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

Pevensey Levels Special Area of Conservation (SAC)
Site Code: UK0030367

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About this document

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

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

This advice replaces a draft version dated 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	Pevensey Levels Special Area of Conservation (SAC)
Location	East Sussex
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	11 February 2016
Qualifying Features	See section below
Designation Area	3585.38 ha
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)	Pevensey Levels SSSI
Relationship with other European or International Site designations	The boundary of this SAC overlaps with Pevensey Levels Ramsar

Site background and geography

Pevensey Levels SAC is located in the low-lying area between Eastbourne and Bexhill in East Sussex. The High Weald Area of Outstanding Natural Beauty (AONB) lies to the northeast, the South Downs National Park to the southwest and the English Channel to the south.

The site lies within the Pevensey Levels National Character Area and is described as a low-lying, open landscape with few trees and wide views to surrounding high ground and the sea, giving the impression of remoteness. The geology of the Pevensey Levels consists of sandstones and clays overlain by fairly impermeable marine silts and clay. The combination of the flat and low-lying nature of the topography and poor drainage of the soils can result in long periods of standing water on the surface, particularly in winter, encouraging associated flocks of birds to the wet fields.

The area is largely reclaimed land with extensive grazed wet meadows actively maintained by purpose-built drainage systems and characteristic dykes. A small area of shingle and intertidal muds and sands is included within the site. The freshwater ditches criss-crossing the site reflect the historic reclamation of land which has been continuous since the 13th century. The relative permanence of the ditches and the continued pastoral use of much of the area mean that this landscape is a remarkable survival of a medieval field system in a lowland context.

The network of freshwater ditches provide botanical interest, public water supplies and wet fences for stock control, and act as flood storage reservoirs. Consequently, Pevensey Levels is one of the largest and least-fragmented lowland wet grassland systems in southeast England. The SAC feature is a small freshwater snail, little whirlpool ram's-horn snail (*Anisus vorticulus*). The site also supports a variety of

important wetland communities, including nationally rare and scarce aquatic plants and invertebrates, and a notable assemblage of breeding and wintering wildfowl.

The site is of hydrological value for shoreline stabilisation and dissipation of erosive forces, recharge and discharge of groundwater, flood water storage / desynchronisation of flood peaks, and maintenance of water quality (removal of nutrients).

The majority of the site is used for low intensity livestock farming. Nearly all land within the SAC is under private ownership comprising approximately 200 owner occupiers and about 60 – 80 active managers. A small portion of the site area (around 100 hectares) is owned by Natural England and Sussex Wildlife Trust. Current recreation and tourism activities include walking and horse riding on the public footpaths and bridleways, recreational cycling, angling, and rowing.

About the qualifying features of the SAC

The following section gives 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:

- ***S4056. Anisus vorticulus; Little whirlpool ram's-horn snail***

The Little whirlpool ram's-horn snail *Anisus vorticulus* is a small aquatic snail with a flattened spiral shell rarely more than 5 mm in diameter. It occurs in unpolluted, calcareous waters in marsh drains with a dense aquatic flora, and favours ditches with a diverse flora but little emergent vegetation. It often floats on the surface amongst duckweed *Lemna* spp. Ditches that are either completely cleared of vegetation or are choked with weed and silt are unsuitable. Winter flooding may be important in enabling young snails to colonise new ditches. The main threats to the species include land drainage, inappropriate habitat management and eutrophication, and studies of its requirements and conservation management have been undertaken (Willing & Killeen 1999; Watson & Ormerod 2004).

Anisus vorticulus has always been a very local species in Britain. It formerly occurred at around 15 sites in south-east England, but has declined for reasons that are not fully understood, and is now restricted to a few locations in Norfolk, Suffolk and Sussex.

Pevensey Levels supports *Anisus vorticulus* in both a wide spatial distribution and in good population density classes. It is recorded across a number of the levels, including at Hooe level, Manxey level, Glynleigh and Horse Eye Levels. The western areas of the Hooe Levels should be regarded as one of the richest locations for this species within an often linked complex of ditches and channels. The Pevensey Levels, with an occupation of some 38% of sampled ditches at designation, supports the largest known population of Anisus vorticulus in the UK.

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Table 1: Supplementary Advice for Qualifying Features: S4056. *Anisus vorticulus*; Little whirlpool ram's-horn snail

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Population abundance**	Maintain population presence within the favourable ditch network where the known core population areas are maintained (Hooe Level and White Dyke), allowing for population changes and within-ditch losses, considering the likely metapopulation characteristics of *Anisus vorticulis.*	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 (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 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. Ecological monitoring of ram's-horn snail *Anisus vorticulus*: An accurate and up-dated knowledge of the ditch occupation by ram's-horn snail to be maintained. Repeat surveys of the whole SAC will be required periodically. Post ditch clearance monitoring of populated ditches is important to assess effectiveness of ditch clearance protocol and other changes that are/may occur in the future such as changes in water	NATURAL ENGLAND, 2018.*Anisus vorticuluis* Survey, Available on request from Natural England

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			levels/water quality/management of ditches. Climate change assessments to be incorporated into the monitoring plan for the ram's-horn snail, in particular investigations into the effects of increased water and air temperature. 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 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.	
Supporting habitat: extent and distribution	**Extent and distribution of supporting habitat**	Maintain the total extent of the freshwater ditches which support *Anisus Vorticulus*. There are approximately 450km of freshwater ditches spread across 3,500 ha.	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. *Anisus vorticulus* is known to be present in two key areas of the site, however because the autecology of the species is poorly understood, and it is likely to have metapopulation characteristics, the whole site is taken as possible habitat.	
Supporting habitat: structure/ function	**Ditch management**	Maintain a physical structure dominated by unshaded, gently-shelving ditch margins with low levels of accumulated in-channel silt.	Ditch management impacts: >80% of all the surveyed ditches should have a berm/margin (with gentle gradient) on one side or both. The same section of drainage ditch or water-body should not be completely cleared (i.e. clearing both sides of the channel, removing both weed and the sediments) at intervals less of than 7 years. Ideally, silt removal should be much less frequent (i.e. no less than every 10 years). The diverse suite of aquatic plants and invertebrates which support the feature require a cycle of ditch management to ensure that there is a balance of habitats from early (recently cleared) to late successional ditches. The little whirlpool ram's-	NATURAL ENGLAND, 2017. Ditch Management Protocol for Little Whirlpool Ram's-horn Snail, Available on request from Natural England The IUCN Red List of Threatened Species – (2018)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			horn snail prefers mid to late successional ditches. The speed at which a ditch succeeds is dependent on the size and depth of the ditch, the prevailing weather conditions, the available nutrients as well as the water level and ditch management. It is important to note that although the species has currently only been identified in ditches in the UK it is known to occur in that more naturally functioning habitats elsewhere in Europe.	
Supporting habitat: structure/ function	**Ditch margin structure**	Maintain open, lightly grazed ditch channel margins	Shallow marginal areas warm quickly and are beneficial to many aquatic invertebrates. If banks are too steep, grazing animals are prevented from reaching the ditch margins to graze and drink and do not keep the margins open. Studies of *Anisus vorticulus* have found a positive correlation with grazing of cattle but this may be because the species prefers a mid-successional ditch structure and this is more likely to be maintained with cattle as well as sheep grazing.	
Supporting habitat: structure/ function	**Ditch vegetation structure**	Maintain a well-vegetated channel, with native vegetation in at least 10% of ditches with a ratio of 50:50 emergent to floating/submerged.	Vegetation should be managed when seriously impeding water flow and / or when the water depth is insufficient. It is best if ditches are not shaded by overhanging and tall emergent vegetation. This allows sunlight to warm ditch waters allowing the growth of a greater variety of aquatic vegetation	
Supporting habitat: structure/ function	**Vegetation composition: invasive non-native species**	Ensure invasive non-native species which pose a threat to the feature are either absent or being contained at a level which does not significantly affect the feature	The presence of the more aggressive species such as *Crassula* or *Hydrocotyle ranunculoides* is a particular concern. Floating pennywort *Hydrocotyle ranunculoides* and *Crassula* have a known impact on freshwater invertebrate assemblages partly through intervention in ditch succession. *Anisus vorticulus* has not been found where Floating Pennywort has high coverage levels. Floating pennywort and *Crassula* are likely to spread across the site unless appropriate control is in place. An ongoing funded programme is in place to control both invasive species until a safe biological control is identified.	NATURAL ENGLAND, 2014 Pevensey Levels Site Improvement Plan
Supporting processes (on which the feature and/or its supporting	**Adaptation and resilience**	Restore 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.	The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as high, taking into account the sensitivity, fragmentation, topography and habitat management and condition. This means that is considered to be the most vulnerable sites overall and are likely to require the	NATURAL ENGLAND, 2014 Pevensey Levels Site Improvement Plan Climate Change Theme Plan and

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat relies)			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, change will be inevitable so appropriate monitoring would be advisable. This recognises the 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. Vulnerability to climate change will depend not only on whether features are inherently sensitive to climate change, but also the level of climate change they will be exposed to (exposure), the ability of the species or habitats to respond to climate change (intrinsic adaptive capacity) and the ability of conservation management to alleviate climate change impacts (extrinsic adaptive capacity). High sensitivity habitats are those whose existence is dependent on specific climatic, hydrological or coastal conditions, which projections indicate will change with climate change. Pevensey Levels sits at the bottom of the Pevensey and Cuckmere catchment. The functioning of the catchment is	supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England, Natural England (2015).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			essential for the integrity of the site in two ways: 1) All the water entering the SAC is drawn from the wider catchment which is approximately 10,000 ha. The quality and quantity of water within the catchment is essential for the functioning of the site. 2) Approximately 700 ha of wet grassland with freshwater ditches exists outside of the SAC area and this habitat has the potential to buffer and expand the SAC bearing in mind climate change requirements.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect and maintain this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	Views about Management, English Nature (2005) NATURAL ENGLAND, 2014 Pevensey Levels Site Improvement Plan
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quality**	Restore water quality to a standard which provides the necessary conditions to support the feature. • The mean range of soluble reactive phosphorous: 0.085 mgl-1 near Hailsham to 0.063mgl-1 near Windmill Hill. • DO 70% saturation 10th centile • BOD 4 Mgl-1 90th Centile • 0.6 Ammonia mgNl-1	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality can adversely affect the availability and suitability of breeding, rearing and feeding habitats. Two sewerage treatment plants flow into the top of the catchment. Water quality analysis by the Environment Agency show that phosphorus (P) levels are higher than 0.1m/l downstream of these plants. Maximum levels of 0.1m/l P can be tolerated by freshwater invertebrate and plant assemblages (which includes ram's-horn snail). Discharges from these two sewerage plants are not sufficiently diluted due to low flow. The storm water tank of one plant sits directly on the site and during peak flows discharges filtered, but untreated, sewerage into the same location. A mechanism	NATURAL ENGLAND, 2017. Natural England's Standard Advice on development within the Pevensey catchment. This is available on request from Natural England. NATURAL ENGLAND, 2014 Pevensey Levels Site Improvement Plan

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			is required to reduce phosphate output from existing point sources without loss of water flow. 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 however in this case, more stringent standards are needed to reflect the ecological needs of the species feature. Natural England has aligned water quality targets for the site with the Environment Agency's Water Framework Directive targets for Good Ecological Status. These targets are site specific and were developed using the Agency's detailed models and available data.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity**	Maintain water quantity at a standard which provides the necessary conditions to support the feature (0.3cm below ditch neck).	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quantity of water supply will be critical, especially at certain times of year. Inadequate quantities of water can adversely affect the structure and function of supporting habitats. The site has a complex hydrology which is subject to a water level management plan. The Environment Agency and the Pevensey and Cuckmere Water Level Management Board are jointly responsibility for delivering this plan. Levels are controlled by a series of sluices and pumping stations. Maintaining adequate water levels (0.3cm below ditch neck) is critical to the feature.	Natural England's standard advice on development within the Pevensey catchment (Natural England, 2017) This is available on request from Natural England. NATURAL ENGLAND, 2014 Pevensey Levels Site Improvement Plan
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water salinity**	Maintain salinity at a level which would not significantly affect *Anisus* populations.	Raised salinity levels may occur at a result of changes in sea level and/or frequency of tidal or brackish inundations. *Anisus vorticulus* is not known to have a tolerance for elevated salinity levels. Any changes in management or connectivity which result in the elevation of salinity levels in the main channels are likely to have an impact of the SAC feature over time.	
Version Control Advice last updated: **18 March 2019:** Following feedback from stakeholders. Explanatory notes for **Water salinity** amended to clarify potential impact on species if saline levels increase; additional information in explanatory notes for **Ditch Management** attribute to provide context around habitat usage in the UK compared to Europe.				
Variations from national feature-framework of integrity-guidance: N/A				

References

The International Union for Conservation of Nature (IUCN) (2018). The IUCN Red List of Threatened Species. Version 2018-2. http://www.iucnredlist.org. Downloaded on 14 November 2018.

Watson, A. M & Ormerod, S. J (2004) The distribution and conservation of threatened *Sphaeriidae* on British grazing marshland. Biodiversity and Conservation, **14** (9) 2207-2220.

Willing, M. J & Killeen, I. J. (1999) *Anisus vorticulus* - A rare and threatened water snail. British Wildlife, **10** (6) 412-418