2 - 1995/6). In recent years a 5 year mean peak of 2,484 Eurasian teal were counted between 2012/13-2016/17 (WeBS data from the BTO). These small dabbling ducks generally congregate in low-lying wetlands mainly in the south and west of the UK, many are continental birds from around the Baltic and Siberia.

- **A054 Northern pintail *Anas acuta;* (Non-breeding)**

This site supports internationally significant numbers of Northern Pintail with 978 individuals representing at least 1.6% of the wintering NW Europe population (5 year peak mean 1991/2 - 1995/6. In recent years a 5 year mean peak of 317 pintails were counted between 2012/13-2016/17 (WeBS data from the BTO)

showing a significant decline, reflective of a national trend. Pintail will often congregate in large flocks at a handful of sites, and being very mobile during winter, taking advantage of habitats which are temporarily available through flooding.

- **Qualifying assemblage of species (Article 4.2)**

During the non-breeding season the SPA regularly supports an assemblage of waterfowl of more than 20,000 birds. Over winter, the site regularly supports 46,196 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Pochard *Aythya ferina,* Mallard *Anas platyrhynchos,* Teal *Anas crecca,* Wigeon *Anas penelope,* Pintail *Anas acuta,* Pink-footed goose *Anser brachyrhynchus,* Whooper Swan *Cygnus cygnus,* Bewick's Swan *Cygnus columbianus bewickii.*

Three broad supporting habitats are important for sustaining the waterfowl assemblage and its component species through the provision of food, shelter and refuge from human disturbance. These habitats are therefore important for the maintenance of favourable conservation status of the waterbird assemblage. The broad habitats are:

• Open standing water and other adjacent waterbodies
• Lowland damp Neutral grassland
• Swamp and tall herb fen
• Arable land Outside of SPA used for feed

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
Bewick Swan	*Non-breeding*	*Winter*													*Includes analysis of SPA WeBS Counts*
Eurasian Teal	*Non-breeding*	*Winter*													*Includes analysis of SPA WeBS Counts*
Northern Pintail	*Non-breeding*	*Winter*													*Includes analysis of SPA WeBS Counts*
Pink-footed goose	*Non-breeding*	*Winter*													*Includes analysis of SPA WeBS Counts*
Whooper Swan	*Non-breeding*	*Winter*													*Includes analysis of SPA WeBS Counts*

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: A037. *Cygnus columbianus bewickii*; Bewick's 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 449 individuals whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will sustain the site's population and contribute 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 abundance 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	The most recent data about this feature on this SPA can be derived from WeBs data upon request: http://www.bto.org/volunteer-surveys/webs/data/submit-data-request .

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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. All bird population targets taken from published JNCC website for Martin Mere SPA as data is too wide ranging from original notification document to present an accurate representation. The latest 5yr peak mean for this species was zero (2013/14-2017/18). Although principal reasons for decline in numbers of Bewick's swan visiting the site are likely to be as a result of off-site issues, a restore target has been set until it has been confirmed there are no onsite issues affecting this species.	
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) Habitat extent baselines are provided below as a percentage of the component areas of the SPA: • 14.17 ha of permanent open water, with muddy margins and marginal vegetation • 7.64 ha of open ditches • 10.78 ha of reeds and	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.	Martin Mere, Burscough favourable condition table (2007). Data maybe available on request.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		other tall grasses • 64.98 ha of damp pasture • 21.73 ha of rush pasture • Surrounding off-site arable habitat		
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Air quality.**	Maintain 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).	The structure and function of 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).
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 including functionally linked land where this is relevant.	
Supporting	**Conservation**	Maintain management or other	Active and ongoing conservation management is often needed	English Nature (2003), Views

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat (both within and outside the SPA): function/ supporting process.	**measures.**	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.	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. General management within the site includes; Livestock grazing and hay cutting in summer to reduce grassland sward height and rank vegetation; partial winter flooding to maintain suitable conditions for wintering birds; water reduction in areas in spring/summer months for breeding birds whilst maintaining some areas of shallow flooding for feeding; flood defence operations and river channel management; minimising disturbance; control of some predators and corvids; removal and control of injurious weeds; removal of sediment in ditches to prevent the accumulation of silt and control of dominant plants that out-compete others including invasive non-native species; control of access and recreational activities.	about Management available here Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776
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. *Potamogeton, Ceratophylum, Zannichellia, Myriophyllum, Chara spp*.).	The availability of an abundant food supply is critically important for 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 plants which may adversely affect the population.	
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, 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 and may adversely affect the population. This attribute alludes to off-site arable habitat.	
Supporting	**Food**	Maintain cover/abundance of	The availability of an abundant food supply is critically	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat (both within and outside the SPA): function/ supporting process.	**availability within supporting habitat.**	preferred food plants (e.g. *Lolium perenne, Glyceria fluitans, Phleum pratense, Rorippa amphibia, Alopecurus geniculatus*).	important for 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 plants which may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Food availability within supporting habitat.**	Maintain the cover/abundance of preferred food plants (e.g. *Zostera*).	The availability of an abundant food supply is critically important for 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 plants which may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Hydrology/flow.**	Maintain 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.	Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776
Supporting habitat (both within and outside the SPA): function/ supporting process.	**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 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.	
Supporting habitat (both within and outside the SPA): function/ supporting	**Water area.**	Maintain the number of large waterbodies of optimal size.	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.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
process.			Martin mere is comprised of multiple open water features (meres) the largest of which is 3.74ha. There are many other smaller waters bodies which total more than 10ha in size.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Water depth.**	Maintain the supply of water to a standard which provides the necessary conditions to support the qualifying features of the SPA. In winter the water level management regime must provide a mixture of splash, shallow and deep flooded areas	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 food within the water, 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. Three hundred years of agricultural activity, land drainage and wind erosion have caused shrinkage of peat surrounding the site resulting in the site being significantly higher than adjacent land. Active management of water levels across the site through pumping and drainage is required. There is considerable pressure on the flood defences, and the embankments require constant maintenance to prevent breaches which would result in water draining from the site onto the lower surrounding land. Bewick's swans generally require water depth of <1m across 50% of the total area of standing water.	Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776
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 to a standard which provides the necessary conditions to support the feature.	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 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.	
Supporting	**Minimising**	Restrict the frequency, duration	The nature, scale, timing and duration of some human activities	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat (both within and outside the SPA): minimising disturbance.	**disturbance caused by human activity.**	and/or intensity of disturbance within close proximity of affecting roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly disturbed.	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, presence of people, animals and structures. Throughout the site, visitors are generally restricted to pathways in order to access hides to control the level of disturbance to wildlife.	
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.	
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.	
Version Control Advice last updated: **7th March 2019** - Stakeholder comments – **population abundance**, the latest 5yr peak mean for this species and explanation added to supporting and explanatory notes; **Minimising disturbance caused by human activity attribute**, visitors restricted to pathways to access hides to reduce disturbance levels added.				
Variations from national feature-framework of integrity-guidance: N/A				

Table 2: 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 621 individuals, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will sustain the site's population and contribute 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 abundance 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 proportions of birds of different ages) but eventually may	The most recent data about this feature on this SPA can be derived from WeBs data upon request: http://www.bto.org/volunteer-surveys/webs/data/submit-data-request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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.	
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) See further information regarding habitat and extent above for Bewick's Swan.	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.**	Maintain 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).	The structure and function of 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	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)
			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.	
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.	
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. A general overview of desired conservation and management measures on Martin Mere SPA is outlined above within the Bewick's Swan section of this document.	English Nature (2003), Views about Management available here Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776.
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Food availability within supporting habitat.**	Maintain 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 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 plants which may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/	**Food availability within supporting habitat.**	Maintain the cover/abundance of preferred food plants (e.g. *Zostera, Ruppia*).	The availability of an abundant food supply is critically important for 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 plants which may adversely affect the population.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
supporting process.				
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 turnips, where these sources are locally important to feeding flocks.	The availability of an abundant food supply is critically important for 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 plants which may adversely affect the population. This attribute alludes to off-site arable habitat.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Food availability within supporting habitat.**	Maintain OR 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 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 plants which 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.	Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Water area.**	Maintain the number of large open waterbodies of optimal size.	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. Martin Mere is comprised of multiple open water features (meres) the largest of which is 3.74ha. There are many other smaller waters bodies which total more than 10ha in size.	
Supporting habitat (both within	**Water depth.**	Maintain the supply of water to a standard which provides the necessary conditions to support	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	Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
and outside the SPA): function/ supporting process.		the qualifying features of the SPA. In winter the water level management regime must provide a mixture of splash, shallow and deep flooded areas.	detecting their food within the water, 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. Three hundred years of agricultural activity, land drainage and wind erosion have caused shrinkage of peat surrounding the site resulting in the site being significantly higher than adjacent land. Active management of water levels across the site through pumping and drainage is required. There is considerable pressure on the flood defences, and the embankments require constant maintenance to prevent breaches which would result in water draining from the site onto the lower surrounding land. Whooper Swan's typically require an optimal water depth of <1m deep, over at least 50% of the total standing water area.	org.uk/file/6280619046731776
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] to a standard which provides the necessary conditions to support the feature.	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 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.	
Supporting habitat (both within and outside the SPA): minimising disturbance.	**Minimising disturbance caused by human activity.**	Restrict 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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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, presence of people, animals and structures. Throughout the site, visitors are generally restricted to pathways in order to access hides to control the level of disturbance to wildlife.	
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.	
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.	
Version Control Advice last updated: **7th March 2019** following stakeholder comments –**Minimising disturbance caused by human activity** attribute, visitors restricted to pathways to access hides to reduce disturbance levels added.				
Variations from national feature-framework of integrity-guidance: NA				

Table 3: Supplementary Advice for Qualifying Features: A040. *Anser brachyrhynchus*; Pink-footed goose (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 25,779 individuals, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will sustain the site's population and contribute 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 abundance 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	The most recent data about this feature on this SPA can be derived from WeBs data upon request: http://www.bto.org/volunteer-surveys/webs/data/submit-data-request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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.	
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) See further information regarding habitat and extent above for Bewick's Swan.	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, pink-footed geese make extensive use of farmland throughout the area.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Air quality.**	Maintain 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).	The structure and function of 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	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)
			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.	
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.	
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. A general overview of desired conservation and management measures on Martin Mere SPA is outlined above within the Bewick's Swan section of this document.	English Nature (2003), Views about Management available here Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Food availability within supporting habitat.**	Maintain the availability of cereal grains, carrots, potatoes and sugar beet, where these sources are locally important to feeding flocks.	The availability of an abundant food supply is critically important for 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 plants which may adversely affect the population. This attribute alludes to off-site arable habitat.	
Supporting habitat (both within and outside the SPA):	**Food availability within supporting habitat.**	Maintain cover/abundance of preferred food plants (e.g. *Trifolium repens, Poa pratensis, Alopecurus geniculatus, Lolium perenne*).	The availability of an abundant food supply is critically important for 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 plants which	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function/ supporting process.			may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Water area.**	Maintain the number and size of waterbodies of optimal size.	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. Martin Mere is comprised of multiple open water features (meres) the largest of which is 3.74ha. There are many other smaller waters bodies which total more than 10ha in size.	
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 to a standard which provides the necessary conditions to support the feature.	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 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.	
Supporting habitat (both within and outside the SPA): minimising disturbance.	**Minimising disturbance caused by human activity.**	Restrict 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, presence of	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			people, animals and structures. Throughout the site, visitors are generally restricted to pathways in order to access hides to control the level of disturbance to wildlife.	
Supporting habitat (both within and outside the SPA): structure.	**Landscape.**	Maintain open and unobstructed terrain within and around roosting and feeding sites and 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. Pink-footed geese generally winter on permanent pasture and arable fields where grass, barley stubble, potato crops and winter-sown cereals provide winter food; they roost on large areas of permanent open water at Martin Mere.	Martin Mere, Burscough favourable condition table (2007). Data maybe available on request.
Supporting habitat (both within and outside the SPA): structure.	**Vegetation characteristics.**	Maintain vegetation heights at between 10-20 cm in those 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: **7th March 2019** following stakeholder comment – **Minimising disturbance caused by human activity** attribute, visitors restricted to pathways to access hides to reduce disturbance levels added.				
Variations from national feature-framework of integrity-guidance: NA				

Table 4: Supplementary Advice for Qualifying Features: A054. *Anas acuta*; Northern pintail (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 978 individuals, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will sustain the site's population and contribute 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 abundance 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	The most recent data about this feature on this SPA can be derived from WeBs data upon request: http://www.bto.org/volunteer-surveys/webs/data/submit-data-request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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 latest 5yr peak mean for this species was 442 (2013/14-2017/18). Although principal reasons for decline in numbers of Pintail visiting the site are likely to be as a result of off-site issues, a restore target has been set until it has been confirmed there are no onsite issues affecting this species.	
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) See further information regarding habitat and extent above for Bewick's Swan.	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.**	Maintain 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).	The structure and function of 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),	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)
			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.	
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.	
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. A general overview of desired conservation and management measures on Martin Mere SPA is outlined above within the Bewick's Swan section of this document.	English Nature (2003), Views about Management available here Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776
Supporting habitat (both within and outside the SPA):	**Food availability within supporting habitat.**	Maintain the availability of cereal grains and potatoes, where these sources are locally important to feeding flocks.	The availability of an abundant food supply is critically important for 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 plants which	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function/ supporting process.			may adversely affect the population. This attribute alludes to off-site arable habitat.	
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. *Eleocharis palustris*).	The availability of an abundant food supply is critically important for 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 plants which may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Food availability within supporting habitat.**	Maintain availability of key prey species (hatching midges, insects, molluscs and crustaceans Hydrobia) of preferred prey sizes.	The availability of an abundant food supply is critically important for 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.**	Maintain cover/abundance of preferred food plants (e.g. *Potamogeton, Elodea, Rumex, Glyceria, Chara*).	The availability of an abundant food supply is critically important for 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 plants which may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Hydrology/ flow**	Maintain the availability of fresh water areas on mudflats within feeding and resting areas.	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.	
Supporting habitat (both within and outside	**Water depth.**	Maintain the supply of water to a standard which provides the necessary conditions to support the qualifying features of the	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 food within the water, the depth of water at	Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776 .

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
the SPA): function/ supporting process.		SPA. In winter the water level management regime must provide a mixture of splash, shallow and deep flooded areas.	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. Three hundred years of agricultural activity, land drainage and wind erosion have caused shrinkage of peat surrounding the site resulting in the site being significantly higher than adjacent land. Active management of water levels across the site through pumping and drainage is required. There is considerable pressure on the flood defences, and the embankments require constant maintenance to prevent breaches which would result in water draining from the site onto the lower surrounding land. Pintail typically require water 0.1 – 0.3m deep across 50% of the total standing water area.	
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 to a standard which provides the necessary conditions to support the feature.	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 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.	
Supporting habitat (both within and outside the SPA): minimising disturbance.	**Minimising disturbance caused by human activity.**	Restrict 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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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, presence of people, animals and structures. Throughout the site, visitors are generally restricted to pathways in order to access hides to control the level of disturbance to wildlife.	
Version Control Advice last updated: **7th March 2019** following stakeholder comments – **population abundance**, the latest 5yr peak mean for this species and explanation added to supporting and explanatory notes; **Minimising disturbance caused by human activity** attribute, visitors restricted to pathways to access hides to reduce disturbance levels added.				
Variations from national feature-framework of integrity-guidance: NA				

Table 5: Supplementary Advice for Qualifying Features: A052. *Anas crecca*; Eurasian teal (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 3,282 individuals, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will sustain the site's population and contribute 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 abundance 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 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	The most recent data about this feature on this SPA can be derived from WeBs data upon request: http://www.bto.org/volunteer-surveys/webs/data/submit-data-request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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 latest 5yr peak mean for this species was 2,582 (2013/14-2017/18). Although principal reasons for decline in numbers of teal visiting the site are likely to be as a result of off-site issues, a restore target has been set until it has been confirmed there are no onsite issues affecting this species.	
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) See further information regarding habitat and extent above for Bewick's Swan.	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.**	Maintain concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for the feature' supporting habitat on the Air Pollution Information System (www.apis.ac.uk).	The structure and function of 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.	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)
			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.	
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.	
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. A general overview of desired conservation and management measures on Martin Mere SPA is outlined above within the Bewick's Swan section of this document.	English Nature (2003), Views about Management available here Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat.**	Maintain the availability of cereal grains, where these sources are locally important to feeding flocks.	The availability of an abundant food supply is critically important for 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 plants which may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Food availability within supporting habitat.**	Maintain the availability of key prey species (e.g. Hydrobia, flies, caddisfly, beetles, bugs, hatching midges) of preferred prey sizes.	The availability of an abundant food supply is critically important for 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.	

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 cover/abundance of preferred food plants (e.g. *Polygonum, Eleocharis, Rumex, Ranunculus*).	The availability of an abundant food supply is critically important for 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 plants which may adversely affect the population.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Hydrology/ flow.**	Maintain the hydrology of a waterbody used as a feeding site such that water levels reduce (or are reduced) from the time of mean hatch date to the end of the breeding season.	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.	
Supporting habitat (both within and outside the SPA): function/ supporting process.	**Water depth.**	Maintain the supply of water to a standard which provides the necessary conditions to support the qualifying features of the SPA. In winter the water level management regime must provide a mixture of splash, shallow and deep flooded areas.	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 food within the water, 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. Three hundred years of agricultural activity, land drainage and wind erosion have caused shrinkage of peat surrounding the site resulting in the site being significantly higher than adjacent land. Active management of water levels across the site through pumping and drainage is required. There is considerable pressure on the flood defences, and the embankments require constant maintenance to prevent breaches which would result in water draining from the site onto the lower surrounding land. Teal generally requires water <0.1m deep across 50% of the total standing water area.	Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776
Supporting habitat (both within and outside the	**Water quality/ quantity.**	Where the supporting habitats of the SPA feature are dependent on surface water ensure water quality and quantity is	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 quality and inadequate	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
SPA): function/ supporting process.		[maintained to a standard which provides the necessary conditions to support the feature.	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.	
Supporting habitat (both within and outside the SPA): minimising disturbance.	**Minimising disturbance caused by human activity.**	Restrict 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, presence of people, animals and structures. Throughout the site, visitors are generally restricted to pathways in order to access hides to control the level of disturbance to wildlife.	
Supporting habitat (both within and outside the SPA): structure.	**Vegetation characteristics.**	Maintain the overall heights of vegetation patches (20-60 cm) within nesting areas.	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: **7th March 2019** following stakeholder comments – **population abundance**, the latest 5yr peak mean for this species and explanation added to supporting and explanatory notes; **Minimising disturbance caused by human activity** attribute, visitors restricted to pathways to access hides to reduce disturbance levels added.				
Variations from national feature-framework of integrity-guidance: N/A				

Table 6: Supplementary Advice for Qualifying Features: Waterbird assemblage

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Assemblage of species.	**Assemblage abundance.**	Maintain the overall abundance of the non-breeding assemblage at a level which is above whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will sustain the assemblage population and contribute to viable local, national and bio-geographic populations of its component species. Assemblage abundance is the annual sum of peak counts of each assemblage component species (at any time of year, though peaks tend to occur in the non-breeding season), unless otherwise stated. Five year peak means are the average of these annual peak sums for the relevant period. An assemblage component is any waterbird using the site. Due to the dynamic nature of assemblage component populations, this target may be subject to periodic review. However, the target assemblage abundance is considered to be the minimum standard for conservation or restoration measures and therefore where at any time the assemblage abundance is greater than the target value given, any measure or impact assessment should take account of the greater abundance. This meets with the obligation to avoid deterioration of a European site or significant disturbance of the species for which the site is classified, and seeks to avoid plans or projects giving rise to the risk of such deterioration or disturbance. 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. Whether to maintain or restore depends on the overall assemblage abundance (i.e. the peak mean derived from the summed peak counts of components), and should only change in response to this value, excepting natural change. Fluctuations of individual assemblage component species alone should not necessarily change the target. Assemblage abundance is linked to the demographic rates of assemblage components, including survival (dependent on	The most recent data about this feature on this SPA can be derived from BTO WeBS data and Natural England upon request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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 proportions of birds of different ages) but eventually may negatively affect abundance. These rates can be measured / estimated (particularly for the main or named components) to inform judgements of likely changes to the assemblage and associated impacts on abundance targets. 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. NB Many SPA citations omitted gulls and terns from their assemblage totals. Assessments of abundance should be consistent with the waterbirds included in citation calculations (often limited to waders and wildfowl).	
Assemblage of species.	**Diversity of species.**	Maintain the species diversity of the bird assemblage.	This will ensure the bird assemblage reflects the diversity of species the SPA supports. Assemblage diversity is a product of species richness (the number of different species present), abundance (population size of each assemblage component species) and relative 'importance' (an assessment of the conservation status of each assemblage component, described below). Each component makes a different contribution to the diversity of the assemblage, and changes to some components may be considered to affect diversity more than others. Negative changes to small numbers of relatively important assemblage components may have a similar overall effect to negative changes in larger numbers of less important components. To meet the target, the populations of each of the 'main component' assemblage species to be maintained or restored are i) those present in nationally important numbers (≥1% GB population); ii) migratory species present in internationally important numbers (≥1% biogeographic population); iii) those species comprising ≥2,000 individuals (≥10% of the minimum	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			qualifying threshold for an internationally-important assemblage); and iv) 'named components' otherwise listed on the SPA citation. In addition to the main components, other components should be considered as these contribute collectively to the assemblage diversity, in particular proportionally abundant populations of species of conservation importance. Examples are those 'red-listed' as Birds of Conservation Concern and/or those listed on Sections 41/42 of the Natural Environment and Rural Communities Act 2006. The species composition of an assemblage may change over time. However, to meet this target, the total number of all native waterbird species contributing to the assemblage species richness should not decline significantly.	
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 habitats which support the assemblage feature during all necessary stages (moulting, roosting, loafing, feeding) of the non-breeding period.	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 [give details if relevant].The principal habitats known or likely to support the assemblage feature at this SPA are: • 14.17 ha of permanent open water, with muddy margins and marginal vegetation • 7.64 ha of open ditches • 10.78 ha of reeds and other tall grasses • 64.98 ha of damp pasture • 21.73 ha of rush pasture • Surrounding off-site arable habitat	
Supporting habitat	**Air quality.**	Maintain concentrations and deposition of air pollutants to at	The structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding	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).	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.	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.	**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. General management within the site includes; Livestock grazing and hay cutting in summer to reduce grassland sward height and rank vegetation; partial winter flooding to maintain	English Nature (2003), Views about Management available here Natural England (2014) Martin Mere Site Improvement Plan: http://publications.naturalengland.org.uk/file/6280619046731776

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			suitable conditions for wintering birds; water reduction in areas in spring/summer months for breeding birds whilst maintaining some areas of shallow flooding for feeding; flood defence operations and river channel management; minimising disturbance; control of some predators and corvids; removal and control of injurious weeds; removal of sediment in ditches to prevent the accumulation of silt and control of dominant plants that out-compete others including invasive non-native species; control of access and recreational activities	
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] to a standard which provides the necessary conditions to support the feature.	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 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.	
Supporting habitat (both within and outside the SPA): minimising disturbance.	**Minimising disturbance caused by human activity.**	Restrict the frequency, duration and/or intensity of disturbance affecting moulting, loafing, feeding and/or roosting birds so that the assemblage 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 which may significantly affect their behaviour, and consequently impact on the long-term viability of their population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increased energy expenditure due to more frequent flights, disrupted incubation of eggs and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). Anthropogenic disturbance of birds may in effect reduce the availability to the birds of suitable habitat through temporary or long-lasting displacement of birds from affected areas and may result in their redistribution within the site or displacement from it. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling and sight of people, animals and structures.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Throughout the site, visitors are generally restricted to pathways in order to access hides to control the level of disturbance to wildlife.	
Supporting habitat (both within and outside the SPA): structure/ function.	**Quality of supporting non-breeding habitat.**	Maintain the structure, function and availability of the following habitats which support the main component species of the assemblage feature for all stages (moulting, roosting, loafing, feeding) of the non-breeding period; • 14.17 ha of permanent open water, with muddy margins and marginal vegetation • 7.64 ha of open ditches • 10.78 ha of reeds and other tall grasses • 64.98 ha of damp pasture • 21.73 ha of rush pasture • Supporting off site arable land	The site's ability to support and sustain an assemblage comprising a very large number of birds (in excess of 20,000) made up of a diverse mix of species will be reliant on the overall quality and diversity of the habitats that support them. The feeding and roosting habitats which support the assemblage will occur within, and in some cases outside, the site boundary. This target is applicable to both circumstances. Due to the large number of species and natural fluctuations in the overall composition of an assemblage, it is not practical to provide specific targets relating to each supporting habitat relevant to the assemblage. Generally speaking, the specific attributes of each supporting habitat may include vegetation characteristics and structure, water depth, food availability, connectivity between nesting, roosting and feeding areas both within and outside the SPA. Further advice will be provided by Natural England on a case by case basis. The main component-species of the assemblage at this SPA include: Pochard *Aythya ferina*, Mallard *Anas platyrhynchos*, Teal *Anas crecca*, Wigeon *Anas penelope*, Pintail *Anas acuta*, Pink-footed goose *Anser brachyrhynchus*, Whooper swan *Cygnus cygnus*, Bewick's Swan *Cygnus columbianus bewickii*	
Version Control Advice last updated: **7th March 2019** following stakeholder comments – **Minimising disturbance caused by human activity** attribute, visitors restricted to pathways to access hides to reduce disturbance levels added; **Extent and distribution of supporting non-breeding habita**t and **Quality of supporting non-breeding habitat** attribute surrounding off-site arable land added.				
Variations from national feature-framework of integrity-guidance: N/A				