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

Dixton Wood Special Area of Conservation (SAC)
Site code: UK0030135

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About this document

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

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	Dixton Wood Special Area of Conservation (SAC)
Location	Gloucestershire
Site Maps	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	April 2005
Qualifying Features	See section below
Designation Area	13.14 ha
Designation Changes 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)	Dixton Wood SSSI
Relationship with other European or International Site designations	None

Site background and geography

Dixton Wood SAC, on Oxenton Hill in Gloucestershire, falls within the Severn and Avon Vales National Character Area (see: NCA 106 for further information). Although, both it and the neighbouring violet click beetle site of Bredon Hill SAC (7.5 km away) sit atop Cotswolds Jurassic oolitic limestone outliers.

Dixton Wood is a steep east facing woodland surrounded by permanent grassland, situated in the foothills of the Cotswold Scarp. The wood represents an atypical ash *Fraxinus excelsior*-field maple Acer campestre-dog's mercury *Mercuralis perennis* community, with a lush but impoverished ground flora and unusual structure derived from wood pasture management. The historic management of the site has resulted in a number of very large, low ash pollards with a range of deadwood types, from split ash boles, shattered tree limbs, old and active pollards and cut stumps. The moist clay soils, the aspect and ground and scrub cover sustain a humid microclimate which probably enhances the decay process.

The beetle fauna associated with the decaying-wood habitats of Dixton Wood is very rich and includes the violet click beetle *Limoniscus violaceus*. Hawthorn *Crataegus monogyna* hedges and flowering bramble *Rubus fruticosus* agg. both provide important nectar sources for the deadwood fauna.

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:

- **S1079 Violet click beetle *Limoniscus violaceus***

  The violet click beetle *Limoniscus violaceus* is extremely rare in the UK and was first noted in 1937 at Windsor Forest.

  There are only three sites in the UK currently known to support this species; all are in England. It is primarily associated with ancient trees, as it develops in undisturbed wood-mould or mulch at the base of central cavities in these trees. At Windsor Forest it seems to develop exclusively in beech *Fagus sylvatica*, but at Bredon Hill and Dixton Wood ash *Fraxinus excelsior* appears to be the main species used. It is probable that a large population of ancient ash and beech trees is necessary for a site to support this species. Violet click beetles are thought to breed repeatedly in the same tree until it rots away and the adults fly off to find new breeding sites.

  Violet click beetle was discovered at Dixton Wood in 1998 and it has been found at the site on a single occasion subsequently. It is a small site with large number of ancient ash *Fraxinus excelsio*r pollards, and supports a rich fauna of scarce invertebrate species associated with decaying timber on ancient trees.

  The violet click beetle is also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017, making it a 'European Protected Species'. A Licence may therefore be required for any activities likely to harm or disturb violet click beetle.

Violet click beetle (Roger Key/Peoples Trust for Endangered Species)

Table 1: Supplementary Advice for Qualifying Features: S1079. *Limoniscus violaceus*; Violet click beetle

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)	**Conservation measures**	Maintain the management measures within the woodland site boundary, which are necessary to restore the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	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. 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. Pollarding of trees to extend their life and provide suitable habitat for deadwood invertebrates has been carried out under agreements with the landowner. Management agreements will need to be arranged beyond the lifetime of the current one and ideally include land beyond the boundary of the SAC. A continuity of dead and decaying wood, at a suitable stage of decay for the beetle needs to be established into the long term future to ensure the survival of the violet click beetle.	NATURAL ENGLAND. SSSI Condition assessment report. Available from Natural England : https://designatedsites.naturalengland.org.uk/ NATURAL ENGLAND, 2014. Dixton Wood Site Improvement Plan (SIP). Available from : https://designatedsites.naturalengland.org.uk/
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Maintain the total extent of the woodland habitat(s) which support the feature at: 13.14 ha Suitable wood decay (quantity unknown).	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 beetle depends on the production of humid wood-mould where it lives for part of its life cycle within decaying trees; this is typically found in veteran trees where they show signs of rot. The amount of suitable and available wood-mould in the SAC is unknown. The lack of succession in veteran cohorts is an issue and it makes the need for extending the life of the existing veteran trees, in a state of usefulness to the beetle, even more important. Fully dead trees dry out and become unsuitable habitat. The adult beetle also requires a nearby nectar source provided by flowering shrubs such as bramble and hawthorn.	NATURAL ENGLAND, SSSI Condition assessment report. Available from : https://designatedsites.naturalengland.org.uk/ NATURAL ENGLAND, 2014. Dixton Wood Site Improvement Plan (SIP). Available from : https://designatedsites.naturalengland.org.uk/

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Maintain the distribution and continuity of the feature and its supporting habitat, W8 Ash woodland (including the presence of suitably decaying veteran trees and nectar providing plants	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. The violet click beetle requires large circumference trees, Gouix et al (2015) suggest greater than 235 cm at 30cm above ground with basal rot cavities in the advanced stages of decay. Little is known about the dispersal dynamics of the species so the required distribution of suitable trees and appropriate woodland density is currently unknown although they do appear to utilise both woodland and pasture trees. Nectar sources, such as hawthorn *Crataegus monogyna* in hedgerows and scrub, and thistles *Cirsium* spp. in grasslands, are important feeding and mating sites for the adults of saproxylic insects. In terms of the wider ecological network, the Bredon Hill SAC (also designated for violet click beetle) is approximately 7.5 km away and both sites are within a landscape noted for its veteran ash trees. Linkages between these two populations need to be identified and maintained or restored as appropriate.	NATURAL ENGLAND. SSSI Condition assessment report. Available from : https://designatedsites.naturalengland.org.uk/ NATURAL ENGLAND, 2014. Dixton Wood Site Improvement Plan (SIP). Available from : https://designatedsites.naturalengland.org.uk/ GOUIX N et al 2015, Habitat requirements of the violet click beetle (*Limoniscus violaceus*), an endangered umbrella species of basal hollow trees, *Insect Conservation and Diversity*, 8, 418-427. WHITEHEAD PF 2003, Current Knowledge of the violet click beetle (*Limoniscus violaceus*) in Britain. In: Proceedings of the second pan-European conference on Saproxylic Beetles. London: People's

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				Trust for Endangered Species. pp 1-9.
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 low, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be vulnerable overall but are a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable. Climate change may impact wood decay fungi and therefore the rate of formation of rot holes suitable for the beetle. The impact may be positive or negative depending on the combination of temperature and moisture. Suitable wood habitat needs to be expanded in order to provide a varied range of temperature and moisture combinations to continue to provide the correct conditions for wood decay that suit the beetle. Climate change may also increase the likelihood of extreme weather conditions. For example, an increase in stormy conditions affecting the survival rate of old trees (especially in the summer) and summer droughts leading to tree deaths.	A'BEAR AD et al 2014, Interactive effects of temperature and soil moisture on fungal-mediated wood decomposition and extracellular enzyme activity. *Soil Biology and Biochemistry*, 70, 151-158. 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]
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 of the feature	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 processes (on which the feature relies)	**Hydrology**	At a site, unit and/or catchment level (as necessary), maintain natural hydrological processes to provide the conditions necessary to sustain the feature's supporting habitat within the site	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. The moist clay soils of this SAC help to sustain a humid microclimate which probably enhances the wood-decay process to benefit the beetle. These damp woodland floor conditions rely on subsurface water passing through the SAC. No abstraction licenses identified as impacting the site.	ENVIRONMENT AGENCY. 2002. PROFORMA FOR STAGES 1 & 2 OF THE REVIEW OF CONSENTS FOR DIXTON WOODS c SAC. Available on Request from Natural England
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Restore as necessary concentrations and deposition of air pollutants to 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).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Nitrogen is currently exceeding the 10-20 kg/ha/yr at an average of 29.82. This may impact soil processes through nutrient imbalance, altered composition of mycorrhiza and ground vegetation. Acidity, Ammonia and NOx are within set limits while no limit has been set for SO_2. The impacts of air pollution are on the broad woodland habitat rather than the click beetle itself.	
Supporting habitat: structure/ function	**Abundance of standing decaying-wood**	Maintain all ancient and veteran ash and/or beech trees which have hollowed and contain wood mould in a constant humid environment.	The decaying wood and leaf litter associated with tree cavities in very old hollow ash and beech trees provides habitat for the larvae and breeding adults. The number of potentially suitable trees has been assessed in the 2017 survey	NATURAL ENGLAND, 2014. Dixton Wood SSSI Definitions of Favourable Condition. Available from Natural England on request BUGLIFE, 2017. Dixton wood tree survey, (restricted data may be shared at an appropriate scale on request)
Supporting habitat: structure/ function	**Continuity of ancient trees and decaying-wood habitat**	Ensure the continuous presence of future ancient tree cohorts within the SAC for long-term survival of the species.	The decaying wood and leaf litter associated with tree cavities in very old hollow ash and beech trees provides habitat for the larvae and breeding adults. It is thought adults have a close association with individual trees all their lives, only leaving when the tree rots away and no longer provides the conditions they need for breeding. Maintaining the continuity of this habitat is critical for their long-term survival. The beetle requires large circumference trees (greater than 235 cm at 30cm above ground) with basal rot cavities in the advanced stages of decay. Gouix *et al* (2015) suggest that coppicing was an important part of creating trees that developed suitable rot holes. Little is known about the dispersal dynamics of the species so the required distribution of suitable trees and appropriate woodland density is currently unknown therefore a precautionary approach should be taken. They do appear to utilise both woodland and pasture trees, it is the wood mould resource that is most critical. The 2017 survey report gives details of the trees predicted to be suitable resource for the beetle.	NATURAL ENGLAND, 2014. Dixton Wood Site Improvement Plan (SIP). Available from : https://designatedsites.naturalengland.org.uk/ BUGLIFE, 2017. Dixton wood tree survey, (restricted data may be shared at an appropriate scale on request) GOUIX N et al 2015, Habitat requirements of the violet click beetle (*Limoniscus*

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			A successor generation of ash or beech trees should be present and average at least 5 trees per hectare. Planning needs to be for at least 300 years into the future. Zach (2002) recommended that suitable trees should be no more than 80 metres apart as the species is not a good disperser. Outbreaks of tree disease has the potential to affect future generations of successor trees. The violet click beetle is only found in ash trees on the two SW sites, and ash dieback can affect both currently suitable and potentially suitable trees (age class gap). Recently pollarded trees are thought to be more susceptible ash die back which may affect the ability to manage valuable veteran trees.	*violaceus*), an endangered umbrella species of basal hollow trees, Insect Conservation and Diversity, 8, 418-427. WHITEHEAD PF 2003, Current Knowledge of the violet click beetle (*Limoniscus violaceus*) in Britain. In: Proceedings of the second pan-European conference on Saproxylic Beetles. London: People's Trust for Endangered Species. pp 1-9. ZACH P. (2002) The occurence and conservation status of Limoniscus violaceus and Ampedus quadrisignatus (Coleoptera, Elateridae) in Central Slovakia. Proceedings of the second pan-European conference on Saproxylic Beetles. PTES
Supporting processes (on which the feature and/or its supporting	**Continuity of natural processes**	Restore the continuity of natural processes through timber decay and nutrient recycling to provide a continuity of wood-mould habitat	Natural processes of decomposition and decay are important in providing conditions for beetle larvae which live off the nutrients derived from the mixture of leaves, decaying wood and bird droppings that they live in. The 2017 survey identifies few trees of high suitability within the site,	NATURAL ENGLAND, SSSI condition assessment report. Available from : https://designatedsites

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat relies)			though there are more of medium suitability, therefore the target is set as restore	.naturalengland.org.uk/ BUGLIFE, 2017. Dixton wood tree survey, (restricted data may be shared at an appropriate scale on request) GOUIX N et al 2015, Habitat requirements of the violet click beetle (*Limoniscus violaceus*), an endangered umbrella species of basal hollow trees, Insect *Conservation and Diversity*, 8, 418-427.
Population (of the feature)	**Occupation of wood-mould trees.**	Restore the abundance of host trees occupied by the Violet Click Beetle, whilst avoiding deterioration from its current levels as indicated by the latest count or equivalent. .	Trees which are, and can be, occupied by the beetle larvae are critical given the fidelity of the beetle to host trees. The larvae live in the black mulch within the base of hollow trees that forms towards the end of the cycle of decay, usually at or below ground level. Emergence trapping as described by Gouix (2011) is now considered to be the best option for getting an understanding of occupation in likely trees. Comprehensive survey for the beetle still needs to be carried out, hence the target remains as restore. Emergence trapping failed at Bredon so until such time as DNA identification or pheromone trapping has been successfully developed, the best assessment remains assessing the viability of the wood mould resource .	NATURAL ENGLAND, 2014. SSSI condition assessment report. Available from : https://designatedsites.naturalengland.org.uk/ GOUIX et al 2011, Emergence trap, a new method to survey *Limoniscus violaceus* (Coleoptera: Elateridae) from hollow trees. *Biodiversity and Conservation*, 21.
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: **n/a**				