



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

**St Austell Clay Pits Special Area of Conservation (SAC)
Site Code: UK0030282**



St Austell Clay Pits SAC - Baal Pit (photo credit D. Callaghan 2011)

Date of Publication: 11 February 2019

About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to St Austell Clay Pits SAC.

This advice should therefore be read together with the SAC Conservation Objectives available [here](#)

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	St Austell Clay Pits Special Area of Conservation (SAC)
Location	Cornwall
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	01/04/2005
Qualifying Features	See section below
Designation Area	0.61 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)	St Austell Clay Pits SSSI
Relationship with other European or International Site designations	N/A

Site background and geography

St Austell Clay Pits SAC is comprised of three sub-sites, all located in mid-Cornwall within the china clay district to the north of St Austell, and within an approximate 4 km radius of each other. The sub-sites; Baal Pit (Carclaze, north of St Austell), Prosper Pit (south of Roche) and Trethosa Pit (south of Treviscoe), are located within china clay workings, consisting of pits, spoil tips and granitic debris with sparse vegetation cover. They are underlain by the Upper Carboniferous St Austell Granite, which forms part of the Cornubian batholith.

Zones within the granite, altered by kaolinisation (a process of decomposition), have been extensively worked for china clay. Decomposition of the white feldspar component of the granite produces kaolinite, the main constituent of china clay. China Clay was first discovered in Cornwall at Tregonning Hill, near Helston in 1746. By 1748 larger and more pure deposits had been found in the St Austell area, and by the early 19th Century the St Austell china clay deposits had emerged as the largest in the World. China clay continues to be extracted in the St Austell district.

The site supports important populations of the internationally rare liverwort, western rustwort *Marsupella profunda*. In the St Austell Clay Pits SAC, *Marsupella profunda* is generally found growing on firm clay substrates and soft or crumbling granite boulders. *Marsupella profunda* is a pioneer species, the largest populations being found on surfaces showing the early stages of colonisation by filamentous algae, other bryophyte species and vascular plants.

The SAC lies within the [Hensbarrow National Character Area \(NCA Profile 154\)](#)

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:

- **S1390 Western rustwort *Marsupella profunda***

The SAC is comprised of three sub-sites, all within the china clay district to the north of St Austell. The site supports important populations of *Marsupella profunda* western rustwort, an internationally rare liverwort, endemic to western Europe. It has a restricted, strongly oceanic distribution, and is known only from a small number of sites in Portugal, the Azores, Madeira and the UK where it is known only from Cornwall. Surveys and research have shown that a large proportion of the global population of *Marsupella profunda* occurs in Cornwall, within former china clay workings in west Cornwall near St Just and Helston, and in the working china clay district of St Austell in mid Cornwall.

Marsupella profunda is a specialist of open clay substrates and kaolinised granitic material (boulders, rock outcrops) which are bare or in the early stages of colonisation by filamentous algae and other small bryophytes. *Marsupella profunda* often grows intermixed with the similar species, *Marsupella sprucei*, and/or with *Marsupella emarginata*.

Marsupella profunda is a 'mobile' colonist species, which functions as a typical 'metapopulation'. This species is limited by the duration of suitable habitat. The maintenance of the metapopulation relies on a balance between local extinctions due to vegetation succession, and its ability to colonize new sites. The critical requirement of a metapopulation is the continual availability of suitable habitat.

A metapopulation is the overall population within a general area, consisting of a number of, sub-populations which may be temporary in nature, with a balance between local extinctions and colonisation of new sites.

Marsupella profunda is a poor competitor which is soon shaded out as other plants become established. It freely produces wind-blown spores, a typical reproductive strategy of a colonist. Factors influencing the success of colonisation are spore production, dispersal distance, rates of establishment and survival, and most importantly, the availability, proximity and spatial distribution of habitats suitable for colonisation.

Table 1: Supplementary Advice for Qualifying Features: S1390. *Marsupella profunda*; Western rustwort *

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	Population abundance	Restore the abundance of the population to a level which is above the 2003 baseline population cover	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>It is difficult to quantify the size of <i>Marsupella profunda</i> populations, as it commonly grows intermixed with the superficially similar species <i>Marsupella sprucei</i> (microscopic verification of sample material is required</p>	<p>CALLAGHAN D. 2011</p> <p>HOLYOAK D. T. 1998</p> <p>HOLYOAK D. T. 1999</p> <p>HOLYOAK D. T. 2003</p> <p>HOLYOAK D. T. 2006</p> <p>HOLYOAK D. T. 2007a</p> <p>HOLYOAK D. T. 2009</p> <p>HOLYOAK D. T. 2010</p> <p>HOLYOAK D. T. 2010</p> <p>PORLEY R. 2007b</p>

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			<p>for reliable confirmation of field identification). <i>Marsupella emarginata</i> may also grow intermixed with <i>Marsupella profunda</i>.</p> <p>In 2010 surveys to sample the most promising habitats for <i>M. profunda</i> outside of SAC/SSSI designated sites in the St Austell china clay district found more than 30,000 cm², compared with a total of 147 cm² within the SAC. i.e.: surveys in 2010 found that ≥99.5% of the total <i>Marsupella profunda</i> population was outside of designated sites in the St Austell china clay district, while only ≤ 0.5% of the population occurred within the SAC boundaries (D T Holyoak March 2010 report).</p> <table border="1"> <thead> <tr> <th colspan="5"><i>Marsupella profunda</i> population size/cover estimates cm² (ca.)</th> </tr> <tr> <th>Surveys</th> <th>Baal Pit (Carclaze)</th> <th>Prosper Pit (Great Wheal Prosper)</th> <th>Trethosa Pit (S. of Treviscoe)</th> <th>Total cm² in SAC</th> </tr> </thead> <tbody> <tr> <td>1998</td> <td>substantial population</td> <td>not found here until 1999</td> <td>large population</td> <td></td> </tr> <tr> <td>1999</td> <td>900 cm²</td> <td>1800 cm²</td> <td>1400 cm²</td> <td>4100</td> </tr> <tr> <td>2003</td> <td>1630 cm²</td> <td>720 cm²</td> <td>160 cm²</td> <td>2510</td> </tr> <tr> <td>2006</td> <td>1800 cm²</td> <td></td> <td>46 cm²</td> <td>≥1846</td> </tr> <tr> <td>2007</td> <td>1800 cm²</td> <td>not measured</td> <td>probably several hundred cm²⁴</td> <td>≥1800</td> </tr> <tr> <td>2009</td> <td>40 cm²</td> <td>50 cm²</td> <td>55 cm²</td> <td>145</td> </tr> <tr> <td>2010</td> <td>40 cm²</td> <td>52 cm²</td> <td>55 cm²</td> <td>147</td> </tr> <tr> <td>2011</td> <td>917 cm²</td> <td>35 cm²</td> <td>30 cm²</td> <td>982</td> </tr> </tbody> </table>	<i>Marsupella profunda</i> population size/cover estimates cm² (ca.)					Surveys	Baal Pit (Carclaze)	Prosper Pit (Great Wheal Prosper)	Trethosa Pit (S. of Treviscoe)	Total cm ² in SAC	1998	substantial population	not found here until 1999	large population		1999	900 cm ²	1800 cm ²	1400 cm ²	4100	2003	1630 cm²	720 cm²	160 cm²	2510	2006	1800 cm ²		46 cm ²	≥1846	2007	1800 cm ²	not measured	probably several hundred cm ²⁴	≥1800	2009	40 cm ²	50 cm ²	55 cm ²	145	2010	40 cm ²	52 cm ²	55 cm ²	147	2011	917 cm ²	35 cm ²	30 cm ²	982	
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Supporting habitat: extent and distribution	Distribution of supporting habitat	Restore 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	<p>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.</p> <p>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.</p>	<p>CALLAGHAN D. 2011</p> <p>HOLYOAK D. T 2010</p> <p>NATURAL ENGLAND 2015a</p> <p>PORLEY R. 2007</p>																																																		

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p><i>Marsupella profunda</i> habitat requirements:</p> <ul style="list-style-type: none"> • relatively young, damp bare clay substrates or soft granitic material (boulders, rock outcrops) in well-lit situations (shade is not tolerated) • clay substrates in the early stages of colonisation by filamentous algae and other small bryophytes • sheltered sites with humid conditions (often occurring close to open water) with firm substrates in well-drained topographic situations <p>China clay habitats patches exist for relatively short periods, before natural vegetation succession results in local extinctions of <i>Marsupella profunda</i> populations. The species relies on its abilities to disperse (windblown spores) and establish new populations, therefore it is critical that new or suitable habitat patches are continually available for re-colonisation. The availability, proximity and spatial distribution of habitats suitable for colonisation appear to be the key factors influencing the success of dispersal and establishment of new colonies.</p> <p>Because of the meta-population nature of this species, as well as restoring the distribution of supporting within the SAC boundary, consideration should be given to the creation and/or restoration of suitable habitat outside of the SAC boundary, where there are opportunities to do so.</p> <p>See comments under 'conservation measures' and 'extent of supporting habitat' with regard to metapopulation functioning and the significant populations of <i>Marsupella profunda</i> present outside of the SAC site boundaries and also the large areas of potentially suitable habitat within the wider china clay working area.</p>	
Supporting habitat: extent and distribution	Extent of supporting habitat	<p>Restore the total extent of the habitats which support the feature within and outside of the SAC boundaries</p> <p>Baseline values for the extent of suitable habitat will need to be determined, both for existing</p>	<p>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.</p>	<p>CALLAGHAN D. 2011</p> <p>HOLYOAK D. T 2010</p> <p>PORLEY R. 2007</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		SAC boundaries and outside of the designated site, in the wider St Austell china clay working area.	<p>Significant areas of potential habitat are present within SAC sub-sites but management is needed to improve the habitat for <i>M. profunda</i> (See Conservation Measures attribute)</p> <p>In addition to increasing the area of suitable habitat within the SAC, huge areas of potentially suitable habitat for the species exists outside of the SAC, within the wider working area of the St Austell china clay district (See Conservation Measures attribute)</p>	
Supporting habitat: structure/function	Bare ground and vegetation structure	Ensure the total extent of unshaded, bare ground is at least 80% with other pioneer bryophytes, scattered seedlings and grasses at a low level and not out-competing <i>M. profunda</i> .	<p><i>M. profunda</i> is readily out-competed by other more vigorous bryophytes, such as <i>Diplophyllum albicans</i>, and vascular plants, and thus a sufficiently high level of bare ground should be available for colonisation by this pioneer species.</p> <p>Bare ground includes clay substrates, rocks, stones and thin algal crusts.</p>	
Supporting habitat: structure/function	Hydrological regime	Maintain the hydrology of sites at a level appropriate for <i>M. profunda</i> , which favours humid conditions.	<p><i>M. profunda</i> favours moist substrates and humid conditions, for example it is known to favour boulders in flooded disused pits where humidity is permanently high. It may be beneficial to place suitable boulders within such pits as habitats for the species after sites have been worked.</p> <p><i>Marsupella profunda</i> requires sheltered sites with humid conditions in well-drained topographic situations.</p> <p>Open water (flooded clay pit) is present in close proximity to <i>Marsupella profunda</i> populations at Baal, Prosper and Trethosa Pits.</p>	NATURAL ENGLAND 2015a
Supporting habitat: structure/function	Scrub and tree cover	<p>Restore the total extent of the cover of scrub and trees where <i>M. profunda</i> grows, or has the potential to colonise, to less than 10%.</p> <p>Scrub and trees should not directly shade colonies of <i>M. profunda</i>.</p>	<p><i>M. profunda</i> is vulnerable to being shaded out by the canopy of scrub and trees. Scrub should be cleared and treated with herbicide at regular intervals. Scrub and tree species which may be of particular concern include gorse, bramble, heather, Rhododendron, sallows (willows) and birch. Tree planting and cultivation should not occur on or near areas colonised by <i>M. profunda</i>.</p> <p>Scrub, including Rhododendron is a threat on all three SAC sub-sites and throughout the St Austell china clay district generally</p>	CALLAGHAN D. 2011 NATURAL ENGLAND 2015a

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/function	Soils, substrate and nutrient cycling	Restore 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	<p>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.</p> <p><i>Marsupella profunda</i> requires bare, soft granitic rock/boulders and firm clayey substrates (acidic).</p>	PORLEY R. 2007
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	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	<p>NATURAL ENGLAND, 2015b. http://publications.naturalengland.org.uk/publication/4954594591375360</p> <p>PORLEY R. 2007</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>The implications of local and global warming and other aspects of climate change on an oceanic species such as <i>Marsupella profunda</i> are not known. It is at the northern limits of its global distribution in Cornwall.</p> <p>Research into the genetic variation within and between sub-populations of <i>Marsupella profunda</i> and investigation (modelling) of the functioning of metapopulations in respect of climate change would be valuable in informing the future management of this species.</p>	
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 to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	<p>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.</p> <p>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 (NO_x) 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.</p> <p>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.</p> <p>It is possible that <i>Marsupella profunda</i> could be affected by air pollution.</p>	<p>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).</p> <p>NATURAL ENGLAND 2015a</p>
Supporting processes (on which the feature and/or	Conservation measures	Restore the management measures within and outside the site boundary which are necessary to restore the	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,	<p>CALLAGHAN D. 2011</p> <p>DAVIES I. 2018</p>

Attributes	Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
its supporting habitat relies)	structure, functions and supporting processes associated with the feature and/or its supporting habitats.	<p>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.</p> <p>Key conservation management measures (D. Callaghan, email 20/11/2018):</p> <ul style="list-style-type: none"> • Large-scale vegetation/scrub clearance, focusing on north-facing slopes • Removal of plant litter to re-expose soft bare granite surfaces (this will require access for a mechanical digger) • Importation of a number of small boulders (ca. 10) which support <i>Marsupella profunda</i>, from selected donor sites in the St Austell China Clay district (potentially from non-designated sites) which support large <i>M profunda</i> populations, to aid re-colonisation <p>The restore target is selected for the following reasons:</p> <ul style="list-style-type: none"> • The 2011 survey (Callaghan D. 2011) assessed the <i>Marsupella profunda</i> populations in all three SAC sub-sites as undergoing a long-term decline from peak abundance about ten years previously, due to vegetation succession. <p>Since the St Austell Clay Pits SAC was designated in 2005, extensive surveys have found significantly larger populations of <i>Marsupella profunda</i> present outside of the designated SAC boundaries. Surveys in 2010 (Holyoak D. T. 2010) found that ≥ 99.5% of the <i>M. profunda</i> population in the St Austell china clay district occurred outside of SAC/SSSI boundaries.</p> <p>The current SAC site, composed of three spatially isolated sub-populations of <i>Marsupella profunda</i> and covering a total area of just 0.61 ha, is too small to support a functioning metapopulation.</p> <p>New habitat, suitable for <i>Marsupella profunda</i>, is constantly being created by the extraction of china clay in the St Austell district, and there are large populations of <i>Marsupella profunda</i> throughout the china clay working area. Conservation measures for this species, which functions as a metapopulation, should encompass the management and maintenance of</p>	<p>HOLYOAK D. T 2010</p> <p>NATURAL ENGLAND 2015a</p> <p>PORLEY R. 2007</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p><i>Marsupella profunda</i> populations within the SAC boundaries, in conjunction with landscape-scale management within the wider china clay area outside of designated sites.</p> <p>A landscape-scale management strategy for the proposed Garden Village development at west Carclaze has been designed to address the conservation measures needed to secure a long-term, viable metapopulation of <i>Marsupella profunda</i>. A detailed five year management plan (2019-2023) covers two of the SAC sub-sites at Baal and Prosper Pits and an additional seven refugia sites to be created within the west Carclaze area of the St Austell china clay district.</p>	
Supporting processes (on which the feature and/or its supporting habitat relies)	Surface disturbance	Restore high levels of surface disturbance to provide conditions necessary for colonisation by <i>M. profunda</i> .	High levels of surface disturbance may be of benefit by exposing additional areas of bare ground suitable for colonisation by <i>M. profunda</i> .	NATURAL ENGLAND 2015a
Supporting processes (on which the feature and/or its supporting habitat relies)	Water quantity/ quality	<p>Where the feature or its supporting habitat is dependent on surface water and/or groundwater, maintain water quality and quantity to a standard which provides the necessary conditions to support the feature</p> <p>Site-specific standards for water quantity/quality are not available</p>	<p>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.</p> <p>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.</p> <p><i>Marsupella profunda</i> requires sheltered sites with humid conditions in well-drained topographic situations. Open water (flooded clay pit) is present in close proximity to <i>Marsupella profunda</i> populations at Baal, Prosper and Trethosa Pits.</p>	PORLEY R. & HODGETTS N. 2005
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance:				
Surface Disturbance: Target for Surface Disturbance has been changed from low level to high level of disturbance, because the amount of scrub and consequent loss of habitat requires large scale disturbance to provide sufficient areas of bare substrate suitable for colonisation by <i>Marsupella profunda</i>				

References

CALLAGHAN D. 2011 *Bryophyte Survey and Condition Assessment of St Austell Clay Pits SSSI/SAC, Cornwall*. EcoStudy Report to Natural England (available on request)

DAVIS I. 2018 *West Carclaze Garden Village (Reserved Matters) Ecology: Marsupella profunda Management Strategy*. Code 7 Consulting, August 2018

HOLYOAK D. 2010 *The Status of Western Rustwort Marsupella profunda in Mid-Cornwall: Report to IMERYS on Surveys in March 2010* (report available on request from Natural England).

HOLYOAK D. T. 1998 *Status, Ecology and Conservation of the Liverwort Marsupella profunda in Cornwall, 1998* Report for English Nature under the Species Recovery Programme SRP (report available from Natural England on request)

HOLYOAK D. T. 1999 *Status, Ecology and Conservation of the Liverwort Marsupella profunda in Cornwall, 1999* Report for English Nature under the Species Recovery Programme SRP (report available from Natural England on request)

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