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

Arun Valley Special Area of Conservation (SAC) UK0030366

Date of Publication: 20 March 2019

About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Arun Valley SAC. This advice should therefore be read together with the SPA 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.

This advice replaces a draft version dated 11 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	Arun Valley Special Area of Conservation (SAC)
Location	Surrey, East and West 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	487.48 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)	Amberley Wild Brooks SSSI and Pulborough Brooks SSSI
Relationship with other European or International Site designations	The boundary of the Arun Valley SAC overlaps with Arun Valley SPA - UK9020281 Separate European Site Conservation Objectives for the nearby sites can be found at: • Arun Valley SPA

Site background and geography

The Arun Valley SAC is situated within the South Downs National Character Area (NCA Profile 125) in West Sussex is located just north of the South Downs escarpment about 15 km inland from the south coast of England. It consists of low-lying grazing marsh, largely on alluvial soils, but with an area of peat derived from a relict raised bog. Variation in soils and water supply lead to a wide range of ecological conditions and hence a rich flora and fauna. Southern parts of the Arun Valley are fed by calcareous springs, while to the north, where the underlying geology is Greensand, the water is more acidic.

The history of management of fields, and their water levels, determines the plant communities present, with drier fields dominated by meadow grasses, Crested Dog's-tail *Cynosurus cristatus* and Perennial Rye-grass *Lolium perenne*. In wetter areas, rushes, sedges and Tufted Hair-grass *Deschampsia cespitosa* are more frequent. Ungrazed fields have developed into fen, scrub or woodland. Fen areas consist of Common Reed *Phragmites australis*, Reed Sweet-grass *Glyceria maxima* and Greater Tussock-sedge *Carex paniculata*, often with scattered elder *Sambucus* sp. and sallow scrub. On firmer ground, there is Alder *Alnus glutinosa*, Willow *Salix* sp., Birch *Betula* sp., and sallow, with Oak *Quercus robur* and Hazel *Corylus avellana* woodland on the driest ground. The ditches and margins between grazing marsh fields have an outstanding aquatic flora and invertebrate fauna.

The Arun Valley supports important numbers of wintering waterbirds, which feed in the wetter, low-lying fields and along ditches.

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:

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

Little whirlpool ram's-horn snail 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.

This snail 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. The Arun valley is one of the three main population centres for this species in the UK. Two of its core sites are situated in the wash lands of the Arun floodplain
(Pulborough Brooks and Amberley Wild Brooks SSSIs).

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 the abundance of the population at a level within the known core population areas at Pulborough Brooks. Restore the population within Amberley Wild Brooks.	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. 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	Natural England (2013) Definition of Favourable Condition - Pulborough Brooks and Amberley Wild Brooks SSSI (Available on request from Natural England) Population surveys undertaken between 2013 and 2016 (Natural England)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			possible, local Natural England staff can advise that the figures stated are the best available.	
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. *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: extent and distribution	**Extent of supporting habitat**	Maintain the total extent of the habitats which support the feature There are approximately 63km of ditches spread across 473 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.	
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 for which the site is designated require a cycle of ditch management, to	Natural England (2018) The IUCN Red List of Threatened Species – (2018)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			ensure that there is a balance of habitats from early (recently cleared) to late successional ditches. The little whirlpool ram's-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 more naturally functioning habitats elsewhere in Europe.	
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	Natural England (2017)
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.	Natural England (2017)
Supporting habitat: structure/ function	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, within typical values for the supporting habitat	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
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	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. Native plants are able to co-exist somewhat more easily with other non-native species, such as *Acorus calamus, Elodea spp, and Lagarosiphon major. Elodea* is present in a small number of ditches, but the population has not increased.	Natural England (2013) Definition of Favourable Condition - Pulborough Brooks and Amberley Wild Brooks SSSI (Available on request from Natural England)
Supporting processes (on which the feature and/or its supporting habitat relies)	**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 being moderate, taking into account the sensitivity, fragmentation, topography and management of its habitats/supporting habitats. This means that this site is considered to be vulnerable overall but moderately so. This means that some adaptation action for specific issues may be required, 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. There is an extensive network of freshwater ditches and wet grassland outside of the SAC which is known to support population/s of *Anisus vorticlus.* The Environment Agency is currently reviewing the future maintenance of the banks of the River Arun with several options under consideration. A full assessment of potential impacts on *Anisus vorticulus* is ongoing. There is a need to for these sub-sites to remain functionally linked to the SAC so that the population can become resilient to periodic flooding and poor water quality events.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360] Willings, 2012 Lower Tidal River Arun Strategy (LTRAS): https://www.gov.uk/government/publications/lower-tidal-river-arun-flood-risk-management-scheme
Supporting processes (on which the feature and/or	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary	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.	English Nature, Views About Management (2005) Natural England (2014) Site

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
its supporting habitat relies)		to Maintain the structure, functions and supporting processes associated with the feature 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.	Improvement Plan, Arun Valley
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quality/ nutrient status**	Restore a total phosphorus level <0.1 mg L-1	The ranges are derived from Pevensey which probably has the biggest population of *Anisus* although their locally derived targets for the other component sites should be checked against this and the lowest impact levels adopted for assessments. There's a risk that undetected deterioration in the quality of water entering the ditch systems is impacting upon SPA/SCI/Ramsar species. *A. vorticulus* requires good water quality. Many aquatic plant species such as Potamogeton spp. (pond weeds), require good water quality, which is the essential supporting habitat for *A.vorticulus*. The River Arun, which has connections to the SAC is not meeting WFD standards for phosphorus levels	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity**	Maintain water quantity to a standard which provides the necessary conditions to support the feature Characteristic water levels to be maintained. Generally, in wet ditches summer water depth at least 0.5m in minor ditches and 1m in major drains. 90% of channel length should reach this target. For *Anisus vorticulus*: 30% of ditches should not exceed 1m in depth.	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 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 and feeding habitats. Meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) can be sufficient to support the SAC Conservation Objectives but as they are not related to near surface protection they will not adequately protect the SAC feature and more stringent standards may be needed to support the SAC feature. Further site-specific investigations may be required to establish appropriate standards for the SAC.	More detailed information for each component part of the SAC may be available from Natural England. Natural England (2014) Site Improvement Plan, Arun Valley Natural England (2013) There is a Water Level Management Plan in place for Amberley Wild Brooks. This requires reviewing.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
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.	Natural England (2014) Site Improvement Plan, Arun Valley
Version Control Advice last updated: **20 March 2019** following stakeholder feedback. **Ditch management** additional explanatory notes added to note apparent difference in habitat use between UK and European populations. **Water salinity** additional explanatory notes included to clarify impacts of elevated salinity levels.				
Variations from national feature-framework of integrity-guidance: **Air quality** attribute removed as no critical load data for ram's-horn snail				

References

English Nature (2005), Views About Management document for Amberley Wild Brooks SSSI. Available from: https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1003987.pdf

Natural England (2014) A survey of ditches on Pulborough Brooks SSSI for the Little Whirlpool Ram's-horn Snail *Anisus vorticulus*

Natural England (2016) A survey of ditches on Amberley Wild Brooks SSSI for the Little Whirlpool Ram's-horn Snail *Anisus vorticulus*

Natural England (2014) Site Improvement Plan Arun Valley. Available from:

Natural England (2017), Ditch Management Protocol for Little Whirlpool Ramshorn Snail (version 12/2017)

Natural England (2018), Land Drainage Act 1991, proposed abolition of the River Arun internal drainage district document

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.