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

South Devon Shore Dock Special Area of Conservation (SAC)
Site Code: UK0030060

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to South Devon Shore Dock 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:

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About this site

European Site information

Name of European Site	South Devon Shore Dock Special Area of Conservation (SAC)
Location	Devon
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	341.01 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)	Prawle Point and Start Point SSSI Bolt Head to Bolt Tail SSSI
Relationship with other European or International Site designations	This site is adjacent to Start Point to Plymouth Sound and Eddystone cSAC and Skerries Bank and Surrounds MCZ

Site background and geography

This important rocky-shore site for shore dock (*Rumex rupestris*) stretches along the south Devon coast from near Hare Stone, just south of Hallsands in the east, to a point between Leek Cove and The Bull, near the entrance to the Salcombe estuary in the west. It includes the most southerly point in Devon and is predominantly south-facing. There is an additional section of this site at Soar Mill Cove, which overlaps with part of the Bolt Head to Bolt Tail SSSI. The site lies in the South Devon National Character Area (NCA 151).

Cliffs formed by Devonian schists occur throughout the length of the site. There are many rock outcrops, and the cliff height reaches 120m. Along much of the coast, however, these cliffs do not extend down to the present sea level. There are raised beaches between these and the low Pleistocene cliffs of pebbles, gravel, sand and clay (material known as 'head'), which are found at the present high water mark.

On the cliffs, there is a thin layer of well-drained loamy soil supporting maritime rock-crevice, maritime grassland, maritime heath and scrub communities with thrift (*Armeria maritima*), autumn squill (*Scilla autumnalis*) and heather (*Calluna vulgaris*). The site is of particular botanical importance due to the presence of many rare or local flowering plants and lichens and is also important for its invertebrate fauna and breeding birds. Shore dock within this site lies at the eastern limit of its current UK range.

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 habitats:

- **H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts**

Vegetated sea cliffs are steep slopes fringing hard or soft coasts, created by past or present marine erosion, and supporting a wide diversity of vegetation types with variable maritime influence. Exposure to the sea is a key determinant of the type of sea cliff vegetation. In the UK exposure is greatest on the south-west and northern coasts, where the long oceanic fetch associated with these coasts generates high waves and swell, and the prevailing winds help deliver salt spray to the cliff face and cliff tops. The most exposed areas of cliff support maritime vegetation dominated by a range of salt-tolerant plants. More sheltered cliffs support communities closely related to those found on similar substrates inland, such as grassland and heath, with only a minor maritime element in the flora.

The bedrock at South Devon Shore Dock SAC is composed of mineral-rich Lower Devonian schists forming cliffs. These cliffs support maritime grassland communities containing maritime species such as thrift *Armeria maritima*, sea plantain *Plantago maritima* and autumn squill *Scilla autumnalis*. The grassland merges into bare rock and coastal heath, which also support a number of uncommon plant species, including a lichen assemblage with Mediterranean affinities, and an invertebrate fauna consisting of species limited to southerly coastal sites. The site also supports a number of populations of shore dock *Rumex rupestris*, for which the site is also selected.

Qualifying Species:

- **S1441 Shore dock *Rumex rupestris***

Shore dock *Rumex rupestris* grows on rocky, sandy and raised beaches, shore platforms and the lower slopes of cliffs, and rarely in dune slacks. Plants can be found growing in isolation on the strand-line, through to tall-herb perennial communities at the base of flushed cliffs. However, it occurs only where a constant source of freshwater, running or static, is available. It is most commonly found growing by the side of streams entering beaches, on oozing soft-rock cliffs, and in rock clefts where flushing occurs. Populations of shore dock are known to fluctuate according to the severity of winter storms.

Culverting of streams, coastal defence, and boat-ramp construction on beaches have altered many of the shore dock's former localities, making them unsuitable for its survival by separating perennial vegetation at the bases of cliffs from the strand-line community and interfering with the natural geomorphological processes of slumping cliffs and streams entering beaches. Visitor pressure appears to be a significant factor in the decline of shore dock at several sites. A high proportion of the UK localities for this plant are owned by conservation bodies or public authorities, so favouring the maintenance and enhancement of populations at these localities. Other measures to promote species recovery have also been undertaken, including its attempted reintroduction at three sites in Devon and Cornwall.

Rumex rupestris is one of Europe's most threatened endemic vascular plants. Outside the UK, it is restricted to the coastal margins of Normandy and Brittany in France and Galicia in Spain, where it is declining and in low numbers. The UK is the world stronghold for this species.

In the UK, *Rumex rupestris* is currently known from about 40 locations in south-west England and Wales. The species is extinct in the former easternmost part of its range in Dorset. Several new colonies have been found in recent years as a result of systematic surveys of coastlines with suitable habitat in south-west England and south and west Wales. Population size varies greatly between sites, with the largest colonies generally supporting 50-100 individuals, most others (especially those on rocky shores) generally holding fewer than ten individuals, and several sites comprising single plants.

Shore dock colonies within this site can be found at Soar Mill Cove, Rickham Sands, Venericks Cove, Elender Cove and Great Mattiscombe Sand. At Elender Cover, shore dock was last recorded in 1999 and may have been lost from this location.

Table 1: Supplementary Advice for Qualifying Features: H1230. Vegetated sea cliffs of the Atlantic and Baltic coasts

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution	**Extent of hard or soft cliff capable of supporting sea cliff vegetation**	Maintain the total extent of the cliff system which is capable of supporting H1230 sea cliff vegetation, whilst avoiding deterioration from its current extent.	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis. The whole system acts to provide the range and variation of vegetation types and mosaics with bare ground. Extent may be measured in different ways but there are issues with measuring area of vertical cliffs. Reduction in extent can include smothering cliff slope, cliff foot or cliff top surfaces by artificial or dumped materials. This site has two discrete sections, with the largest section stretching approximately 12km along the south Devon coast and encompassing the headlands Start Point and Prawle Point (Natural England 2018). This 12km stretch consists of many rocky outcrops and cliffs that reach 90-120m in height. There are raised beaches and low cliffs of pebbles, gravels, sand and clay (known as 'head' material). The smaller section of this site lies further west at Soar Mill Cove, with cliffs and a sandy beach that span approximately 200m.	This attribute will be periodically monitored as part of Natural England's site condition assessments. JNCC (2015) Nature Conservancy council (1986) .

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution	**Future extent of habitat within the site and ability to respond to seasonal changes**	Maintain active processes such that the system can adjust to longer-term natural change, including landward recession, and that fluctuations in the extent of vegetated areas to bare rock occur over time and space within the site.	This recognises the need to allow for natural fluctuations in the extent and the distribution of this habitat feature, often during particular seasons and usually as a result of natural coastal processes.	
Extent and distribution	**Spatial distribution of the feature within the site**	Restore the distribution and continuity of the habitat and any associated transitions which reflects the natural functioning of the cliff system	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) 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. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also 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 some of the typical and more specialist species associated with the Annex I habitat feature. Transitions include cliff top and cliff foot transitions to terrestrial or marine habitats. Target set to Restore because this feature has been recorded as being in unfavourable condition in a number of areas within the SAC (SSSI units 4-10, 13, 16, 17, 20, 21 and 23), due to both under and over-grazing and lack of scrub management.	This attribute will be periodically monitored as part of Natural England's site condition assessments. Natural England (2014a)
Structure and function (including its typical species)	**Geo-morphological naturalness**	Maintain the geomorphological naturalness of the sea cliff system (from cliff top to foreshore connection with the intertidal zone)	The physical landforms associated with this habitat feature, and the processes that shape them, will be a primary influence on sea-cliff habitat. A key criteria for selecting SACs for this habitat feature was that they had no or minimal artificial modification and so demonstrates good geomorphological naturalness. Having a well-developed sea-cliff structure,	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			shaped by natural geomorphological processes, will ensure the full range of natural variation can occur.	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature Constant and preferential plants of the NVC communities associated with this feature present within the SAC. Cirl Bunting, *Emberiza cirlus* Vascular plant assemblage Lichen assemblage	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available. The hard rock outcrops support one of the richest saxicolous lichen floras to be found anywhere on the coast of Britain, including an assemblage of species with Mediterranean affinities. The species include the conspicuous and very rare *Roccella fuciformis*, *R. phycopsis*, *Buellia leptoclinoides* and *Teloschistes flavicans* together with many more rare and uncommon species.	Nature Conservancy Council (1986)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			The 'head' cliffs support good populations of many species of mining bees and digger wasps which burrow into the cliff face, and there are other bees and flies which are parasitic upon them. This site is nationally important for these hymenoptera, with over 100 species of bees and wasps having been recorded. Some of these are extremely rare, e.g. the long-horned bee *Eucera longicornis* which is parasitized by the cuckoo-bee *Nomada sexfasciata*. The mason wasp *Euodynenia quadrifasciatus* is restricted to only one or two localities. Butterflies and moths are well represented, the most notable species being the silver-studded blue butterfly *Plebejus argus*. Many birds, notably cirl bunting *Emberiza cirlus*, breed in the dense scrub, as do kittiwake *Rissa tridactyla* and cormorant *Phalacrocorax carbo* on cliff ledges.	
Structure and function (including its typical species)	**Presence of mosaic of microhabitats**	Maintain the diversity and range of microhabitats and bare areas resulting from active coastal processes/landslips	Each site will have a different configuration of geology and hydrology and maritime exposure, which will also change over time and space. The key aim is to maintain the full, naturally expected range of these in as natural a state as possible.	
Structure and function (including its typical species)	**Regeneration potential**	Maintain semi-natural vegetation on the cliff-top (either within of beyond the site boundary as appropriate), and its connectivity with the lower cliff slopes.	This is important to ensure that there is a continuous supply of seed-rich semi-natural vegetation material from the clifftops to feed the sea-cliff system below. As the top of the cliff slumps and recedes as a result of natural processes, the vegetation dropping onto the lower slopes should provide suitable material for their re-colonisation with native plant species from adjacent semi-natural habitats above.	
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by National Vegetation Classification types associated with this SAC feature.	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC).	Nature Conservancy Council (1986)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations). The presence, composition, location and extent of maritime scrub, heath and/or grassland plus mosaics of the three, on cliff slopes or cliff tops will be determined by the interaction of natural geomorphologcial processes with exposure and soil characteristics and management where relevant. The SAC encompasses all semi-natural NVC communities growing on the cliffs. The distribution of vegetation communities within the SAC is not well understood. A full NVC survey of the site is required.	
Structure and function (including its typical species)	**Vegetation: undesirable species**	Maintain the frequency/cover of the undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread.	Undesirable non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. Often they may be indicative of a negative trend relating to another aspect of a site's structure and function. These species will vary depending on the nature of the particular feature, and in some cases these species may be natural/acceptable components or even dominants. There are a range of non-native plants affecting coastal cliffs, and due to difficulties of access, these often pose problems with management. The key objective is to prevent any introductions or planting. This includes the dumping of spoil or organic waste on cliff tops or slopes within or beyond the site boundary which may contain plant seeds or propagules or enrich the site. There should be no invasive non-natives on the site. Appropriate scrub structure and density is a key feature of the sea cliffs. Target set to Restore because levels of scrub cover appeared to be increasing in 2014 and it was recommended	This attribute will be periodically monitored as part of Natural England's site condition assessments. Natural England (2014a)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			that developing scrub be removed from land in existing Higher Level Stewardship agreements via additional capital works (Natural England 2014a). Additional undesirable species may need to be added to this attribute as understanding of vegetation communities on the site is improved.	
Supporting processes (on which the feature relies)	**Air quality**	Maintain as necessary, the 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).	This habitat type 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 and causing the loss of sensitive typical species associated with it. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature relies)	**Cliff morphology, slope and elevation**	Maintain the natural processes that determine cliff morphology, slope and elevation	These physical components greatly influence the structure of this habitat type. Allowing natural dynamic processes to operate is important to providing optimal conditions which will allow the long-term conservation of this habitat feature. Interruption of these processes, through partial stabilisation or	Daniels *et al*. (1996)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			slowing of cliff erosion and recession rates, with artificial management of cliff slope vegetation, does not produce naturally-occurring conditions which could lead to undesirable changes in characteristic sea cliff vegetation. Natural coastal processes are thought to be generally unhindered within this site. Head material that overlies schist can be unstable and at times is subject to increased erosion as a result of storms (Daniels *at al*. 1996).	
Supporting processes (on which the feature relies)	**Hydrology/ drainage**	At a site, unit and/or catchment level maintain natural hydrological processes to provide the conditions necessary to sustain the feature 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. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. In 1995 and 1999, surveyors described the hydrological features at the following sites within the SAC when surveying shore dock (Daniels *et* al. 1996; McDonnell & King 2000): <u>Great Mattiscombe Sand</u> • Freshwater seepages present on the surface • A stream enters the beach and trickles over the rocks. • A very small seepage area present by the path • Small seepages surrounding the stream <u>Elender Cove</u> • A damp site with freshwater from a small stream which cascades and seeps down the cliffs. • Rocks around the cove are dry, with a few damp ledges with seepages near the stream. <u>Venericks Cove</u> • Surface seepages and plenty of wet runnels and damp wave-cut platforms.	Daniels *et al*. (1996) McDonnell & King (2000)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<u>Rickham Sands (Little Seacombe Sand)</u> • Freshwater seeping through at the base of head cliffs. • Two main areas of water movement down the cliff are present, one with a series of erosion channels draining into gravel at the base of the eastern rock platform and the other issuing on to the western rock platform. <u>Soar Mill Cove</u> • Some damp or oozing rocks and seepage areas. • Two streams present, flowing onto the beach However, the wider hydrology and water supply mechanisms of the site are not fully understood. More extensive hydrological surveys are required.	
Supporting processes (on which the feature relies)	**Maritime exposure including salt spray effects**	Maintain an appropriate degree of exposure to maritime effects, such as salt spray, both from regular inputs and storm events	Excessive exposure to salt spray can cause episodic die-back of sea cliff vegetation in some circumstances, although this may not be applicable to all sites.	
Supporting processes (on which the feature relies)	**Physical features supporting vegetation: crevices, ledges, isolated stacks *etc***	Maintain the associated physical components of the vegetated cliff feature (crevices, ledges, isolated stacks) with changes to them determined by natural processes only	Cliff structure and geomorphological processes are major influences on sea-cliff vegetation. 'Hard' cliffs with vertical or very steep faces are characteristic of hard igneous, metamorphic and sedimentary rocks and also of chalk, which, although a soft rock, nevertheless forms vertical cliffs. More mobile 'Soft' cliffs have a sloping or slumped profile, often with a distinct 'undercliff'; these occur on a range of soft rocks, or on hard rocks interspersed with softer deposits and may be subject to mudslides or landslips. These processes all create smaller structural elements such as ledges, crevices and stacks which create complexes of pioneer and more mature vegetation which are typical of this habitat feature. In areas within the site, such as Rickham Sands, eroding head material forms cliffs that slump onto rock platforms (Daniels *et al.* 1996). The rock outcrops and head cliffs are fronted by sandy beaches and wave cut platforms in many parts of the site, with boulders in some areas. Natural processes are	Daniels *et al*. (1996)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			thought to be unhindered throughout much of the site.	
Supporting processes (on which the feature relies)	Water quality	Where the feature 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.	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. See comments for the 'Hydrology/drainage' attribute, above.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 2: Supplementary Advice for Qualifying Features: S1441. *Rumex rupestris*; Shore dock

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 which is above 11-50, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	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.	This attribute will be periodically monitored as part of Natural England's site condition assessments. King (1989) McDonnell & King (2000)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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. Shore dock populations have been recorded at several sites within this SAC. Shore dock was originally known to be present at Soar Mill Cove, Rickham Sands and Venericks Cove. In 1999 new populations were discovered at Elender Cove and Great Mattiscombe Sand (McDonnell & King 2000). At Soar Mill Cove, the most studied shore dock site within this SAC, total counts have varied over the years. The earliest record is from 1984, where 2 plants were present. Numbers remained fairly low (e.g. 13 in 1999; 15 in 2005) but started to increase in 2006 (77 plants). 310 were recorded in 2007; 255 in 2008; 447 in 2009; 301 in 2010; 272 in 2011 and 219 in 2012. Numbers decreased after that, with 93 recorded in 2013; 29 in 2014 and 32 in 2017 (Bennalick, I. pers. comm). The shore dock population was assessed as 'favourable' in 2010 (Natural England 2010). When the site was designated the population range was thought to be between 11-50 individual plants (JNCC 2015). The only shore dock site within the SAC for which recent population abundance data are available, and that has been monitored regularly over the years, is Soar Mill Cove. Population abundance at Soar Mill Cove has at times been very high in comparison with numbers recorded around the time of designation.	
Population (of the feature)	**Flowering/ fruiting performance**	Ensure some plants should be flowering/fruiting each year. At each site the minimum requirement should be >20 flowering stems present at least once in each 5-year monitoring cycle.	Even just one flowering/fruiting plant will often be found to have 10-15 flowering stems producing potentially prodigious quantities of seed (5,000-20,000 seeds on a large multi-stemmed plant). Weather conditions (winter storms, cold spring, and summer drought) can limit seed production in any one year, but poor fruiting in two or three in every five is unlikely to be a problem. Plantlife undertook a series of shore dock surveys in Devon and Cornwall between 1994 and 2001. Not all shore dock sites	Daniels *et al*. (1996) Daniels *et al*. (1998) King (2002) Leach *et al*. (2007) McDonnell (1995) McDonnell & King (2000)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			within this SAC were visited each time, but both flowering plants were regularly observed (McDonnell 1995; Daniels *et* al. 1996; Daniels *et* al. 1998; McDonnell & King 1999; McDonnell & King 2000; King 2002). Shore dock colonies at Soar Mill Cove have had fruiting/ flowering plants present consistently between 1984 and 2017 (McDonnell & King 2000; Penny Anderson Associates 2006; Leach *et al*. 2007; Natural England 2014, Bennalick, I. pers. comm). Numbers of fruiting plants have ranged between 2 in 1984 to a peak of 167 in 2009, with 43 present in 2017. In 2006, seven colonies were observed at Soar Mill Cove, one of which had 39 flowering plants with 112 flowering stems. Between the seven colonies, 50 flowering plants contained 185 flowering stems (Penny Anderson Associates 2006). 38 fruiting plants were recorded at Venericks Cove in 2017; 1 at Rickham Sands and 1 at Mattiscombe (Bennalick, I., pers. comm.).	Natural England (2007) Penny Anderson Associates (2006)
Population (of the feature)	**Metapopulation size and structure**	Maintain both the geographical extent/limits of each metapopulation and the number of colonies/sites contained within it.	Each colony in relation to its nearest neighbours and other colonies will form groups or clusters which function as a larger metapopulation. Some (usually outlying and very small) populations may 'come and go'. Natural losses are acceptable, but the aim should be to ensure that, over the medium to long term, local losses are more or less offset by re/colonisation at other sites. Following their surveys in 1999 and looking at data from previous years, McDonnell & King (2000) noted a pattern of larger metapopulations in South Devon, between Wembury and Bigbury and Bolt Tail and Start Point. King (2006) noted that sites are scattered along the coastline with many miles between some of them, and suggested that the Devon and Cornwall populations could be considered as two metapopulations, one at Penhale Sands and Gear Sands and one occupying locations between Lands' End and Start Point.	King (2006) McDonnell & King (2000) Natural England (2009) Penny Anderson Associates (2006)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Limited genetic investigations have suggested gene flow between western and eastern populations may be limited, with metapopulations suggested for: • Tregiffian and Lamorna • Trebarvah to Stackhouse Cove • Roseland Peninsula • Polruan to Looe • Whitsand Bay • Wembury to Bigbury • Bolt Tail to Start Point Colonies within this SAC would therefore make up the Bolt Tail to Start Point population (although no recent analysis has been undertaken). The number of colonies has fluctuated somewhat over the last 20 - 25 years. 13 colonies were recorded at Soar Mill Cove in 2009 (Natural England 2009) whereas only 7 were found at this site in 2006 (Penny Anderson Associates 2006) and 6 in 1999 (McDonnell & King 2000). 6 colonies were recorded at Venericks Cove in 1999, 1 at Rickham Sands, 1 at Elender Cove (the last time shore dock was recorded here) and 2 at Great Mattiscombe Sand (McDonnell & King 2000).	
Population (of the feature)	**Population structure**	Maintain a 'healthy' and viable population as indicated by the presence of plants of different ages, with flowering/fruiting plants, vegetative plants, 'youngsters' and seedlings all present.	When censusing for shore dock, separate counts should be kept of flowering/fruiting and vegetative mature plants and seedlings/youngsters. Mature plants do not flower/fruit every year, and elderly plants may cease flowering several years before finally succumbing. Plants are said to live for ten or more years, although most are lost some years before they reach old age. Plantlife undertook a series of shore dock surveys in Devon and Cornwall between 1994 and 2001. Not all shore dock sites within this SAC were visited each time, but both flowering and vegetative plants were regularly observed (McDonnell 1995; Daniels *et al*. 1996; Daniels *et* al. 1998; McDonnell & King 1999; McDonnell & King 2000; King 2002).	This attribute will be periodically monitored as part of Natural England's site condition assessments. Daniels *et al*. (1996) Daniels *et al*. (1998) King (2002) McDonnell (1995) McDonnell & King (1999)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			In 2017, 28 fruiting and 21 vegetative shore dock plants were recorded across the SAC. All shore dock sites apart from Elender Cove - where no plants were found - had fruiting plants present. Vegetative plants were present at Soar Mill Cove and Venericks Cove (I. Bennalick *pers. comm.*). Soar Mill Cove has been well studied over the years, with frequent surveys having taken place between 1984 and 2017. In all surveys, both fruiting and vegetative plants were present (unpublished Natural England surveys). Seedlings have rarely been recorded in the site, but this may be due to identification difficulties. 6 seedlings were recorded at Great Mattiscombe Sand in 1999 (McDonnell & King 2000).	McDonnell & King (2000)
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. Shore dock has been recorded on sand, in rock crevices, at stream edges, between boulders, on earthy cliffs and areas where seepages are present. The habitat types are present in a number of different locations across the site (Daniels *et* al. 1996; McDonnell & King 2000).	This attribute will be periodically monitored as part of Natural England's site condition assessments. Daniels *et al*. (1996) McDonnell & King (2000)
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Maintain the total extent of the habitats which support the feature with whilst avoiding deterioration from the current	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.	This attribute will be periodically monitored as part of Natural England's site condition assessments.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		extent.	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. Shore dock has been recorded on sand, in rock crevices, at stream edges, between boulders, on earthy cliffs and areas where seepages are present. These habitat types are present in a number of different locations across the site but the current extent of these habitats is unknown (Daniels *et* al. 1996; McDonnell & King 2000). The habitat 'vegetated sea cliffs of the Atlantic and Baltic coasts (H1230)' which is also a feature of this site, supports shore dock in places, but not throughout its whole extent of 232.5 ha (JNCC 2015), as many areas will not be suitable for shore dock colonisation.	Daniels *et al*. (1996) JNCC (2015) McDonnell & King (2000)
Supporting habitat: structure / function	**Habitat structure: regeneration/ colonisation niches**	Maintain the availability of regeneration niches to aid seedling establishment within a sandy/gravelly/rocky substrate within rooting distance of freshwater trickles and seepages, or close to where streams debouch onto the shore	Suitable habitats include sand, gravel or shingle beach-heads, rocky wave-cut platforms, oozing sea-cliffs and (rarely) dune slacks. Sea-borne seed dispersal aids mobility within and between sites: seed washed into the sea during high spring tides, freshwater 'spate' or winter storms can find itself being thrown up onto patches of suitable but currently unoccupied habitat elsewhere. Comprehensive surveys conducted in 1999 and 2000 along the South Devon and Cornwall coasts indicated that there were many potentially suitable locations for shore dock colonisation (McDonnell & King 2000; Neil *et al*. 2001). McDonnell and King (2000) described the area surrounding the stream at Great Mattiscombe Sand as good potential habitat, with freshwater seepages and exposed earthy edges. At Elender Cove, rocks were found to be quite dry, limiting potential colonisation niches. However, there were a few damp rock ledges with seepages near the stream. Venericks Cove had good potential habitat, with plenty of wet runnels and	Daniels *et al*. (1995) McDonnell & King (2000) Neil *et al*. (2001)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			damp, wave-cut platforms. Soar Mill Cove was thought to have plenty of suitable colonisation niches, with damp stream edges, wet rocks and seepage areas. Daniels *et al*. (1995) noted some possible recolonization areas at Rickham Sands, on the western rock platform with its moving water and developing soil in rock. Suitable habitat has been observed at Woodcombe Sand and also at Limpet Cove, sites where shore dock has not, so far, been recorded (McDonnell & King 1999). Small streams are present throughout the site as well as numerous seepage areas.	
Supporting habitat: structure / function	**Hydrological regime**	Maintain presence and supply of freshwater as surface or subsurface seepages, streams or dune-slacks with seasonally high water table.	Note that on some beach-head colonies freshwater may be 'hidden' (i.e. below the surface), meaning that 'surface' conditions could appear unsuitable even though freshwater seepages lie within rooting distance of the plants. A year-round supply of freshwater may be crucial, so anything that limits or removes that supply could be detrimental (e.g. lowering of water table, re-direction of surface watercourses or flow rate reduction). See comments in 'Hydrology/drainage' attribute in Table 1, above. The wider hydrology and water supply mechanisms of the site are not fully understood and more extensive hydrological surveys are required.	Daniels *et al*. (1996) McDonnell & King (2000)
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.	
Supporting habitat:	**Vegetation structure and**	Maintain the characteristic vegetation communities which	Vegetation composition can be very variable, depending on habitat.	Daniels *et al*. (1996)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
structure / function	**composition**	support the feature	Typical associates of *Rumex rupestris* include *Agrostis stolonifera*, *Atriplex spp*., *Beta vulgaris ssp*. *maritima*, *Carex otrubae*, *Festuca rubra*, *Phragmites australis*, *Potentilla anserina*, *Pulicaria dysenterica*, *Raphanus raphanistrum* ssp. *maritimus*, *Samolus valerandii, Sonchus arvensis* and *Tripleurospermum maritimum* (King 2006). Shore dock does not easily fit into the National Vegetation Classification (NVC), with few consistent affinities (David 1999; King 2006). Shore dock has been found to occur in MC8 - *Festuca rubra - Armeria maritima* maritime grassland and in MG12 - *Festuca arundinacea* grassland (David 1999; King 2006). The species may also occur in MG11 - *Festuca rubra – Agrostis stolonifera – Potentilla anserina* grassland, particularly MG11b *Atriplex prostrata* sub-community, which is typical of disturbed and saline environments (King 2006). Daniels *et al*. (1995) found the following species associated with shore dock at Rickham Sands: *Ameria maritima, Plantago maritima, Festuca rubra, Sonchus arvensis, Spergularia rupicola, Rumex crispus, Tripleurospermum maritimum, Crithmum maritimum, Beta maritima, Atriplex prostata, Agrostis stolonifera, Carex extensa* and *Carex otrubae*. At Little Seacombe Sand**,** *Crithmum maritimum, Rumex crispus, Armeria maritima, Cochlearia officinalis, Lotus corniculatus, Rorippa nasturtium-aquaticum, Holcus lanatus, Sonchus arvensis, Beta maritima, Carex otrubae, Atriplex prostrata* and *Agrostis stolonifera* were found associated with shore dock. At Soar Mill Cove, shore dock has been found within a number of habitat types. One colony was found on part of a cliff where vegetation was not rank and was generally between 5cm and 30cm in height. Associated species included *Potentilla anserina*, *Armeria maritima*, *Rumex crispus*, *Carex otrubae*, *Samolus valerandi*, *Tripleurospermum maritimum*, *Agrostis stolonifera* and *Rorippa nasturtium-aquatica*. Another colony at	David (1999) King (2006) Penny Anderson Associates (2006)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			this site was found amongst fairly rank vegetation (between 30cm and 50cm) dominated by *Calystegia sepium*, with *Rumex crispus* growing nearby. One colony at this site was thought to be at risk of being out-competed by the tall vegetation (30-70cm in height).	
Supporting habitat: structure / function	**Vegetation succession and maintenance of early-succession communities**	Maintain supporting habitat in an open, sparsely vegetated early-successional condition.	A range of 'natural' and 'anthropogenic' factors may help in maintaining habitat patches at an early-successional stage. Many factors that may be advantageous 'in moderation' could be detrimental in larger doses, but determining 'safe' and 'unsafe' levels may be difficult and are probably site-specific (dependent on topography, exposure, substrate, *etc*). Aim should be to maintain open vegetation, so any shift towards more closed/tall/rank communities should be avoided as far as possible.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of supporting habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being moderate, taking into account the sensitivity, fragmentation, topography and management of its 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,	Natural England (2015)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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.	
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).	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. Target set to Restore because current nitrogen deposition exceeds the critical load for shore dock supporting habitat (APIS accessed on 06/12/18).	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature and/or its supporting	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to Maintain the	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,	JNCC (2015)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat relies)		structure, functions and supporting processes associated with the feature and/or its supporting habitats.	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. Parts of this site are owned by the National Trust and managed by tenants who are aware of the importance of this feature (JNCC 2015). There are several Higher Level Stewardship agreements in place. The most likely threats to the integrity of the site are inadvertent damage resulting from recreational activities and extreme coastal process events which are beyond human control and influence (JNCC 2015).	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Grazing pressure**	Where vegetation is not kept open by other means (exposure, ground instability, storm events, etc), maintain a grazing regime which is extensive in nature with cattle the dominant grazing animal.	Low levels of grazing likely to be acceptable, but this should not be viewed as a primary way of keeping habitat patches open - in any case, grazing not an option on many. Intensive grazing likely to be damaging.	Natural England, 2010. Definition of Favourable Condition - Prawle Point and Start Point SSSI (Available on request from Natural England) Natural England, 2014. South Devon Shore Dock SAC Site Improvement Plan. http://publications.naturalengland.org.uk/publication/5221789818945536
Supporting processes (on which the feature and/or its supporting habitat relies)	**Habitat dynamics: coastal erosion and accretion**	Maintain the operation of natural coastal processes and deliberately accept coastal instability, erosion and accretion to maintain suitable conditions for the feature	Allowing coastal processes with minimal human intervention is probably crucial for this species; anything that tends to lessen the impact of coastal processes, especially if it leads to greater shoreline stability, is likely to be detrimental to its long-term survival. Plants being buried under a cliff-fall or lost following a winter storm might seem damaging to the plant's survival, but it is this very dynamism that helps to maintain and create new colonisation niches. Natural coastal processes are thought to be generally unhindered within this site. Head material that overlies schist can be unstable and at times is subject to increased erosion as a result of storms (Daniels at al. 1996).	Daniels *et al*. (1996)

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 quantity/quality**	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.	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. See comments in 'Hydrology/drainage' attribute in Table 1, above. There do not appear to be any water quality/quantity issues. However, the hydrology of the site is not well understood and further investigation is required.	Daniels *et al*. (1996) McDonnell & King (2000)
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

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