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

Nene Washes Special Area of Conservation (SAC)
Site Code: UK0030222

High Wash at Nene Washes ©Natural England

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About this document

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

Where this site overlaps with other European Sites, you should also refer to the separate European Site Conservation Objectives and Supplementary Advice (where available) provided for those sites.

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	Nene Washes Special Area of Conservation (SAC)
Location	Cambridgeshire
Site Maps	The designated boundary of this site can be viewed here on the MAGiC website
Designation Date	1st April 2005
Qualifying Features	See section below
Designation Area	88.19 hectares
Designation Changes	Not applicable
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)	Nene Washes SSSI
Relationship with other European or International Site designations	The SAC coincides with the Nene Washes SPA and the Nene Washes Wetland of International Importance ('Ramsar site').

Site background and geography

Covering a total area of approximately 88 hectares within the Fens National Character Area (NCA), the Nene Washes SAC lie north-west of the Ouse Washes. The Nene Washes are one of the country's few remaining areas of low-lying, periodically-inundated grassland (washland) habitat and this site is notable for the diversity of plant and associated animal life within its network of dykes.

The general site character is predominantly standing and running water, with bogs, marshes, water fringed vegetation and fens, and areas of improved grassland. The washlands are used for the seasonal uptake of floodwaters and, traditionally, for cattle grazing in the summer months. The mosaic of rough grassland and wet pasture provide a variety of sward structure and herbs of importance respectively for bird nesting habitat and feeding. Additional winter feeding is provided by remains of arable cropping on small areas. Many of the ditches hold a rich flora which includes such uncommon species as frogbit *Hydrocharis morsus-ranae*, water violet *Hottonia palustris* and flowering rush *Butomus umbellatus*.

These washlands play an additional role in relation to the nearby Ouse Washes in that they accommodate wildfowl populations displaced from the Ouse Washes when deep floodwaters prevent their feeding. In summer, the site is of importance for an assemblage of breeding waders whilst in winter the site holds large numbers of waders and wildfowl.

The primary reason for the SAC designation on the Nene Washes is for its representative populations of spined loach *Cobitis taenia*. Moreton's Leam, a large drainage channel running along the southern flank of the washes, contains a high density of spined loach.

About the qualifying features of the SAC

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

Qualifying Species:

- **S1149 Spined Loach *Cobitis taenia***

The spined loach is one of the UK's smallest freshwater fish, usually reaching no more than 14 centimetres in length. Its name is derived from the two small spines present under each eye.

It is a bottom-living fish that has a restricted microhabitat associated with a specialised feeding mechanism. They use a complex branchial or gill apparatus to filter-feed in fine but well-oxygenated sediments. Optimal habitat is typically standing or slow-moving open water with a patchy cover of submerged (and possibly emergent) plants which are important for spawning during summer, and a sandy or silty substrate into which juvenile fish tend to bury themselves when inactive.

Whilst spined loach has a broad European range, in the UK it appears to be restricted to just five east-flowing river systems in eastern England – the Rivers Trent, Welland, Witham, Nene and Great Ouse, with their associated waterways. The fish has limited means of dispersal so UK populations are largely genetically isolated from each other.

The Nene Washes SAC represents spined loach populations within the Nene catchment. Moreton's Leam, a large drainage channel running along the eastern flank of the Nene Washes, contains the highest density of spined loach in the UK. There may also be populations in the smaller ditches of the Washes.

Spined loach

Table 1: Supplementary Advice for Qualifying Features: S1149. *Cobitis taenia* Spined loach

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Juvenile densities**	Maintain a good density of juvenile spined loach throughout the site, taking into account natural habitat conditions and allowing for natural fluctuations; at least 50% of the population should be no more than one year old.	Impacts on physical, chemical or hydrological integrity, or from non-native species, may suppress juvenile densities.	
Population (of the feature)	**Population abundance**	Maintain the abundance of the Spined loach population at a density which is consistently greater than 0.1 individuals/m^{-2} (allowing for natural fluctuations), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. At least three year-classes should be present at significant densities	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence 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. 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 size 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 designated, 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 in any assessment. Unless otherwise stated, the population size or presence 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	APEM (2002a) APEM, (2015) ECON (2010) NATURAL ENGLAND (2011) PERROW M.R., HINDES A.M., TOMLINSON M.L. AND LEIGH S. (1999) TOMLINSON, M.L., PERROW. M.R., SKEATE, E.R. AND GILROY, J.J. (2010). WILLIAMS A.E., MURPHY J. AND HENDRY K. (2002b)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available. The standard method for density surveys of spined loach is through hand trawls (for methodology see APEM 2002a). 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 that the figures stated are the best available. The target for spined loach on the Nene Washes is set at no reduction in densities from existing levels, and in any case no less than 0.1 m^{-2}. The APEM survey in 2015 recorded population densities of 0.52 m^{-2} in Morton's Leam.	
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Maintain the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site.	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.	
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Maintain the total extent of the habitat(s) which support the feature at 17 km, approximately 88 hectares of standing open water and canals (ditch system).	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data. The supporting habitat for the SAC feature comprises standing open water and canals (ditch system). The designated SAC is Moreton's Leam, a large, slow moving drain. Field drains within the Nene Washes, outside the SAC but within the SSSI and SPA, probably support a low density of spined loach.	This attribute will be periodically monitored as part of Natural England's site condition assessments. ENVIRONMENT AGENCY (2013)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/ function	**Biological connectivity**	Maintain the free movement of spined loach within supporting habitats.	Even weirs with small vertical drops will prevent re-colonisation of upper reaches affected by lethal pollution episodes or drought, and more generally will also lead to constraints on genetic interactions that may have adverse consequences. Free movement within the channels is necessary to ensure maintenance of genetic diversity (and therefore population viability). New artificial constraints to movement should be avoided and existing barriers should be removed wherever possible	ENVIRONMENT AGENCY (2007)
Supporting habitat: structure/ function	**Flow regime**	Maintain a flow regime that is characteristic of the river; as a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year.	The natural flow regime is critical to all aspects of the spined loach life cycle, maintaining the biotope mosiac that is optimal for the species.	ENVIRONMENT AGENCY. (2013)
Supporting habitat: structure/ function	**Integrity of off-site habitats**	Maintain any supporting habitats present beyond the site boundary upon which the SAC population of spined loach may depend	Spined loach populations within the SAC may be dependent on the integrity of sections of river channel and riparian areas that lie outside of the site boundary. Headwater areas and tributaries may not fall within the site boundary, yet spined loach may use these areas for spawning and juvenile development and be critical for sustaining populations within the site. Spined loach have been found in field drains within the Nene Washes SSSI.	ENVIRONMENT AGENCY (2007)
Supporting habitat: structure/ function	**Invasive non-native species**	Ensure non-native species categorised as 'high-impact' in the UK under the Water Framework Directive are either rare or absent but if present, the mean cover of each very aggressive non-native plant should not exceed 1% and mean total combined cover of all non-native species and introduced species should not exceed 30%.	Non-native plant invasions may result in gross distortions to aquatic plant communities. The very aggressive *Azolla* spp., *Crassula helmsii* and *Hydrocotyle ranunculoides* can blanket sections of ditch and out-compete native species, resulting in a significant loss in diversity. *Myriophyllum aquaticum* may also have this potential in ditches. A more stringent target may be necessary on large ditch systems. Native plants are able to co-exist somewhat more easily with other non-native species, such as *Acorus calamus*, *Elodea* spp. and *Lagarosiphon major*. The non-native *Lemna minuta* is not included in this assessment unless it is found to be dominant, because it is very difficult to distinguish from *Lemna minor*. Where invasive native plants with a restricted natural distribution in the UK (e.g. *Stratiotes aloides* and *Nymphoides peltata*) are introduced to a site outside their natural range, these species should be treated as 'non-native'. Species such as signal crayfish may have a serious effect on spined loach	This attribute will be periodically monitored as part of Natural England's site condition assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			habitat (by destabilising banks and enhancing very fine sediment input), and may predate heavily on spined loach if present at high densities. Chinese mitten crab has the potential to migrate long distances up rivers and may cause similar damage to spined loach habitat. Chinese mitten crabs are known to inhabit Moreton's Leam, but have so far not been found to be causing a detrimental impact. Populations of invasive non-native species should be monitored, and controlled if there is any evidence for effects on spined loach populations	
Supporting habitat: structure/ function	**Riparian zone**	Maintain vegetation management to no more than 50% of the channel width (for submerged plants) and 50% of the bank length (for marginal fringing plants)	Active marginal vegetation including riparian trees provides important cover for spined loach. A mosaic of vegetation types and sward heights provides suitable conditions for the whole characteristic biological community including spined loach. Riparian trees are not deemed acceptable along the banks of Moreton's Leam. This is partly because of the requirements of the breeding waders that the Nene Washes SPA supports, and partly for the most efficient functioning of Moreton's Leam as a drainage channel.	This attribute will be periodically monitored as part of Natural England's site condition assessments. ENVIRONMENT AGENCY. (2013)
Supporting habitat: structure/ function	**Screening of intakes and discharges**	Ensure any intakes and discharges likely to trap a significant number of spined loach are being adequately screened.	Spined loach can be entrained in intakes and discharges along with other fish species.	
Supporting habitat: structure/ function	**Sediment regime**	Maintain substrate character at no more than 40% silt.	Excessive delivery of very fine sediment, from the catchment or artificially enhanced bank erosion, can produce sub-optimal feeding conditions for spined loach and can interfere with submerged plant communities on which the species relies for cover and spawning. Periodic desilting is necessary in Moreton's Leam to maintain suitable substrate for spined loach, because there is insufficient flow to mobilise sediment.	ENVIRONMENT AGENCY (2013)
Supporting habitat: structure/ function	**Fisheries - introduction of fish species**	Ensure fish stocking/introductions do not interfere with the ability of the SAC to support self-sustaining	The presence of artificially high densities of fish can create unacceptably high levels of predatory pressure on spined loach. Stocking with fish carries various ecological risks, including the loss of natural spawning from broodstock, competition between stocked and naturally produced individuals,	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		populations of spined loach	disease introduction and genetic alterations to the population	
Supporting habitat: structure/ function	**Cover of submerged macrophytes**	Maintain a sufficient proportion of submerged aquatic macrophytes to allow them to reproduce in suitable habitat and unaffected by river management practices.	Submerged and marginal vegetation provides vital cover for spined loach. Submerged plants are used for egg-laying. For ditch sites, cutting operations should leave sufficient vegetation to maintain cover and spawning substrate. Rotational cutting regimes to maintain ditch habitat should be adequate for the species. Maintain grazing activity in the riparian zone and in the river channel at suitably low levels. During 2010-12 the EA conducted research into the effects of weed cutting and dredging regimes on the spined loach populations of Morton's Leam.	ENVIRONMENT AGENCY (2012) ENVIRONMENT AGENCY (2013) RSPB (2015)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of supporting habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this SAC to climate change has been assessed by Natural England as being high, taking into account the sensitivity, fragmentation, topography and management of its supporting habitats. These sites are considered to be the most vulnerable sites overall and are likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases,	ENVIRONMENT AGENCY. (2007) NATURAL ENGLAND (2015)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			change will be inevitable so appropriate monitoring would be required. The Nene Washes is a designated flood storage reservoir and is often subject to deep winter floods which don't appear to impact spined loach. Water levels are generally maintained in summer, and even if low they are unlikely to be a problem to a bottom-dwelling fish. The low-lying nature of the Nene Washes SAC and its connection to the sea via tidal rivers means it is increasingly vulnerable to the effects of sea-level rise, exacerbated by land shrinkage through peat oxidation; in future the intrusion of increasingly saline water may have an impact on the spined loach feature. The River Nene becomes tidal at the Dog in a Doublet Sluice.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants 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 supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature and/or its supporting	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure,	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England.	ENVIRONMENT AGENCY (2007) ENVIRONMENT AGENCY. (2013)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat relies)		functions and supporting processes associated with Spined Loach and/or its supporting habitats.	This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	NATURAL ENGLAND (2011) NATURAL ENGLAND, (2014)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity/ quality**	Restore water quality and quantity to the following standards which provides the necessary conditions to support the feature; Dissolved oxygen, ammonia, BOD = Equivalent to Class 'C' of the EA's General Quality Assessment scheme Soluble reactive phosphorus = 0.1 mg/L-1 annual mean	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. 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 achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. Recent water quality data shows that water quality in Moreton's Leam is marginally within the acceptable limits. There are concerns over the amount of summer abstraction that might affect water levels in Moreton's Leam, but levels are extremely unlikely to become low enough to affect a bottom dwelling fish. Dissolved oxygen levels can become low during winter floods or during periods of low summer flows. There is little information about the way that low dissolved oxygen levels affect spined loach.	ENVIRONMENT AGENCY (2007) The Environment Agency routinely collects water quality data from Moreton's Leam, which can be found here. This attribute will be periodically monitored as part of Natural England's site condition assessments.
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: Invasive non-native species attribute amended to include aquatic fauna and flora				

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