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

Dorset Heaths (Purbeck and Wareham) and Studland Dunes Special Area of Conservation (SAC)
Site Code: UK0030038

Dorset Heaths Special Area of Conservation (SAC)
Site Code: UK0019857

Date of Publication: 25 March 2019

About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Dorset Heaths (Purbeck and Wareham) and Studland Dunes SAC and Dorset Heaths SAC. This advice should therefore be read together with the SAC Conservation Objectives available for Dorset Heaths (Purbeck and Wareham) and Studland Dunes SAC here; and for Dorset Heaths SAC, here

These two archipelago SACs lie adjacent to each other in a complex pattern; in some cases underpinning SSSIs may fall within both SACs. The presence of two SACs in such a complex relationship is due to past designation processes; for administration purposes, a joint supplementary advice package has been produced covering both SACs. The *About this Site* section sets out the distribution of features across the two SACs.

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

This advice replaces a draft version dated February 2019 following the receipt of comments from the site's stakeholders.

You should use the Conservation Objectives, this Supplementary Advice and any case-specific advice given by Natural England when developing, proposing or assessing an activity, plan or project that may affect this site'

This Supplementary Advice to the Conservation Objectives presents attributes which are ecological characteristics of the designated species and habitats within a site. The listed attributes are considered to be those that best describe the site's ecological integrity and which, if safeguarded, will enable achievement of the Conservation Objectives. Each attribute has a target which is either quantified or qualitative depending on the available evidence. The target identifies as far as possible the desired state to be achieved for the attribute.

The tables provided below bring together the findings of the best available scientific evidence relating to the site's qualifying features, which may be updated or supplemented in further publications from Natural England and other sources. The local evidence used in preparing this supplementary advice has been cited. The references to the national evidence used are available on request. Where evidence and references have not been indicated, Natural England has applied ecological knowledge and expert judgement. You may decide to use other additional sources of information.

In many cases, the attribute targets shown in the tables indicate whether the current objective is to 'maintain' or 'restore' the attribute. This is based on the best available information, including that gathered during monitoring of the feature's current condition. As new information on feature condition becomes available, this will be added so that the advice remains up to date.

The targets given for each attribute do not represent thresholds to assess the significance of any given impact in Habitats Regulations Assessments. You will need to assess this on a case-by-case basis using the most current information available.

Some, but not all, of these attributes can also be used for regular monitoring of the actual condition of the designated features. The attributes selected for monitoring the features, and the standards used to assess their condition, are listed in separate monitoring documents, which will be available from Natural England.

These tables do not give advice about SSSI features or other legally protected species which may also be present within the European Site.

If you have any comments or queries about this Supplementary Advice document please contact your local Natural England adviser or email HDIRConservationObjectivesNE@naturalengland.org.uk

About this site

European Site information

Name of European Site	Dorset Heaths (Purbeck and Wareham) and Studland Dunes Special Area of Conservation (SAC)	Dorset Heaths SAC
Location	Dorset	Dorset, Hampshire
Site Map	The designated boundary of this site can be viewed here on the MAGIC website	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	2221.94ha	5730.73ha
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)	Arne SSSI, Blue Pool and Norden Heaths SSSI, Brenscombe Heath SSSI, Hartland Moor SSSI, Holton and Sandford Heaths SSSI, Morden Bog and Hyde Heath SSSI, Poole Harbour SSSI, Rempstone Heaths SSSI, Stoborough and Creech Heaths SSSI, Studland and Godlingston Heaths SSSI, The Moors SSSI, Thrasher's Heath SSSI	Arne SSSI, Black Hill Heath SSSI, Blue Pool and Norden Heaths SSSI, Bourne Valley SSSI, Canford Heath SSSI, Christchurch Harbour SSSI, Corfe & Barrow Hills SSSI, Corfe Common SSSI, Corfe Mullen Pastures SSSI, Cranborne Common SSSI, Ebblake Bog SSSI, Ferndown Common SSSI, Ham Common SSSI, Holt and West Moors Heaths SSSI, Holton and Sandford Heaths SSSI, Horton Common SSSI, Hurn Common SSSI, Lions Hill SSSI, Morden Bog and Hyde Heath SSSI, Oakers Bog SSSI, Parley Common SSSI, Poole Harbour SSSI, Povington and Grange Heaths SSSI, Rempstone Heaths SSSI, Slop Bog and Uddens Heath SSSI, St. Leonards and St. Ives Heaths, SSSI Stoborough & Creech Heaths, SSSI Stokeford Heaths SSSI, Town Common SSSI, Turbary and Kinson Commons SSSI, Turners Puddle Heath SSSI, Upton Heath SSSI, Verwood Heaths SSSI, Wareham Meadows SSSI, Warmwell Heath SSSI, Winfrith Heath SSSI, Worgret Heath SSSI
Relationship with other European or International Site designations	The Dorset Heaths (Purbeck and Wareham) and Studland Dunes SAC adjoins the Dorset Heaths SAC at a number of locations and includes similar qualifying features. At Studland, a small part of the SAC adjoins the Isle of Portland to Studland Cliffs SAC. Much of both of the Dorset heath SACs overlap with both the Dorset Heathlands SPA and the Dorset Heathlands Ramsar site and provide much of the habitat to support the SPA features. In the areas around Poole Harbour both SACs also	

	adjoin Poole Harbour SPA and Ramsar site. At Town Common the Dorset Heaths SAC is adjacent to part of the Avon Valley SPA and Ramsar site. Separate European Site Conservation Objectives for the nearby sites can be found at: • Isle of Portland to Studland Cliffs SAC • Dorset Heathlands SPA • Poole Harbour SPA • Avon Valley SPA

Site background and geography

The two sites fall within the Dorset Heaths Natural Character Area (NCA Profile 135), cover an extensive complex of heaths that form one of the best developed and most significant tracts of heathland in the lowlands of the UK. There are fine transitions between dry heath, wet heath and acid mire vegetation types, as well as a high diversity of associated habitats such as acid grassland, sand dune, acid oak woods, bog woodland, base-rich mires, fen-meadow and small water bodies.

The dry heath occurs on very infertile soils and is dominated by heather *Calluna vulgaris* growing in association with bell heather *Erica cinerea*, gorse *Ulex europaeus* and usually one of the dwarf gorse species – dwarf gorse *U. minor* and western gorse *U. gallii*. These heaths are not diverse botanically but occasionally some nationally scarce plants occur, such as mossy stonecrop *Crassula tillaea*, which has a stronghold on the Dorset heathlands. In places, where heather *Calluna vulgaris* occurs in mature stands, lichens of the genus *Cladonia* are very abundant. Uncommon features are the localised presence of bilberry *Vaccinium myrtillus* and the co-existence in some areas of the two dwarf gorse species. The dry heath, in conjunction with the wider heathland mosaic, supports important assemblages of animal species that include grasshoppers (*Orthoptera*), bees and wasps (*Hymenoptera*), spiders (*Arachnida*), and all six species of native British reptiles. Some species have a major part of their UK population on these heaths, including silver-studded blue butterfly *Plebejus argus*, heath grasshopper *Chorthippus vagans*, the mason wasp *Pseudepipona herrichii*, ladybird spider *Eresus cinnaberinus*, sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*.

Typically the wet heaths occupy areas of impeded drainage on the lower sides of valleys and on areas of less steeply sloping ground over more impermeable soils. They are characterised by the dominance of cross-leaved heath *Erica tetralix*, heather and purple moor-grass *Molinia* often in association with the bog-moss *Sphagnum compactum*. Within this SAC the nationally rare Dorset heath *Erica ciliaris* (which readily hybridises with *E. tetralix*), occurs extensively and often in abundance, and this is its principal location in the UK. In many situations the wet heaths grade into examples of other wetland vegetation types. These are usually base-poor, acid mire communities and include a widespread presence of the more floristically rich *Rhynchosporion* associated with depressions on peat in bog pool and flush situations.

The valley mires contain small pockets of wet woodland but most of these appear to be of recent origin. However, at Morden Bog a bog woodland stand is of ancient origin, as shown by its pollen record and old maps. The woodland is dominated by downy birch *Betula pubescens* with a ground flora consisting of greater tussock sedge *Carex paniculata* and purple moor-grass. There is a rich epiphytic lichen assemblage, again indicating the persistence of this area of bog woodland.

At Studland there is a large acidic dune system. The structure and function are well conserved with dune-building processes still active. Embryonic shifting dunes initiate the very clear successional sequence of dune communities and there are well-developed examples of both sand couch *Elytrigia juncea* and lyme-grass *Leymus arenarius*-dominated communities. Shifting dunes form the next stage of the successional sequence and the seaward dune ridge supports marram *Ammophila arenaria* vegetation. There are transitions to embryonic dunes, and to decalcified fixed dunes and dune heath. The dune heath occupies a series of dune ridges, which have developed over a period of several hundred years. This dry open heath is especially important for sand lizards.

Acidic humid dune slack communities with a high water table lie in the parallel hollows between the dune ridges. In these slacks, wet heath, acid mire and reedbeds have developed. Some areas are dominated by grey willow *Salix cinerea* and birch *Betula* sp. carr with the very local royal fern *Osmunda regalis* a conspicuous element. The dune slacks are linked to the Little Sea, which is a shallow lake of recent origin (<500 years old), formed as a large body of seawater became landlocked by the growing sand dunes (hence the name Little Sea). This water is now fresh and is replenished by acidic, nutrient-poor water draining off the adjacent heathland, which then flows through the

dune slacks and into the sea. The submerged vegetation is characterised by communities of alternate water-milfoil *Myriophyllum alterniflorum*, shoreweed *Littorella uniflora* and spring quillwort *Isoetes echinospora*, together with bladderwort *Utricularia australis* and less frequently six-stamened waterwort *Elatine hexandra*.

To the north of the Purbeck chalk ridge and in places elsewhere, spring-fed water flushes the heathland wetlands. This base enrichment gives rise to mires which are characterised by the presence of black bog-rush *Schoenus nigricans* and species rich fen-meadows that conform to the purple moor-grass *Molinia caerulea* – meadow thistle *Cirsium dissectum* community. Near Poole Harbour a further type of wetland, saw sedge *Cladium mariscus* fen, occurs very locally.

The heathland wetlands together with numerous small water bodies form a stronghold for invertebrates, particularly dragonflies and damselflies (*Odonata*) such as small red damselfly *Ceriagrion tenellum* and southern damselfly *Coenagrion mercuriale*, some grasshoppers notably large marsh grasshopper *Stethophyma grossum*, butterflies and moths (*Lepidoptera*), beetles (*Coleoptera*) and spiders. Some of the ponds, particularly towards the edges of the heathland area where there is base enrichment of the groundwater, support populations of great crested newt *Triturus cristatus*.

About the qualifying features of the SAC

The following section gives you additional, site-specific information about these SAC's qualifying features. These are the natural habitats and/or species for which these SAC's have been designated. Annex 1 sets out the qualifying features for the two SACs.

Annex 1 Summary of SAC qualifying features

	Dorset Heaths SAC	Dorset Heaths (Purbeck and Wareham) and Studland Dunes SAC
H2110 Embryonic shifting dunes		Y
H2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('White dunes')		Y
H2150 Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)		Y
H2190 Humid dune slacks		Y
H3110 Oligotrophic water containing very few minerals of sandy plains		Y
H4010 Northern Atlantic wet heaths with *Erica tetralix*	Y	Y
H4020 Temp Atlantic wet heaths with *Erica ciliaris* and *E. tetralix*	Y	Y
H4030 European dry heaths	Y	Y
H6410 *Molinia* meadows on calcareous, peat or clay-silt soil	Y	Y
H7150 Depressions on peat substrates of the *Rhynchosporion*	Y	Y
H7210 Calcareous fens with *C. mariscus* and species of *C. davallianae*	Y	Y
H7230 Alkaline fens	Y	Y
H9190 Old acidophilous oak woods with *Q. robur* on sandy plains	Y	Y
H91D0 Bog woodland		Y
S1044 Southern damselfly, *Coenagrion mercuriale*	Y	Y
S1166 Great crested newt, *Triturus cristatus*	Y	Y

Qualifying habitats:

- **H7230 Alkaline fens**

This vegetation is characteristic of sites where there is peat formation with a high water table and a calcareous base-rich water supply. The core vegetation is short sedge mire (mire with low-growing sedge vegetation) and examples within the Dorset Heaths with the few stands represented by the NVC type M10a *Carex dioica – Pinguicula vulgaris* mire, M22 *Juncus subnodulosus–Cirsium palustre* fen meadow, species-rich M22–M24 (*Molinia caerulea–Cirsium dissectum* fen meadow) transition, M14b *Schoenus nigricans-Narthecium ossifragum* mire and S2b *Cladium mariscus* swamp and sedge-beds (Wheeler and Wilson 2014) where there is overlap with H7210 Calcareous fens with C. mariscus and species of C. davallianae.

- **H2150 Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)**

Studland Dunes comprises the only large dune heath site in the south and south-west of Britain. The heathland occupies a series of dune ridges, which have developed over a period of several hundred years. The development of these ridges was the subject of a classic study (Diver 1933) and the processes are still active today. Structure and function of the dune heath communities are therefore well-conserved. The dry open heath is an important habitat for rare reptiles such as sand lizard *Lacerta agilis*. At the western margin of the dune ridges the dry dune heath grades into wet heath in which cross-leaved heath *Erica tetralix* is prominent, while at the northern end it grades into the southern heathland types of inland Dorset.

- **H91D0 Bog woodland**

Both SACs contain small pockets of wet woodland within valley mires but most of these appear to be of recent origin and are not representative of this feature. However, at Morden Bog a Bog woodland stand is of ancient origin, as shown by its pollen record and old maps. The woodland is dominated by downy birch *Betula pubescens* with a ground flora consisting of greater tussock sedge *Carex paniculata* and purple moor-grass *Molinia caerulea*. There is a rich epiphytic lichen assemblage, again indicating the persistence of this area of bog woodland.

- **H7210 Calcareous fens with C. mariscus and species of C. davallianae**

This Annex I type comprises the more species-rich examples of great fen-sedge *Cladium mariscus* fen, particularly those stands enriched with elements of the *Caricion davallianae* (i.e. small-sedge fen with open, low-growing sedge vegetation). Within the SAC, this feature occurs very locally near Poole Harbour.

- **H7150 Depressions on peat substrates of the *Rhynchosporion***

The habitat is widespread on the Dorset Heaths, both in bog pools of valley mires and in flushes. There are numerous valley mires within the Dorset Heaths, and the habitat type is most extensively represented here as part of a habitat mosaic with other mire communities and dry and wet heath. This location shows extensive representation of brown-beak sedge *Rhynchospora fusca* and is also important for great sundew *Drosera anglica* and bog orchid *Hammarbya paludosa*.

- **H2110 Embryonic shifting dunes**

At Studland Dunes there is a very clear successional sequence of dune communities. Embryonic shifting dune vegetation is the first type of vegetation to colonise areas of incipient dune formation at the top of a beach. The dune vegetation exists in a highly dynamic state and is dependent on the continued operation of natural physical processes at the dune/beach interface. This dune vegetation is a transient feature and will either be displaced by marram-dominated vegetation as the dunes develop (2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")) or will be washed away by storms. This is a part of the UK where this habitat type is rare, partly owing to intensive recreational use of the coast.

The main vegetation types present are the SD2 Sea Rocket – Sea Sandwort (*Cakile maritime – Honkenya peploides*) strandline community, SD4 Sand Couch-grass) *Elymus farctus ssp. Boreali-atlanticus)* foredune community, and SD5 Lyme Grass (*Leymus arenarius*) mobile dune community,

- **H4030 European dry heaths**

This site in southern England has extensive stands of lowland dry heath vegetation. The types include H2 Heather – Dwarf Gorse (*Calluna vulgaris – Ulex minor)* heath, H3 Dwarf Gorse - Bristle Bent (*Ulex minor – Agrostis curtisii*) heath and some areas of H4 Western Gorse – Bristle Bent (*Ulex gallii – Agrostis curtisii*) heath. The communities are dominated by heather *Calluna vulgaris* growing in association with bell heather *Erica cinerea* and one of the dwarf gorse species – dwarf gorse *Ulex minor* or western gorse *U. gallii*. Both of the Dorset Heath SACs and the New Forest are in southern England and all three areas are selected because together they contain a high proportion of all the lowland European dry heaths in the UK. There are, however, significant differences in the ecology of the two areas, associated with more oceanic conditions in Dorset and the continuous history of grazing in the New Forest.

- **H2190 Humid dune slacks**

Studland Dunes is a large acidic dune system in south-west England with well-conserved structure and function. The site has been intensively studied. The structure and function of dune systems are well-represented with dune-building processes still active. These processes have resulted in the formation of acidic humid dune slack communities with a high water table, which lie in the parallel hollows between the dune ridges. In these slacks, acidic fen and reedbeds have developed. Some areas are dominated by grey willow *Salix cinerea* and birch *Betula* sp. carr with the very local royal fern *Osmunda regalis* a conspicuous element. The dune slacks are linked to an area of open fresh water known as the Little Sea (see H3110 below).

- **H6410 Molinia meadows on calcareous, peat or clay-silt soil**

These habitats are found mainly on moist, moderately base-rich, peats and peaty gley soils, often with fluctuating water tables. They usually occur as components of wet pastures or fens, and often form mosaics with dry grassland, heath, mire and scrub communities. This habitat type includes the most species-rich *Molinia* grasslands in the UK, in which purple moor-grass *Molinia caerulea* is accompanied by a wide range of associated species, including rushes, sedges and tall-growing herbs. Within the SAC, the predominant NVC community is M24 Molinia *caerulea – Cirsium dissectum* fen-meadow

- **H4010 Northern Atlantic wet heaths with Erica tetralix**

The two Dorset Heaths SACs, together with the New Forest (also in southern England), contain a large proportion of the total UK resource of lowland northern Atlantic wet heaths. The habitat is of the M16 *Erica tetralix – Sphagnum compactum* wet heath type and occurs as well-developed transitions between dry heath and valley bog. This habitat type is important for rare plants, such as marsh gentian *Gentiana pneumonanthe* and brown beak-sedge *Rhynchospora fusca.* The wet heaths and mires are also important for scarce Odonata, such as small red damselfly *Ceriagrion tenellum.* The sites are an important transitional area between the more oceanic heathlands of the south-west peninsula and the semi-continental heathlands of eastern England.

- **H9190 Old acidophilous oak woods with Q. robur on sandy plains**

This habitat type comprises ancient lowland oak woodland on acidic, sandy or gravelly substrates. Veteran trees are relatively abundant in UK stands compared to examples in continental Europe, and are often associated with assemblages of notable lichens, fungi and invertebrates. The scattered examples within these SACs are mostly small stands, part of a mosaic with different heathland or sometimes acid grassland vegetation and vary considerably. Some stands, such as those at Povington and Grange Heaths, are essentially wood pasture and are within a large predominantly heathland grazing unit. In other places (parts of Arne, Parley Common) the woodland is more closed and subject to lighter or no livestock grazing. Often veteran oaks are found on old boundary banks having grown from old hedge lines when parts of the heath were enclosed and temporally farmed.

- **H3110 Oligotrophic water containing very few minerals of sandy plains**

Little Sea is a shallow lake at Studland Dunes in south-west England. It is of recent origin (<500 years old), formed as a large body of seawater became landlocked by the growing sand dunes (hence the name Little Sea). This water is now fresh and is replenished by acidic, oligotrophic water draining off the adjacent heathland, which then flows through the dune slacks and into the sea. The submerged

vegetation is characterised by communities of alternate water-milfoil *Myriophyllum alterniflorum*, shoreweed *Littorella uniflora* and spring quillwort *Isoetes echinospora*, together with bladderwort *Utricularia australis* and less frequently six-stamened waterwort *Elatine hexandra*.

- **H2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('White dunes')**

"White dunes" develop from Embryonic Shifting Dunes as the next stage of sand-dune succession and covers most of the vegetation of unstable dunes where there is active sand movement. This is one part of the very well-marked successional sequences. Marram grass *Ammophila* arenaria is a prominent feature of the vegetation and important for sand-binding to enable dune creation. At Studland Dunes the seaward dune ridge supports marram *Ammophila arenaria* vegetation mainly of NVC type SD6e *Ammophila arenaria* mobile dune, *Festuca rubra* sub-community.

- **H4020 Temperate Atlantic wet heaths with *Erica ciliaris* and *E. tetralix***

The greatest concentration of Dorset heath *Erica ciliaris* in the UK is in Dorset on the heaths south of Poole Harbour, with outlying stands elsewhere in Dorset. Dorset Heaths (Purbeck and Wareham) and Studland Dunes has therefore been selected as it contains a high proportion of the total UK population of *E. ciliaris.*

Qualifying Species:

- **S1166 Great crested newt*, Triturus cristatus***

The great crested newt is the largest native British newt, reaching up to around 17cms in length. Newts require aquatic habitats for breeding. Eggs are laid singly on pond vegetation in spring, and larvae develop over summer to emerge in August – October, normally taking 2–4 years to reach maturity. Juveniles spend most time on land, and all terrestrial phases may range a considerable distance from breeding sites. Within the SAC, great-crested newts are mainly associated with the former clay pools in Blue Pool and Norden Heaths SSSI.

- **S1044 Southern damselfly, *Coenagrion mercuriale***

The southern damselfly *Coenagrion mercuriale* has very specialised habitat requirements, being confined within the SAC to shallow, well-vegetated, base-rich runnels and flushes in open areas within fen or wet heath. With Preseli, the New Forest and the River Itchen, the two Dorset Heath SACs represent one of the four major population centres in the UK.

Table 1: Supplementary Advice for Qualifying Features: H2110 Embryonic shifting dunes and H2120 Shifting dunes along the shoreline with *Ammophilia arenaria* ("white dunes") (shifting dunes with marram).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the annual vegetation of drift lines, embryonic shifting dunes and shifting dunes along the shoreline with *Ammophila arenaria* to around 14ha.	Dune systems are found in the area adjacent to Studland Bay within the Dorset Heaths (Purbeck & Wareham) and Studland Dunes SAC. There should be no reduction (excluding any trivial loss) in the extent and area of these features. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys but area measurements for this feature are approximate because of natural variation in the area and distribution of the features. . These natural dynamic processes also mean there will be acceptable variations in their extent. 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. **H2110 Embryonic shifting dunes** is the most dynamic, naturally changing, zone of the dune system. Its extent may vary seasonally and through the years. This natural functioning is critically dependent on no interruption of sand movement to and from the fore-dunes and the beach. Where beaches are narrow or prevailing winds not onshore, this Annex 1 habitat may be limited in extent. Evidence of natural changes to extent should not justify loss to development. Loss (or gain) due to natural causes is considered acceptable; strandline vegetation may be absent in some years as a result of natural causes, e.g. severe storms. Loss due to human activities is not considered acceptable.	DERC (2006) NVC Survey of Dorset Heaths SAC

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	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 zone of shifting dunes occurs between the beach plane and the usually more stable and fully vegetated older dunes. Communities may be dynamic in their distribution and are linked to the sedimentary processes operating at the site. For H2120 Shifting dunes with marram, this strongly relates to the coastal processes (sediment transport from offshore and along the beach, sand deposition by wind, tideline debris to initiate sand trapping and lack of disturbance during growing season) as well as seed/propagule supply that determine the presence of the habitat. Artificial interference in these natural coastal process is likely to harm this feature. Distribution of habitat relates to the availability of blown sand from the beach plain, as well as seed/propagule supply that determine the presence of the habitat. *Ammophila arenaria* (Marram grass) plants also have a mycorrhizal association. Annex 1 habitat to be present where relevant sedimentary and wind conditions occur.	
Extent and distribution of the feature	**Future extent of habitat within the site and ability to respond to seasonal changes**	**For H2110 Embryonic dunes only**: Maintain the ability to absorb seasonal and periodic fluctuations in the extent of the habitat	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. This ability depends on a continuing linkage between the beach and this Annex 1 habitat, together with the ability of dune building grasses to respond in periods of net sand input.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Dune topography**	**For H2110 Embryonic dunes only:** Maintain a natural dune topography, and allow natural change that is wind driven (some change may be necessary to	Dune topography in the H2110 Embryonic dunes zone can change seasonally and through the years due to wind and tidal events. Accumulations of driftline organic material are important for trapping sand and initiating dune formation. See also 'Functional connectivity with wider coastal sedimentary system' and 'Within-site sedimentary processes'	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		maintain the continuity of slacks). **For H2120 Shifting dunes with marram only** Maintain a natural topography to the shifting dune feature.	component. For **H2120 Shifting Dunes with marram** dune topography may be influenced by the operation of geomorphological processes, which should be allowed to continue in order to maintain the dune system in its naturally dynamic form. Maintaining this zone in a natural form, and as part of the wider dune zonation, will provide optimal conditions for the full range of characteristic flora and fauna. The low shifting dunes on the foreshore provide a vital structural element to any dune system: the varied natural topography provides important means of dune-building and progradation seawards. Key dune-building plants such as *Ammophila arenaria* (Marram grass) is sensitive to salinities over 1.5% so only persists on higher dune ridges.	
Structure and function (including its typical species)	**Presence of unvegetated surfaces**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Maintain an extent of bare sand of varying sizes in a mosaic with the vegetation (up to 50% of the feature extent)	In these developing, dynamic zones, bare sand should be expected. Lack of bare sand would suggest an artificially stabilised system. Blow-throughs are a natural element of this zone. If extent of sand is towards the upper end of the range, it will become important to assess whether recreational pressures are over-riding natural dynamics.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type: **For H2110 Embryonic dunes:** SD2 *Honkenya peploides – Cakile maritima* strandline communities	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). 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	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		SD4 *Elymus farctuss ssp boreali-atlanticus* foredune community SD5 *Leymus arenarius* mobile dune community **For H2120 Shifting dunes with marram** • SD5 *Leymus arenaria* mobile dune community • SD6 Ammophila arenaria mobile dune community.	fluctuations). The vegetation types equivalent to **H2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")** are generally NVC types SD6 and elements of SD5, but can contain elements of other communities depending on degree of surface stability. The majority falls within SD6: a dynamic vegetation type maintained only by change, which will rapidly change and disappear if stability is imposed. It can vary from stands of pure *Ammophila arenaria* (Marram grass) to more diverse communities, reflecting a range of natural factors. SD10 *Carex arenaria* community may become prominent on areas of dune subject to erosion through disturbance. The species composition of shifting dunes is constrained by the harsh conditions, but the vegetation is by no means uniform; he most marked floristic variation relates to the degree of instability. Where sand accretion is extremely rapid it is possible to find vegetation that consists only of *Ammophila arenaria*; as rates of sand deposition decline the Marram is joined by more species. There are a number of sub-communities and there will be natural fluxes in the transition between the mobile dunes and fixed dunes seaward as sand deposition changes.	
Structure and function (including its typical species)	**Vegetation community transitions**	**For H2120 Shifting dunes with marram *only*** Maintain the full natural range of vegetation zones and the transitions between them.	Zonations are seen as indicative of good conservation of structure and function. It is essential that the relationship between this habitat and other elements of the sand dune system are recognised. As much of the dune frontage as possible should have intact zonation to the next stage in succession (generally fixed dunes). This target needs to be determined at a site level, as there may be specific factors that naturally limit continuous coverage.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation structure: zonation of dune vegetation**	**For H2110 Embryonic dunes only:** Restore the cover of this feature at or to 95% of the wider dune	The coastal sand dune ecosystem has a characteristic range of natural features, representing different stages of natural succession. The full representation of these stages should be maintained or where appropriate restored. On some sites there may be specific natural factors that limit continuous coverage,	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		frontage	related to broader scale sediment budgets. Recreational pressure limits the extent of this feature along parts of the due frontage. Where *Leymus arenarius* is present, there can be a continuous floristic transition to marram dominated mobile dunes (Shifting dunes along the shoreline with *Ammophila arenaria*).	
Structure and function (including its typical species)	**Vegetation composition: trees and scrub**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Ensure scrub and tree cover is absent or rare	Dense cover of trees and shrubs can smother and shade out smaller and more characteristic vegetation of this habitat feature, and interrupt naturally occurring dune processes. Usually active management is required to reduce or (where it is native), other trees and shrubs would usually indicate an artificially stabilised system.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation: undesirable species**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Restore the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread. Pirri-pirri Bur *Acaena novae-zelandiae*	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. For this feature, two types of negative species can occur: invasive non-natives such as *Crassula* or pirri-pirri bur; or species indicative of poor or declining condition (eg. nettle or creeping thistle). For known or likely invasive species there should be zero tolerance. Invasive non-native species may be an issue, the presence of non-natives and other undesirable species could be an indication of increased stability. Some species are potentially more invasive into areas of bare sand and will require specific management on site. The invasive non-native species Pirri-pirri Bur *Acaena novae-zelandiae* is present along tracks and elsewhere within Studland & Godlingston Heaths SSSI.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical	**Soils, substrate and nutrient cycling**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram**	Soil is the foundation of basic ecosystem function and 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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)		Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat.	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 this Annex I feature. Embryonic shifting dunes have essentially raw soils with little humus and low nutrient and base status.	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature The constant and preferential plants of the NVC community type which forms a key component of a SAC habitats that is present • SD2 *Honkenya peploides – Cakile maritima* strandline communities • SD4 *Elymus farctuss ssp boreali-atlanticus foredune* community • SD5 *Leymus arenarius* mobile dune community • SD6 *Ammophila arenaria* mobile dune community • Sand Lizard (*Lacerta agilis*).(H2120 Shifting dunes only with marram only	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.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Adaptation and resilience**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of natural 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 habitats. The site is sensitive to changing weather patterns, such as more frequent easterly storms, which will influence the way that coastal processes affect the feature.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Supporting processes (on which the feature relies)	**Functional connectivity with wider coastal sedimentary system and wider landscape**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Maintain adequate movement of sediment from all key sediment sources (directly from and along the beach, indirectly from offshore, eroding cliffs etc.).	This recognises the need at this site to maintain the connectivity of the site to its wider landscape in order to meet the conservation objectives. Features outside of the designated site boundary can be important either for the continuous supply of sediment (such as soft eroding cliffs, dunes, offshore sand banks) or for the migration, dispersal and genetic exchange of those typical species closely associated with embryonic shifting dunes on of the site. **H2110 Embryonic shifting dunes** are an integral element of the 'coastal foredune' (the beach-dune sand-sharing system). At Studland, it is critical that sediment transport that feeds the beach from offshore is not interrupted. In some cases sand	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			may come from marram-dominated dunes landward H2120 (Shifting dunes along the shore with *Ammophila arenaria*). Accumulation of driftline organic material (seaweed etc.) is essential for trapping sand and initiating dune formation. Mechanical beach cleaning could adversely affect this process.	
Supporting processes (on which the feature relies)	**Aeolian (wind-blow) processes**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Maintain the natural movement of sand within the site, resulting from wind blow-outs and blow-throughs and maintain / restore the ability of wind-blow processes to transport sand from the beach plain to the foredune. .	Allowing natural wind-blow (or 'aeolian') processes to operate and to allow active movement of dry sand is important. Blow-throughs are a natural element of the dynamics of this zone. However, excessive recreational pressure can inhibit vegetation growth in sand building phases. The beach plain needs to be dry to allow sand to be transported into the dune system.	
Supporting processes (on which the feature relies)	**Air quality**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Maintain, 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	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			measures to tackle diffuse air pollution, within realistic timescales.	
Supporting processes (on which the feature relies)	**Conservation measures**	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. For **H2110 Embryonic Dunes**, direct habitat and species management is not expected to take place in this zone. However, excessive recreational activity can be damaging and may well need to be managed.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: Attributes for **water quality** and **hydrology** have been removed as they are not considered relevant to this feature within the SAC.				

Table 2: Supplementary Advice for Qualifying Features: H2150. Atlantic decalcified fixed dunes (*Calluno-Ulicetea*); Coastal dune heathland and H2190 Humid Dune Slacks.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Dune topography**	**For H2190 Humid dune slacks only:** Maintain a natural dune topography, but allow natural change that is wind driven (some change may be necessary to maintain the continuity of slacks).	It is possible that on some sites there are over-riding constraints that will not allow natural dune dynamics to proceed. On these sites it may be necessary to artificially lower ground surface levels in slacks to extend their lives. See also 'Within-site sedimentary processes' component.	
Extent and distribution of the feature	**Extent of the feature within the site**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** Restore the total extent of the H2150 Atlantic decalcified fixed dunes (*Calluno – Ulicetea):* Coastal dune heathland and H2190 humid dune slacks	There should be no 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 bulk of the approximately 200ha of the **H2150 Coastal dune heathland** habitat in England is found on only 5 sites, all of which are SACs. Due to the very limited extent and the absence of knowledge about reinstatement, any reduction in extent to development, even of a small part of one site would	DERC (2006) NVC Survey of Dorset Heaths SAC This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			be considered an adverse impact. For the **H2190 humid dune slacks**, if loss (or gain) of area is from natural physical dynamism this is not a decline in condition, but any significant loss due to human interference (e.g. sand extraction, visitor impacts, ploughing or conversion to improved grassland) is to be regarded as harmful. In a naturally functioning dune system some dune slacks will, over time, dry out but new ones will be created by sand blow (secondary slacks) or by beach development (primary slacks). Humid dune slacks represents the wetter and early succession elements of dune wetlands. Different elements of the wet-dry and early-late succession spectrums should reflect the natural development of the dune system. Evidence of natural changes to extent should not justify further loss to development.	
Extent and distribution of the feature	**Future extent of habitat within the site and ability to respond to seasonal changes**	**For H2190 Humid Dune Slacks only:** Maintain the ability to absorb seasonal and periodic fluctuations in the extent of the habitat	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. Humid dune slacks are buffered from short term natural variations in hydrology including dry seasons. However, artificial drainage or a longer series of dry years with lowered water table will lead to early succession away to non-dune wetland habitat. In the medium term, a degree of dune dynamics is required to create new dune slacks.	
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** Maintain the distribution of the dune heath Annex I habitat across the site, and transitions with and between other dune or terrestrial habitats, including fixed dune grassland, acid dune grassland and lowland heath	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	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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. In the short term, **H2190 humid dune slack** wetland features are fixed in space determined by dune topography and hydrology. However, in a naturally functioning dune system topography can change leading to localised losses and gains in dune wetlands, including Humid dune slacks.	
Structure and function (including its typical species)	**Adaptation and resilience**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See explanatory notes for this attribute in Table 1	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature The constant and preferential plants of the NVC community type which forms a key	See explanatory notes for this attribute in Table 1	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		component of a SAC habitat that is present , H11 *Calluna vulgaris -Carex arenaria* heath • Sand Lizard (*Lacerta agilis*). • Vascular plant assemblage		
Structure and function (including its typical species)	**Presence of unvegetated surfaces**	**For H2190 Humid Dune Slacks only:** Maintain an extent of bare ground or sand which is no more than 20% of the total dune slack area.	Patches of bare sand are essential for a wide range of dune invertebrates and colonisation by some bryophytes.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Soils, substrate and nutrient cycling**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** [Maintain OR Restore] the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat.	Soil is the foundation of basic ecosystem function and 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 these Annex 1 features. . The **H2150 fixed dune heath** habitat depends on acidic surface layers which overlie acidic sand or sand deposits that have been subject to long-term leaching. As the **H2190 dune slack** vegetation succession progresses, soils develop in structure and nutrient status. The soils under Humid dune slacks represent less to moderately developed natural soils to be found on dunes.	
Structure and function (including its	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and	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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)		characterised by the following National Vegetation Classification types: **For H2150 Atlantic decalcified fixed dunes (*Calluno- Ulicetea)*** H11 *Calluna vulgaris -Carex arenaria* heath **For H2190 Humid dune slacks:** There are 4 humid dune slack communities: SD13, SD14, SD15, SD17 and various MG communities on sand. However, the acidic dune slacks at Studland do not correspond closely to these communities of calcareous dunes and have more in common with acidic mire communities.	conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). 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). For the **H2190 humid dune slack** feature it is unlikely that all slack communities will be represented in a single slack. It is more usual for individual slacks to be at different stages in vegetation succession, and to have slightly different hydrological regimes. The target relates to the humid dune slack resource across the whole site. • Pioneer and early stages of vegetation characterised by communities with mosses *Bryum pseudotriquetrum, Aneura pinguis and Campylium stellatum*. Other common dune slack plants are *Carex flacca, Sagina nodosa, Equisetum variegatum, Hydrocotyle vulgaris, Juncus articulatus, and Mentha aquatica.* • *SD13 a + b Sagina nodosa – Bryum pseudotriquetrum* community is the most open and immature dune slack vegetation (young drier slack), a rare assemblage of young and perpetually rejuvenated slacks. Periodic wetting provides ideal conditions for a variety of ephemeral plants, perennials and bryophytes. Older strands show transitions to dryer slack vegetation. [*Carex arenaria, Juncus articulatus, Leontodon hispidus, Sagina nodosa, Salix repens, Aneura pinguis, Bryum pseudotriquetrum*.] There are different types of dune slacks and stages within these. • Dune slack community sub-types: dune slack pools (permanent water bodies); dune slack pioneer swards; dune	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			slack fens (calcareous, occasionally acidic); dune slack grasslands (humid grasslands and rushbeds); dune slack reedbeds, sedgebeds and canebeds. Humid dune slacks are composed of wetland vegetation (swamp, marsh, and fen).	
Structure and function (including its typical species)	**Vegetation community transitions (range and zones)**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** Restore the typical patterns of zonations/transitions between the feature and landward to other dune habitats or terrestrial and wetland habitats	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. For this habitat, fluctuations in the extent of grasses to dwarf shrubs can occur over time, but there should be evidence on re-colonisation by dwarf shrubs	
Structure and function (including its typical species)	**Vegetation composition: forb/grass ratio**	**For H2190 Humid dune slacks only:** Restore a typically low vegetation sward with >30% cover of forbs and <50% cover of grasses, and occasional bryophytes	An abundance of tussocky *Molinia caerulea* that dominates the sward is an issue for some slacks. These slacks would benefit from the introduction of an appropriate intensity of grazing.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation composition: trees and scrub**	**For H2190 Humid Dune Slacks Only:** Restore scrub and tree cover of locally native species to between 5% and 10%, scattered and in small groups.	Dense cover of trees and shrubs can smother and shade out smaller and more characteristic vegetation of this habitat feature, and interrupt naturally occurring dune processes. Some slacks have become invaded by willow perhaps partly caused by historic eutrophication of Little Sea by sewage inputs. Active management is required to reduce or contain its cover across this habitat feature. The 'humid dune slack' community requires soil to be wet enough for a diverse range of forbs and some grasses to be also present. The target relates to the humid dune slack resource across the whole site.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its	**Vegetation structure: zonation of**	**For H2190 Humid dune slacks only**:	The coastal sand dune ecosystem has a characteristic range of natural features, representing different stages of natural succession. The full representation of these stages should be	This attribute will be periodically monitored as part of Natural England's SSSI Condition

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)	**dune vegetation**	Restore succession of dune slack stages (early, middle and later). All humid slack communities should be present – from embryonic dune slacks with a high % of bare ground to those with more closed vegetation.	maintained or where appropriate restored. The target relates to the humid dune slack resource across the whole site. The latter end of the dune slack succession which is dry dune slack is covered by H2170 Dunes with *Salix repens*. There are different types of dune slacks - pioneer, young/moderate and old, and stages within these: dune slack community sub-types: dune slack pools (permanent water bodies); dune slack pioneer swards; dune slack fens (calcareous, occasionally acidic); dune slack grasslands (humid grasslands and rushbeds); dune slack reedbeds, sedgebeds and canebeds. Not all slack communities will be represented in a single slack. It is more usual for individual slacks to be at different stages in vegetation succession, and to have slightly different hydrological regimes. A mosaic of other wetland vegetation communities are frequently present within dunes (swamp/mire/tall herb fen). These are all important elements of the dune system and may have hydrological connectivity with the dune slack habitats.	Assessments
Structure and function (including its typical species)	**Vegetation: undesirable species**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** Restore the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread. Pirri-pirri Bur *Acaena novae-zelandiae* *Crassula helmsii* Non heathland grasses indicative of eutrophication *(e.g.* Cock's-	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. For this feature, two types of negative species can occur: invasive non-natives such as *Crassula* or pirri-pirri bur; or species indicative of poor or declining condition (e.g. nettle or creeping thistle). For known or likely invasive species there should be zero tolerance but complete eradication of *Crassula* is not practical at present. Invasive non-native species may be an issue, the presence of non-natives and other undesirable species could be an indication of increased stability. Some species are potentially more invasive into areas of bare sand and will require specific management on site.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		foot *Dactylis glomerata)*	*Crassula helmsii* is present in some slacks. The invasive non-native species Pirri-pirri Bur *Acaena novae-zelandiae* is present along tracks and elsewhere. Occurrence of non-heathland grasses along tracks can be the result of eutrophication by dog faeces and measures are required to prevent an increase in this effect from new housing. *Wit*hin **H2190 Humid dune slack** communities*, Urtica dioica, Cirsium arvense and C. vulgare* species are indicative of poor condition; other thistles should not be included as negative indicators *Senecio jacobaea* is a natural constituent of dune vegetation; however, in dune slacks an abundance of *Senecio jacobaea* indicates over-stocking.	
Supporting processes (on which the feature relies)	**Aeolian (wind-blow) processes**	**For H2190 Humid Dune slacks only:** Maintain the natural movement of sand within the site, resulting from wind blow-outs and blow-throughs.	Allowing natural wind-blow (or 'aeolian') processes to operate and to allow active movement of dry sand is important. Current dune topography, including hollows reaching damp sand where slacks occur, has resulted from past within-site dune movement. Although **H2190 Humid dune slacks** does not depend in the short term on new dune mobility, its medium/long term survival does. Secondary slacks are created where overlying sand is blown away down to the water table/wet sand.	
Supporting processes (on which the feature relies)	**Air quality**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** 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).	See explanatory notes for this attribute in table 1.	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	**Conservation measures**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks**	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	This attribute will be periodically monitored as part of Natural England's SSSI Condition

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature relies)		Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature	can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. The H2150 Dune heath habitat specifically requires stable sand ,with no inputs of calcareous sand, surface layers should not be disturbed as these have been leached over long time periods Although 'natural processes' are given a high priority in sustaining site and feature integrity in dunes, active management (including livestock grazing) is sometimes required in the H2190 Humid dune slack communities. Management includes scrub cutting, grazing and turf-stripping. Management should focus on creating new successional cycles to provide habitat for early successional species and replace that lost by accelerated succession. Stimulation of germination from the seed bank through management may contribute to the conservation of both characteristic and threatened species typical of dune slacks. (Plassmann et al., 2009) Management practices that remove nutrients (N) from the H2190 humid dune slacks system can mitigate the effects of N inputs but may damage fragile components. A range of invertebrates and plants require bare sand, usually naturally created by wind blow, but sometimes where it is infrequently disturbed by vehicles or feet.	Assessments
Supporting processes (on which the feature relies)	**Functional connectivity with wider coastal sedimentary system including seed/**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** Maintain movement of sediment from all key sediment sources (directly from and along the	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
	propagule dispersal, and wider landscape	beach, indirectly from offshore, eroding cliffs etc.). Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis. Although Humid dune slacks do not depend in the short term on continued inputs of sand, its medium/long term survival does. Primary slacks can occur on the beach plane with sufficient input of sand.	
Supporting processes (on which the feature relies)	**Hydrology**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** At a unit and/or catchment level (as necessary, 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 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. For **H2190 Humid dune slacks** • All dune wetland vegetation communities are influenced by the water table. Each community reflects a particular past and current hydrological regime. Water table monitoring should be present on all sites with dune wetlands. • Humid dune-slacks are extremely rich and specialised habitats which are very threatened by the lowering of water tables (Interpretation Manual - EUR28). They require a period of wetting, with inundation to shallow depth in winter and dry in summer. • Permanent pools will sometimes occur in association with dune slacks, and can be hydrologically linked to the humid	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			dune slack feature. There will be a suite of dune slacks within a site, all at different stages in vegetation succession, and although all linked to the same dune aquifer, may have slightly different hydrological regimes due to variations in age, elevation and management.	
Supporting processes (on which the feature relies)	**Water quality**	**For both H2150 Coastal Dune Heathland and H2190 Humid Dune Slacks** Restore 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 of water supply is critical, especially at certain times of year. Although there is no direct water quality information for the dune slacks in this acid dune system, there is hydrological continuity between most of these slacks and Little Sea and since there are some issues with water quality there (see H3110 Oligotrophic water containing few minerals of sandy plains) there may also be an effect on the slacks. Since plant communities have similarities with those within mires, required water quality standards are likely to be similar to H7150 (depressions on peat substrates).	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 3: Supplementary Advice for Qualifying Features: H3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*); Nutrient poor shallow waters with aquatic vegetation on sandy plains.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the feature at 33ha	There should be no reduction (excluding any trivial loss) in the extent and area of this feature. Within the Dorset Heaths (Purbeck to Wareham) and Studland Dunes SAC this feature is limited to Little Sea and Eastern Lake within Studland & Godlingston Heaths SSSI. 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 around the lake shores. There may be acceptable variations in extent because of natural dynamic processes such as changes in water levels.	DERC NVC Survey 2006 Ordnance Survey mapping
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 • The constant and preferential plants of the NVC community type which forms a key component of a SAC habitat that is present including *Littorella uniflora, Isoetes echinospora, Elatine hexandra, Myriophyllum alterniflorum,. Nitella translucens, Utricularia australis, Menyanthes trifoliata Potamogeton polygonifolius, P. perfoliatus, P. obtusifolius.*	See explanatory notes for this attribute in Table 1	Newbold C. (2002) Little Sea Dorset: a Macrophyte Survey. Report to English Nature. Pearman, D. (1997) The vegetation of the Little Sea, *Recording Dorset*, 7, pp.37-39.
Structure and function (including its typical	**Invasive, non-native and/or introduced species**	Non-native species categorised as 'high-impact' in the UK under the Water Framework Directive should be either rare or absent	Non-native species constitute a major threat to many open water systems. Impacts may be on the habitat itself (e.g. damage to banks and consequent siltation) or directly on characteristic biota (through predation, competition and	This attribute will be periodically monitored as part of Natural England's SSSI Condition

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)		but if present are causing minimal damage to the feature *Crassula helmsii* at least not expanding in extent and not supressing native species *Elodea nuttalli* <40%	disease), or a combination of these. For example, species such as signal crayfish have been responsible for much of the decline of native crayfish through competition, habitat damage and the introduction of crayfish plague. The UK Technical Advisory Group of the Water Framework Directive produces a regularly updated classification of aquatic alien species (plants and animals) according to their level of impact. In general high impact species are of greatest concern but low or unknown impact species may be included in the target on a site-specific basis where there is evidence that they are causing a negative impact (for example high cover values or abundances). Those taxa considered likely to colonise lakes, are indicated by an 'L' in the UKTAG guidance. Examples of such high-impact species may include Water Fern, New Zealand pygmy weed and the zebra mussel.	Assessments
Structure and function (including its typical species)	**Macrophyte community structure**	Restore characteristic zonations of vegetation with increasing depth, represented by *Littorella uniflora* then *Isoetes* spp.	This is a strongly characteristic structural aspect of this habitat feature. It will be a response to water transparency, sediment type and disturbance. Little Sea is a shallow lake throughout (mean depth 0.5m) so zonation to deep water is not represented. Along the shoreline, there is mostly a vertical abrupt edge (because of invasion by Salix) where there were once shelving edges; thus the zonation to shallow water and grazed wet flushes (of dune slacks) has mostly gone and several rare plants have been lost as a result (Pearman 1997, Cox 2007).	Pearman, D. (1997) The vegetation of the Little Sea, *Recording Dorset*, 7, pp.37-39 . Cox J H S (2007). Botanical diversity in clearings created around Little Sea, Studland Peninsula, Dorset, monitored between 1996 and 2005. Natural England internal report.
Structure and function (including its typical species)	**Macrophyte community structure**	Restore maximum depth of plant colonisation. This will often be the maximum depth colonised by *Isoetes.*	This is a strongly characteristic structural aspect of this habitat feature. It will be a response to water transparency, sediment type and disturbance. The carp now present in the lake have made the water turbid with resultant loss of plants from all but the shallowest areas.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Physical structure - lake shoreline**	Maintain the natural shoreline of the lake.	Inclusion of hard engineering solutions to lake management will have detrimental effects on lake ecology, replacing near-natural substrates with man-made materials (although note that alterations to the shoreline have occurred through invasion by willow (see macrophyte community structure) which is likely to	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			have been at least partly the result of past eutrophication from sewage inputs (now ceased).	
Structure and function (including its typical species)	**Physical structure - lake substrate**	Restore the natural and characteristic substrate for the lake. Substrate is typically sand, gravel and stones with low organic content, <5% loss on ignition.	The distribution of sediment particle size and organic content influences the biology of the lake and will affect the suitability of within-lake habitats for invertebrates and macrophytes. Increases in sediment loading from activities in the catchment area, including those on the lake shore, may result in the smothering of coarse sediments. Increased inputs of leaf litter, as a result of scrub encroachment, may also be cause for concern, as organic-rich sediments may be a poor rooting medium for macrophytes. Information about sediment characteristics is lacking (but the colonisation of the shoreline and Pipley Swamp upstream of the lake by willow may have affected the organic content of the sediment.	
Supporting processes (on which the feature relies)	**Water quality - phosphate**	Restore stable nutrient levels appropriate for lake type. The maximum annual mean concentration of total phosphorus (TP) is 10 µg P l^{-1} for oligotrophic lakes. These should be met unless site specific targets are available.	Increased loadings of P to a water body are likely to lead to higher algal biomass in the water column, which in turn can have significant impacts on the lake e.g. through competition with vascular plants for nutrients and light, changes in pH, oxygen depletion and production of toxins. There has been no palaeolimnological work or hindcast modelling to reconstruct natural background TP concentrations for this lake but given the catchment geology and extremely low nutrient status of the incoming stream there would seem to be no reason why the natural condition of the lake should not be oligotrophic. Water chemistry data indicates that TP is significantly higher than the target of 10 µg P l^{-1} (average annual TP 2014-2018 is 47.2 µg P l^{-1}). Also averages conceal unexplained spikes. Data indicates that TP has increased since the 1990s and early 2000s (APEM 2013) although it was still above 10 µg P l^{-1} then. Orthophosphate levels are below 5 µg P l^{-1}. Restoration should involve stopping or limiting inputs from foul water overflows; investigation of internal nutrient cycling (a possible legacy of historic sewage inputs, and possibly exacerbated by carp); investigation of any inputs from septic tanks in the catchment.	APEM 2013. Lake Restoration Plan and Nutrient Budget: Little Sea, Studland, Dorset. Report to National Trust EA water quality archive Most recent EA WFD Cycle 2 classification for Total P (2016) is moderate against a target of high for 2027 (EA catchment data explorer).
Supporting processes (on which the	**Water quality - nitrogen**	Restore a stable total nitrogen concentration which is typically between 1-2mg/l	There is an increasing understanding that some standing waters are sensitive to nitrogen (N) enrichment and eutrophication may be driven by increases in N. Although data	APEM 2013. Lake Restoration Plan and Nutrient Budget: Little Sea, Studland, Dorset. Report to

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature relies)			suggests this lake is P limited (APEM 2013) recent higher values of total nitrogen (up to 3.4mg/l when typically values were between 0.5 and 1.5mg/l) suggests that there may be some issues with N. Total oxidised N values are low and contribute little to total N. N targets should be used in combination with P targets to develop a management strategy for the lake that reduces all nutrient inputs.	National Trust EA water quality archive.
Supporting processes (on which the feature relies)	**Water quality - acidity**	Acidity levels should reflect unimpacted conditions, typically with a pH value < 7.	Changes in pH can alter the entire freshwater community present within a water body affecting all trophic levels. Potential causes of a shift in pH include air pollution. Although, pH naturally fluctuates throughout the year, e.g increased plant biomass in summer may result in large fluctuations in pH, including daytime increases in pH values. Therefore pH is not used as a monitoring target, however its importance in affecting many in lake processes means that the pH of a water body should not be artificially altered. There are discrepancies in pH values between different Little Sea data sets so it is not known if the higher values in the EA data (up to 8.9 with very few readings under 7) are significant.	APEM 2013. Lake Restoration Plan and Nutrient Budget: Little Sea, Studland, Dorset. Report to National Trust EA water quality archive
Supporting processes (on which the feature relies)	**Water quality - other pollutants**	Achieve Good chemical status (i.e. compliance with relevant Environmental Quality Standards).	A wide range of pollutants may impact on habitat integrity depending on local circumstance. Good chemical status includes a list of EQSs for individual pollutants that are designed to protect aquatic biota with high levels of precaution.	
Supporting processes (on which the feature relies)	**Water quality - dissolved oxygen**	Adequate dissolved oxygen levels for health of characteristic fauna. Dissolved oxygen standards should be > 7.0mg/l throughout the year.	As for species in terrestrial environments, dissolved oxygen (DO) is required for respiration by aquatic organisms. Anthropogenic activities leading to phytoplankton blooms and increased loadings of organic matter to lakes can cause decreases in the concentration of dissolved oxygen available to support the species present. Mean dissolved oxygen refers to DO being measured at 0.5m intervals throughout the entire water column where the water column is not stratified and measurements taken at 0.5 m intervals below the thermocline only where stratification occurs.	No data is available for dissolved oxygen.
Supporting processes (on which the feature relies)	**Water transparency**	Restore the clarity of water with turbidity similar to values recorded between 2003 and 2006	Water transparency is the major determinant of the depth of colonisation by macrophytes, therefore, it should not be reduced. Turbidity between 2003 and 2006, when the water appeared clear, was between 2.4 and 3.1 ntu (EA data, annual average). Following the colonisation of the lake by carp from about 2007, the lake became turbid and aquatic plants declined	Cox J 2016. Aquatic Plants surveys in the Western Arm, Little Sea: A comparison between 2002, 2013 and 2016. Natural England internal report.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			so that by 2013 hardly any macrophytes remained. Since 2013 following removal of many carp by netting the situation has improved a little and some aquatic plants have returned. But turbidity remains much higher than in the 2000s (between 7.5 and 15.4 ntu – annual average 2016-2018). Increased sediment loads to a lake can also affect turbidity but there are no indications that this is an issue here.	Goldsmith B., ENSIS Ltd., 2012. *Little Sea: Summary of Aquatic Plants from 2003, 2009 & 2012*, results summary to Natural England. EA fish survey 2007 (finding only sticklebacks and eels).
Supporting processes (on which the feature relies)	**Water quality - algae**	Restore the Chlorophyll a concentration to comply with WFD high ecological status without and not have a negative impact on the ecosystem. Blooms of blue-green or green algae should not occur in low nutrient waters.	Chlorophyll is the pigment used for photosynthesis by plants, and the concentration of chlorophyll in the water column during the growing season therefore provides a good measure of the abundance of phytoplankton. Phytoplankton is an important driver of structure and function in lakes and high phytoplankton levels (algal blooms) are usually associated with nutrient enrichment. l. UKTAG Lake Assessment Methods: Phytoplankton. Chlorophyll a and Percentage Nuisance Cyanobacteria are available online at: http://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Biological%20Method%20Statements/lake%20phytoplankton.pdf Little Sea in the last few years has been classified by EA as having moderate (occasionally good) status.	EA catchment data explorer with WFD assessment for phytoplankton moderate in 2014 and 2015, and good in 2013 and 2016.
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).	See explanatory notes for this attribute in Table 1	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature relies)	**Hydrology**	At catchment level as necessary, 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 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. Site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Hydrology influences lake ecosystem functioning in two ways: determining residence time (flushing) and water level fluctuations. Flushing of lakes is important for dilution and removal of nutrients and phytoplankton, and for reduction in sedimentation. The timing of different flushing rates within the year influences the biology of the lake. For example, reduced flushing in summer would encourage bloom conditions. Modifications of inflows and outlets or changes in hydrology, e.g. from flood control regimes, abstraction and gravel removal can lead to unnatural changes in lake levels.	
Supporting processes (on which the feature relies)	**Sediment load**	Maintain the natural sediment load	Increased sediment loadings may result in clogging of the lake bed, increased siltation in the basin and deoxygenation of sediments. Blockage of coarser substrates with finer sediment restricts water flow-through, whilst increases in organic matter increase biochemical oxygen demand. Increases in the sediment load also increases nutrient loads to a site. Examples of causes of increases in siltation include: increased lake productivity, changes in catchment land-use, lake level fluctuations or climatic fluctuations. There is some unnatural erosion where the incoming stream flows through a deep gulley and although sediment from there may largely have settled out before reaching Little Sea remedial measures would still be beneficial.	
Supporting processes (on which the feature relies)	**Supporting off-site habitat**	Restore the quality of land or habitat surrounding or adjacent to the lake.	The structure and function of the qualifying habitat, including its typical species, relies upon the condition of surrounding areas and can be affected by changes in surrounding land-use. Control of willow on neighbouring wetlands would be beneficial to the lake, particularly in Pipley Swamp (which the stream feeding the lake passes through) so as so increase the nutrient retention capacity there.	

Attributes	Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Version Control Advice last updated: N/A			
Variations from national feature-framework of integrity-guidance: Attribute relating to **functional connectivity / isolation** removed as not considered relevant to this feature within this SAC.			

Table 4: Supplementary Advice for Qualifying Features: H4010. Northern Atlantic wet heaths with *Erica tetralix*; Wet heathland with cross-leaved heath. H4020 Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix* H4030 European Dry Heath. H7150 Depressions on peat substrates of the *Rhynchosporion*

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Restore the total extent of the H4010, H4020, H4030 and mosaic of H7150 wet heath, dry heath and mire communities so as to correspond with the historical extent of these to habitats**.** Maintain the current extent of the H4010, H4020, H4030 and H7150 wet heath, dry heath and mire communities. .	There should be no reduction (excluding any trivial loss) in the extent and area of these features, and in some places, the full extent of these features should be restored. In addition there should be no loss or reduction of the potential for restoring these habitats. Up to date measurements of the extent of these habitats across all of the Dorset heaths 42 SSSIs are not available but do exist for some individual SSSIs where a single extent target has been set for the wet heath, dry heath and mire communities because they are present as a complex mosaic of communities with transitions between the habitats; this makes it difficult to map the individual features. The features also occur in a mosaic and transitions make boundaries difficult to define. As a result values for extent are hard to determine with sufficient accuracy to be repeatable and useful as a way of measuring any reduction in area. Dynamic changes between different heath and mire communities may occur naturally but not an overall reduction in the extent of heath and mire communities. Changes as a result of artificial factors are unlikely to be acceptable. Heathland restoration is necessary in some areas where former heathland has been invaded by trees and scrub. 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.	DERC (2006) NVC Survey of Dorset Heaths SAC 1946, 1972 aerial photographs and OS 2nd edition 6 inch maps both available on https://explorer.geowessex.com/
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	**For the H4010, H4020, H4030 and H7150 features:** Restore the distribution and	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	Wheeler BR and Wilson P J, (2014) Survey of EC Habitats Directive Annex I wetland habitats in the Dorset heaths.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		configuration of the feature, including where applicable its component vegetation types, across the site	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 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. Within the SACs invasion by trees and scrub has reduced the area and distribution of these features, hence the need for restoration.	Report to Natural England Cox J 1996 The Dorset Heaths possible Special Areas of Conservation; a scientific account. Report to English Nature Cox J 1994 An appraisal of the Dorset Heathlands Ramsar site. Report to English Nature Edwards B 1997 Bryophyte Survey of the Poole Basin mires Report to English Nature. 1946, 1972 aerial photographs and OS 2nd edition 6 inch maps both available on https://explorer.geowessex.com/
Structure and function (including its typical species)	**Vegetation community transitions**	**For the H4010, H4020, H4030 and H7150 features:** Restore any areas of transition between this and communities which form other heathland-associated habitats, such as dry and humid heaths, mires, acid grasslands, scrub and woodland.	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. This is an important attribute as many characteristic heathland species utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle.	
Structure and function (including its typical species)	**Vegetation community composition**	**For the H4010, H4020, H4030 and H7150 features:** Ensure the component vegetation communities of the feature are referable to and characterised by the following	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).	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		National Vegetation Classification type: H2 *Calluna vulgaris – Agrostis curtisii* heath H3 *Ulex minor – Agrostis curtisii* heath H4 *Ulex gallii – Agrostis curtisii* heath H8 *Calluna vulgaris – Ulex gallii* heath M1 *Sphagnum auriculatum* bog pool; M16 *Erica tetralix – Sphagnum compactum* wet heath M21 *Narthecium ossifragum – Sphagnum papillosum* mire	Maintaining or restoring these characteristic and distinctive vegetation types and the range of types as appropriate, through measures outlined elsewhere, 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). Other NVC communities, M14 *Schoenus nigricans* –. *Narthecium ossifragum* mire and M25 *Molinia caerulea-Potentilla erecta* mire, can also support *Erica ciliaris* Dorset Heath (the characteristic plant species of H4030 Southern Atlantic wet heath).	
Structure and function (including its typical species)	**Vegetation structure: cover of dwarf shrubs**	**For the H4010, H4020, H4030 and H7150 features:** Restore an overall cover of dwarf shrub species which is typically between 75-90%	Variations in the structure of the heathland vegetation (vegetation height, amount of canopy closure, and patch structure) is needed to maintain high niche diversity and hence high species richness of characteristic heathland plants and animals. Many species also utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle. The structural character of the heathland feature is strongly influenced by the growing habits of its dominant species which in most cases will be ericoids (i.e. plants that look like heathers, including members of the *Ericaceae* and *Empetraceae* families). On the Dorset Heathlands, heath and mire swards can be expected comprise from about 75% to near 100% cover of ericaceous, dwarf gorse and other characteristic plant species. The abundance of ericaceous species and dwarf gorses can be	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			naturally low at early stages in cyclical succession but should prevail (>75% cover) at later stages. The attribute is relevant in cases where multiple negative features might affect a single unit (e.g. bracken, tree invasion, exotic plants, and gorse blocks) and although each may be within acceptable limits together they affect a high proportion of a unit. Dwarf shrubs that may contribute to the target on Dorset Heaths are *Calluna vulgaris, Erica cinerea, E. tetralix, E. ciliaris; Ulex minor, Ulex gallii, Vaccinium myrtillus*. Sward structure, composition and cyclical succession, and the quality and abundance of other designated features are vulnerable to degradation from development related effects and inappropriate types, levels and patterns of recreation and amenity use	
Structure and function (including its typical species)	**Vegetation structure: heather age structure**	**For the H4010, H4020, H4030 and H7150 features:** Maintain a diverse age or sward structure amongst the ericaceous shrubs typically found on the site In wet heath Molinia <50% and tussocks not dominate to exclusion of other species.	Each phase of growth associated with the characteristic heathers which dominate this feature also represents different microclimatic conditions and microhabitats which may provide shelter or food to other organisms. Within the Dorset Heaths, this age structure varies both within and between swards and sites. On many areas with mature heather that has not been burnt for many years, different age classes of heather will develop within the sward. For these areas, near natural structural development with limited intervention (normally only low intensity grazing, preferably at a landscape scale, plus control of some invasive species and specific management for selected species interests) is generally desirable. However, management needs to reflect the many differences between sites, e.g. in size, representation of different habitats, management history, the inherent fertility of the soils and species interests. In a few cases, where interest features require short open swards, e.g woodlark, management may be	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			geared towards having a higher representation of pioneer stages, either permanently or temporarily. Where species interests require deep heather, e.g. sand lizard, representation of pioneer stages of heather is likely to be much lower.	
Structure and function (including its typical species)	**Vegetation structure: cover of gorse**	**For the H4010, H4020, H4030 and H7150 features:** Cover of common gorse is low, typically 1-20% predominantly as a small scale patchwork in heath, leggy degenerate growth rare;	Gorse as a component of heathland is a very valuable wildlife habitat, and often a marker of relict heath and common. Both dense and spiny, it provides good, protected cover for many wildlife species: birds, mammals and reptiles; breeding habitat for rare or declining bird species, and excellent winter roosting. The flowers, borne at a time of year when other sources of pollen or nectar are in short supply, are particularly good for invertebrate pollinators. However gorse may cause problems if unchecked by dominating an area, eliminating other typical heathland species. Mature stands en masse or gorse next to tracks and firebreaks can also be fire hazards. Judgement will be needed when assessing this attribute as levels of gorse cover will vary across the SAC at any one time. There should be no indication of declining condition of the associated habitat due to increasing dominance of gorse.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation structure: tree cover**	Restore the open character of the feature, with a typically scattered and low cover of trees and scrub (<10% cover). Sites with little existing tree cover should be maintained in that state.	Scrub (mainly trees or tree saplings above 1 m in height) and isolated trees are usually very important in providing warmth, shelter, cover, foodplants, perches, territorial markers and sources of prey for typical heathland invertebrates and vertebrates. But overall cover of scrub and trees across this habitat feature should be maintained or restored to a fairly sparse level, with a structurally complex edge and with characteristic heathland vegetation as ground cover. The area of scrub/tree cover should be stable or not increasing as a whole with isolated/small clumps of mature trees at less than 10/ha; predominantly only pioneer species (e.g. Scot's pine, birch and willow) within the heath.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its	**Vegetation composition: bracken cover**	**For the H4010, H4020, H4030 and H7150 features:**	The spread of bracken *Pteridium aquilinum* is a problem on many lowland heathlands. The unpalatable nature and density of bracken as a tall-herb fern, and its decomposing litter, can	This attribute will be periodically monitored as part of Natural England's SSSI Condition

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)		Restore a cover of dense bracken which is low, typically at [<5%]	smother and shade out smaller and more characteristic heathland vegetation. Active management of bracken is required in places to reduce or contain its cover across this habitat feature. But this fern has also some nature conservation value, for example on sites where fritillary butterflies occur and utilise bracken litter habitat.	Assessments
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	**For the H4010, H4020, H4030 and H7150 features:** Restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature. • The constant and preferential plants of the NVC communities which form a key components of a SAC habitat that is present (NVC communities listed above) • Reptile assemblage including Sand Lizard *Lacerta agilis* and Smooth Snake *Coronella austriaca*. • Heathland invertebrate assemblage (numerous rare and scarce species) • Vascular plant assemblage (see list of heath and mire plants in Appendix 1)	See explanatory notes for this attribute in Table 1 Bare ground is a key supporting habitat for reptile and invertebrate assemblage. Typical species such as the rare reptiles are vulnerable to effects associated with heaths in urban locations such as a high incidence of fires, predation by domestic cats and trampling or disturbance of egg-laying sites. Public access to lowland heathland from nearby residential developments and other proposals that lead to an increase in visitor numbers, or changes in the pattern of public access may increase the frequency of these effects. These effects are most marked within 400m of heathland. A strategic approach to avoiding and mitigating for potential impacts arising from recreational pressure as a result of new residential development has been developed for the Dorset Heathlands in response to the significant levels of growth in emerging regional plans. The mitigation strategy for the Dorset Heathlands has now been in place since 2006, The Dorset Heathlands Planning Framework Supplementary Planning Document 2015 – 2020 (SPD) sets out the detailed approach to the avoidance and mitigation of adverse effects of development on the Dorset Heathlands. The guiding principle of the SPD is that there is no net increase on urban pressures The SPD retains as its guiding principle that there is no net increase in urban pressures on internationally important heathland as a result of development,	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments Underhill-Day, J.C. (2005) *A literature review of urban effects on lowland heaths and their wildlife*. English Nature, Peterborough. Kirby, J.S. & Tantram, D.A.S. (1999) *Monitoring heathland fires in Dorset: Phase 1*. Fearnley, H., & Liley, D. (2011). Analysis and Presentation of IPF monitoring and projects to inform the Heathland DPD. Footprint Ecology. Floyd, L., Underhill-Day, J. C. (2013). Literature Review on the effects of cats on nearby protected wildlife sites. Unpublished report by Footprint Ecology for Breckland Council.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Vegetation: undesirable species**	**For the H4010, H4020, H4030 and H7150 features:** Restore the frequency/cover of the following undesirable species to absent or <1% cover and not spreading, 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. Negative indicators include: *Rhododendron ponticum, Gaultheria shallon, Fallopia japonica.* *Apium nodiflorum, Cirsium arvense, Epilobium spp. (excl. E. palustre), Glyceria fluitans, Juncus effusus, J. squarrosus, Oenanthe crocata, Phragmites spp., Ranunculus repens, Fallopia japonica, Senecio jacobaea, Rumex obtusifolius, Typha spp., Urtica spp.* *Alnus glutinosa, Betula spp., Prunus spinosa, Pinus spp., Rubus spp., Salix spp, Quercus spp. Acrocarpous* mosses. Non-heathland grasses indicative of high nutrient status (ie with high Ellenberg values for nitrogen) such as *Dactylis glomerata* are negative indicators often colonising along tracks where dog walking is frequent (the result of dog excrement). The measures outlined above in relation to typical species and new housing or other development apply here too.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments Underhill-Day, J.C. (2005) *A literature review of urban effects on lowland heaths and their wildlife*. English Nature, Peterborough.
Structure and function (including its typical species)	**Ecological condition of heathland fragments and functional connectivity with wider landscape**	**For the H4010, H4020, H4030 and H7150 features:** Restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	This recognises the need at this site to maintain or restore connectivity between fragments in order to meet the conservation objectives. Particularly important is heathland restoration in the wider landscape, reversing the historic loss and fragmentation of these heaths and increasing the size of fragments. Such measures can both restore connectivity and counteract edge effects on the SACs. Connections may also take the form of landscape features, such as habitat patches, watercourses and verges, outside of the designated site boundary which may be important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			and its features may rely. Increasing actual and functional landscape-scale connectivity would be beneficial.	
Structure and function (including its typical species)	**Adaptation and resilience**	**For the H4010, H4020, H4030 and H7150 features:** Restore the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See explanatory notes for this attribute in Table 1	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Supporting processes (on which the feature relies)	**Conservation measures**	**For the H4010, H4020, H4030 and H7150 features:** Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the features	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	
Supporting processes (on which the feature relies)	**Soils, substrate and nutrient cycling**	**For the H4010, H4020, H4030 and H7150 features:** Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitats.	Soil is the foundation of basic ecosystem function and 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 this Annex I feature. This Annex 1 habitat has essentially raw soils with little humus and low nutrient status and in Dorset, little capacity to retain phosphorus.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature relies)	**Air quality**	**For the H4010, H4020, H4030 and H7150 features:** Restore 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).	See explanatory notes for this attribute in Table 1	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)	**Water quality**	**For the H4010, H4020, H4030 and H7150 features:** Where the feature is dependent on surface water and/or groundwater restore] water quality to a standard which provides the necessary conditions to support the feature.	Maintaining or restoring the quality of water supply to wet heath and mire features is critical. Poor water quality is likely to adversely affect the function of these habitat types with raised major nutrients (nitrogen and phosphorus) a particular problem. This issue for the H7150 Rhynchosporion feature is considered below under water chemistry. Values for major nutrient concentrations for the wet heath features are likely to be similar. Presence in wet heath or mire of species with high Ellenberg values for nitrogen (such as common reed or willow) often indicates raised major nutrients from unnatural sources. Vigorous growth of mire species such as *Myrica gale and Molinia caerulea* may also be a sign of water quality problems. All of these features are dependent on acid conditions and so operations that artificially raise pH of groundwater or surface water runoff (such as inert fill of quarries in mire or wet heath catchments, discharges of calcareous mains water or use of limestone chippings on tracks or paths) are likely to be harmful and contrary to the conservation objectives.	Hill, M.O.; Mountford, J.O.; Roy, D.B.; Bunce, R.G.H. 1999 *Ellenberg's indicator values for British plants. ECOFACT Volume 2 Technical Annex.* Huntingdon, Institute of Terrestrial Ecology, 46pp. (ECOFACT, 2a)
Supporting processes (on which the feature relies)	**Hydrology**	**For the H4010, H4020, H4030 and H7150 features:** At a unit and/or catchment level, restore the natural hydrological regime to provide the conditions necessary to sustain the feature within the site and where	Defining and maintaining or restoring an appropriate hydrological regime – which will normally be a natural hydrological regime - is a key conservation objective for this site and for sustaining these features. 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. On some mires, natural hydrology has been disrupted by artificial ditches and	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		necessary restore natural hydrology	these are where restoration is needed through ditch infilling or blocking. There are a number of examples where restoration by infilling ditches has been successfully achieved Development that interferes with natural hydrology, such as mineral winning within mire and wet heath catchments, may be contrary to the conservation objectives.	
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	**For H7150 Depressions on peat substrates of the *Rhynchosporion only:*** Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature	Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides).	
Structure and function (including its typical species)	**Presence/ cover of woody species**	**For H7150 Depressions on peat substrates of the *Rhynchosporion only:*** Restore a very low cover <1%, not on seepages and predominantly dwarfed or at immature growth stages; seedlings and saplings no more than rare.	Native trees and shrubs occur naturally on bog and fen surfaces but an abundance of scrub and trees on bogs and fens is detrimental. They are indicators and perpetrators of drying out or of nutrient enrichment and may cause damage to vegetation structure through shading effects. Birch, pine, willow and rhododendron (an invasive non-native species) are the main species of concern. The seeds of most invasive woody species are wind dispersed, so trees are able to establish on raised bog and fen surfaces.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Exposed substrate**	For H7150 Depressions on peat substrates of the *Rhynchosporion only:* Maintain a low cover of exposed substrate of between 5-10% across feature.	For this wetland habitat type, maintaining some continuous extent of exposed, open ground surface is required to support the establishment and supply of those component species which often rely on wet and sparsely-vegetated conditions.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Water chemistry**	**For H7150 Depressions on peat substrates of the *Rhynchosporion only:*** Maintain the surface water and	UKTAG (2012) provides threshold values for nitrate concentration in groundwaters for different wetland types but although there is no groundwater data for Dorset heath mires it is unlikely that these high nitrate values in the UKTAG report are appropriate given the extreme low nutrient status of surface water in mires with natural heathland catchments (typically	Recent unpublished data on nutrient status of mire surface waters from NE/EA as part of work on the Dorset heath wetlands connected with a judicial review

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		groundwater supporting the hydrology of bogs at a very low nutrient status and restore those bogs affected by artificial nutrient inputs.	orthophosphate <0.001mg/l, nitrate <0.01mg/l). Some mires have orthophosphate and nitrate nutrient concentrations in surface water much greater than this because of known artificial nutrient inputs (sometimes, usually in combination with drainage, leading to the complete loss of the feature) and these are where restoration to low nutrient status is required. Any artificial nutrient inputs, where there is pathway between a discharge and the feature, are likely to be contrary to the objectives and so have an adverse effect (e.g. discharges from package sewage treatment plants, overflows or leakages from septic tanks, storm overflows of sewage, leachate discharges from landfills, urban surface water drainage or fertiliser run off from fields).	
Structure and function (including its typical species)	**Hydrology**	**For H7150 Depressions on peat substrates of the *Rhynchosporion only:*** Maintain a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations) on groundwater dependent sites and restore these conditions where necessary.	Some examples of H7150 may be wholly or partly groundwater dependent. Others have a greater dependence on surface water or rain water inputs. It is critical to understand the ecohydrological context of all sites; although the feature will tolerate some drying in summer, generally it is characterised by a permanently high water table. Maintaining or restoring natural hydrology is in most circumstances sufficient to achieve this objective and sites affected by artificial drainage are where restoration is required. Development that interferes with natural hydrological processes, such as mineral winning within mire and wet heath catchments, is likely to be contrary to the conservation objectives.	
Structure and function (including its typical species)	**Supporting off-site habitat**	**For H7150 Depressions on peat substrates of the *Rhynchosporion only:*** Restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect or already be affecting the functioning of the feature and its component species particularly by affecting hydrology. Here the objective is to restore natural hydrology so as to remove the adverse effect on the SAC. This supporting habitat may also be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.	
Version Control Advice last updated: **25 March 2019** following stakeholder feedback. Explanatory notes for **Vegetation structure: heather age structure** attribute revised to highlight need that some key species require a variety of heather age structures within an individual SSSI.				
Variations from national feature-framework of integrity-guidance: N/A				

Table 5: Supplementary Advice for Qualifying Features: H6410. Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*); Purple moor-grass meadows.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Restore the total extent of the feature to reverse any reduction due to scrub invasion or other factors	There should be no 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 (taking account of the likely historical extent). The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present. The feature occurs in an intimate mosaic with other wetland habitats. Transitions between these habitats make boundaries difficult to define. As a result values for extent are hard to determine with sufficient accuracy to be repeatable and useful as a way of measuring any reduction in area. Some acceptable changes in the extent of Alkaline Fen may to occur as a result of natural processes. 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.	Wheeler BR and Wilson P J, (2014) Survey of EC Habitats Directive Annex I wetland habitats in the Dorset heaths. Report to Natural England 1946, 1972 aerial photographs and OS 2nd edition 6 inch maps both available on https://explorer.geowessex.com/
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Restore the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	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	Wheeler BR and Wilson P J, (2014) Survey of EC Habitats Directive Annex I wetland habitats in the Dorset heaths. Report to Natural England Blue Pool and Norden Heaths phase 1 survey (English Nature). Winfrith Heath NVC survey for Dorset Wildlife Trust. Cox J 1996 The Dorset Heaths possible Special Areas of Conservation; a scientific account. Report to English Nature

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature. Within the two SACs, this feature is found at Corfe Common, Brenscombe Heath, Blue Pool and Norden Heaths, Rempstone Heaths, Winfrith Heath, Holton and Sandford Heaths, Corfe Mullen Pastures, Cranborne Common and Povington and Grange Heaths	Cox J 1994 An appraisal of the Dorset Heathlands Ramsar site. Report to English Nature Edwards B 1997 Bryophyte Survey of the Poole Basin mires Report to English Nature
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type : M24 *Molinia caerulea - Cirsium dissectum* fen-meadow;	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). 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).	Wheeler BR and Wilson P J, (2014) Survey of EC Habitats Directive Annex I wetland habitats in the Dorset heaths. Report to Natural England
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature • The constant and preferential plants of the NVC community type which forms a key component of a SAC habitat that is present M24 *Molinia caerulea - Cirsium dissectum* fen-meadow;	See explanatory notes for this attribute in Table 1	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Vegetation: undesirable species**	Restore the frequency/cover of the following undesirable species to absent or <1% cover and not spreading, 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. Negative indicators include: *Cirsium arvense, Cirsium vulgaris, Juncus effuses, Phragmites australis, Senecio spp, Rubus sp, Urtica dioica*	
Structure and function (including its typical species)	**Vegetation community transitions**	Maintain the pattern of natural vegetation zonations/transitions	Transitions/ zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna.	
Structure and function (including its typical species)	**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, to within typical values for the habitat. For this feature, soil P index should typically be index 0 (< 9 mg l -1)	Soil is the foundation of basic ecosystem function and 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 this Annex I feature.	
Structure and function (including its typical species)	**Water quality**	Restore water quality and quantity to a standard which provides the necessary conditions to support the feature [adviser to provide site-specific standards where available].	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality 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. There is no water quality information available for this feature on the Dorset heaths but since it occurs in a mosaic with other wetland SAC features sensitive to nutrient enrichment it will normally be sufficient to maintain or restore	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			the water quality for these features.	
Structure and function (including its typical species)	**Hydrology: Water table**	Maintain a hydrological regime that provides a sub-surface water table during the summer (range -2 to -48 cm below ground level) and a winter water table ± at the surface. Inundation should be absent or only occasional to a minor degree in winter	Defining and maintaining the appropriate hydrological regime is a key step in achieving the conservation objectives for this site and sustaining this feature. Changes in 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 as precise tolerances are not known, further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts.	
Structure and function (including its typical species)	**Supporting off-site habitat**	Restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature [adviser to add any details of such off-site habitat where known].	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.	
Structure and function (including its typical species)	**Maintaining integrity of hydrological catchment**	Maintain the full range of hydrological/ hydrogeological aspects of a site's catchment that contribute to its functioning and the maintenance of the feature	The movement, quality and distribution of water within a site's wider catchment and outside of the site's boundary will affect its ability to support this wetland habitat feature. Catchment size will vary. A site's water table and other hydrological aspects may be adversely affected by changes in the use of the land surface, water abstraction, flood alleviation, development and mineral extraction in the wider catchment.	
Structure and function (including its typical species)	**Functional connectivity with wider landscape**	Restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape, and where possible to reverse the historic fragmentation of the Dorset heaths, in order to meet the conservation objectives. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Adaptation and resilience**	[Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See explanatory notes for this attribute in Table 1	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Supporting 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).	See explanatory notes for this attribute in Table 1	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)	**Conservation measures**	Restore the management measures which are necessary to restore the structure, functions and supporting processes associated with the feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Conservation measures for this feature typically include grazing, cutting, scrub management, weed control, recreation/visitor management. Also covered is maintenance of surface drainage features such as drains, grips, gutters and foot drains. Retention of suitable land use infrastructure/ patterns to enable site management e.g. pastoral livestock farming	
Version Control: Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 6: Supplementary Advice for Qualifying Features: H7210. Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*; Calcium-rich fen dominated by great fen sedge (saw sedge) *

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the feature to 0.09ha	This target is included as there should be no reduction (excluding any trivial loss) in the extent of this feature. Area measurements given may be approximate depending on the nature, age and accuracy of data collection. 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.	McGibbon 1988; Phase 1 SSSI survey Edwards, B 2013. Assessment of sites suitable for freshwater habitat creation and restoration in the lower Frome and Piddle catchments. Dorset Environmental Records Centre report for EA
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site. Changes in distribution may affect the nature and range of the vegetation communities present, the operation of the physical, chemical, and biological processes in the system and the resiliency of the site and its features to changes or impacts. Within the Dorset Heaths (Purbeck and Wareham) and Studland Dunes SAC, this feature is found within The Moors SSSI and within the Dorset Heaths SAC in Wareham Meadows SSSI.	
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type: • S2 *Cladium mariscus* swamp and sedge beds	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). 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.	Edwards, B 2013. Assessment of sites suitable for freshwater habitat creation and restoration in the lower Frome and Piddle catchments. Dorset Environmental Records Centre report for EA.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature	Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). Spread of invasive alien spp. can often be very rapid once established. Invasive aliens within lowland fens may include *Crassula helmsii, Acorus calamus, Mimulus spp., Impatiens glandulifera, Fallopia japonica, Heracleum mantegazzianum*. May include graminoids such as *Phragmites australis, Phalaris arundinacea, Glyceria maxima, Typha latifolia, Juncus spp., Molinia caerulea; tall herbs such as Epilobium hirsutum, Urtica dioica, Pteridium aquilinum, Rubus fruticosus; and bryophytes such as Brachythecium rutabulum, Eurhynchium praelongum, Sphagnum recurvum*.	
Structure and function (including its typical species)	**Presence/ cover of woody species**	Maintain the fen free from trees and scrub	Tree and scrub cover should be absent from the Cladium fen itself. At The Moors SSSI, adjacent mature wet woodland on swamp / lowland valley mire is an important component for some species features especially marsh fern *Thelypteris palustris (T. thelypteroides*) and adequate habitat should be present to maintain a viable presence of these species.	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature [*adviser* to *list species meeting the 3 criteria in the notes - site-distinctive species will include any mentioned in the SAC's Citation and/or in the site's FCT under a 'distinctiveness' attribute*]	See explanatory notes for this attribute in Table 1	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		• The constant and preferential plants of the NVC community type which forms a key component of a SAC habitat that is present • S2 *Cladium mariscus* swamp and sedge beds • Vascular plant assemblage • Invertebrate assemblage		
Structure and function (including its typical species)	**Hydrology**	At a site, unit and/or catchment level (as necessary), restore natural hydrological processes to provide the conditions necessary to sustain the feature within the site	The fen at The Moors is defined as a '*Seepage Percolation Quag*' (Wheeler et al 2009) with the typical state of these types of fen being 'quaking or buoyant surface over rhizome mat; wet for much of year, but often not much flooded.' There are a number of ditches in the vicinity of the *Cladium* fen at The Moors. Most have become blocked and probably no longer function. The substantial ditch to the south is some 50m from the edge of the fen; a water sample with calcium concentration 36mg/l indicates some connection to the *Cladium* (see below). Water levels in this ditch do not vary much seasonally and remained high in the 2018 drought.	Wheeler, B.D., Shaw, S., & Tanner, K 2009 A wetland framework for impact assessment at statutory sites in England and Wales. Environment Agency report.
Structure and function (including its typical species)	**Water chemistry**	Maintain the low nutrient status of irrigating water, ensuring it is rich in base ions, particularly calcium.	A calcium concentration of 41 mg/l in the water emanating northwards from the fen (July 2018) at The Moors shows the different origin of this spring from the adjacent acid mire. It is unclear why there is a calcareous spring in this location. UKTAG (2012) provides threshold values for nitrate concentration in groundwaters for different wetland types but although there is no groundwater data for either Cladium fen it analysis of surface water at The Moors suggests these high nitrate values are not appropriate. Water emanating from the fen had a nitrate concentration of 0.25mg/l (July 2018). Water coming from a nearby calcareous source at Hartland Moor (Ca 40mg/l) had a similar nitrate concentration (0.35mg/l) suggesting they may be fed be the same aquifer.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Any artificial nutrient inputs, where there is pathway between a discharge and the feature, are likely to have an adverse effect (e.g. discharges from package sewage treatment plants, overflows or leakages from septic tanks, storm overflows of sewage or fertiliser run off from fields).	
Structure and function (including its typical species)	**Hydrology**	Maintain a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations) on groundwater dependent sites.	Defining and maintaining the appropriate hydrological regime is a key step in 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. H7210 at The Moors is largely groundwater dependent.	Wheeler, B.D., Shaw, S., & Tanner, K 2009 A wetland framework for impact assessment at statutory sites in England and Wales. Environment Agency report
Structure and function (including its typical species)	**Adaptation and resilience**	[Maintain OR Restore] the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See explanatory notes for this attribute in Table 1	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Structure and function (including its typical species)	**Supporting off-site habitat**	Restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature [adviser to add any details of such off-site habitat where known].	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
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).	See explanatory notes for this attribute in Table 1	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)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 7: Supplementary Advice for Qualifying Features: H7230. Alkaline fens; Calcium-rich springwater-fed fens.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Restore the total extent of the feature to reverse any reduction due to scrub invasion or other factors.	There should be no 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 extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present. The feature occurs in an intimate mosaic with other wetland habitats. Transitions between these habitats make boundaries difficult to define. As a result values for extent are hard to determine with sufficient accuracy to be repeatable and useful as a way of measuring any reduction in area. Some acceptable changes in the extent of Alkaline Fen may to occur as a result of natural processes.	Wheeler BR and Wilson P J, (2014) Survey of EC Habitats Directive Annex I wetland habitats in the Dorset heaths. Report to Natural England This does not map the habitat but indicates that in the SSSIs below it mostly occurs in small patches (<0.5ha) with larger areas on some sites such as Hartland Moor. 1946, 1972 aerial photographs and OS 2nd edition 6 inch maps both available on https://explorer.geowessex.com/
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Restore the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site. Changes in distribution may affect the nature and range of the vegetation communities present, the operation of the physical, chemical, and biological processes in the system and the resiliency of the site and its features to changes or impacts. H7230 Alkaline fen has a restricted distribution across the two Dorset Heaths SACs. The main locations are at Corfe Common, Brenscombe Heaths, Blue Pool and Norden Heaths, Rempstone Heaths, Studland and Godlingston Heaths and Povington and Grange Heaths, Hartland Moor, The Moors and Winfrith Heath SSSIs.	Wheeler BR and Wilson P J, (2014) Survey of EC Habitats Directive Annex I wetland habitats in the Dorset heaths. Report to Natural England
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type:	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).	Wheeler BR and Wilson P J, (2014) Survey of EC Habitats Directive Annex I wetland habitats in the Dorset heaths. Report to Natural England

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		M10a *Pinguicula vulgaris-Carex dioica mire, Carex demissa-Juncus bulbosus/kochii* sub-community. M22 *Juncus subnodulosus–Cirsium palustre* fen meadow, species-rich M22–M24 (*Molinia caerulea–Cirsium dissectum* fen meadow) transition, M14b *Schoenus nigricans-Narthecium ossifragum* mire and S2b *Cladium mariscus* swamp and sedge-beds	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. For this feature this may typically be the M9, M10 & M13 types but detailed investigation by Wheeler and Wilson has identified a wider range of specific NVC communities corresponding to Alkaline Fen.	
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature	Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides).	
Structure and function (including its typical species)	**Presence/cover of woody species**	Restore a low cover of woody species corresponding to the historical distribution (or of not more than 10% scrub/tree cover). No woody species in flushes or springs.	Native trees and shrubs can occur naturally on bog and fen surfaces but most wetlands on the Dorset Heaths historically had no or little tree and scrub cover. Scrub and trees on bogs and fens is often detrimental because they are indicators and perpetrators of drying out, or of eutrophication or sediment deposition, and may cause damage to vegetation structure through shading effects. Birch, pine, willow and rhododendron (an invasive non-native species) are the main species of concern. The seeds of most invasive woody species are wind dispersed, so trees are able to establish on raised bog and fen surfaces.	1946, 1972 aerial photographs and OS 2nd edition 6 inch maps both available on https://explorer.geowessex.com/

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Browsing and grazing by herbivores**	Maintain appropriate levels of grazing,	Appropriate levels of grazing vary on the different sites but most stands benefit from grazing. Overall undergrazing be livestock is be more of an issue than overgrazing. .	
Structure and function (including its typical species)	**Exposed substrate**	Maintain the exposure of the substrate to appropriate levels, which will typically be between 5% & 25% across feature.	For this wetland habitat type, maintaining some continuous extent of exposed, open ground surface is required to support the establishment and supply of those component species which often rely on wet and sparsely-vegetated conditions. The open nature and sometimes skeletal nature of the substrate supporting these features requires a higher upper threshold than for some other wetlands.	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature [*adviser* to *list species meeting the 3 criteria in the notes - site-distinctive species will include any mentioned in the SAC's Citation and/or in the site's FCT under a 'distinctiveness' attribute*] • The constant and preferential plants of the NVC community type which forms a key component of a SAC habitat that is present M10a Pinguicula vulgaris-Carex dioica mire, Carex demissa-Juncus bulbosus/kochii sub-community	See explanatory notes for this attribute in Table 1	
Structure and function (including its typical	**Hydrology**	At a unit and/or catchment level maintain natural hydrological processes to provide the conditions necessary to sustain	Defining and maintaining the appropriate hydrological regime is a key step in achieving the conservation objectives for this site Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant effects. Site-specific	Wheeler, B.D., Shaw, S., & Tanner, K (2009) A wetland framework for impact assessment at statutory sites in England and

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)		the feature within the site, including a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations).	investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Alkaline fens of these SACs are represented by a number of different hydrological types including seepage flow tracks (fen arm Hartland Moor) and seepage percolation quag (The Moors) Wheeler et al. (2009)). The same authors provide range and mean for summer & winter water levels for those wetland NVC types constituting Annex 1 habitats. This provides a rough guide to appropriate levels, but it is critical that individual sites and their needs are considered as there is considerable variation within the NVC communities listed and recorded water levels.	Wales .Environment Agency report.
Structure and function (including its typical species)	**Water chemistry**	Maintain the low nutrient status of irrigating water, ensuring it is rich in base ions, particularly calcium.	UKTAG (2012) provides threshold values for nitrate concentration in groundwaters for different wetland types but although there is no groundwater data for any alkaline fen site analysis of surface water at both The Moors and Hartland Moor suggests these high nitrate thresholds are not appropriate. Water emanating from The Moors fen had a nitrate concentration of 0.25mg/l (July 2018) Water coming from a calcareous source at the head of the fen arm at Hartland Moor (Ca 40mg/l) had a nitrate concentrations of 0.35mg/l.	
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See explanatory notes for this attribute in Table 1	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Structure and function (including its	**Functional connectivity with wider**	Restore the overall extent, quality and function of any supporting features within the local	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)	**landscape**	landscape which provide a critical functional connection with the site		
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).	See explanatory notes for this attribute in Table 1	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)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: Attribute relating to **Integrity of tufa** removed as tufa not present within the SAC.				

Table 8: Supplementary Advice for Qualifying Features: H9190. Old acidophilous oak woods with Quercus robur on sandy plains; Dry oak-dominated woodland.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the feature.	This target is included as there should be no reduction (excluding any trivial loss) in the extent of this feature. Area measurements given may be approximate depending on the nature, age and accuracy of data collection. 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 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. For this feature, this attribute includes the extent of semi-natural wood-pasture mosaic area; tree area; the number of veteran trees (except through natural causes), including dead and living trees. Tree roots (particularly of veteran trees) may extend a considerable distance beyond the boundary of the site. A reduction of woodland/wood-pasture area - whether at the edge or in the middle of a site will reduce the core area where wood-pasture conditions are found - these support significant assemblages of species dependent on woodland conditions (e.g. lichens and bryophytes - being one example). Loss of any woodland area which fragments a site into different parts may interrupt the movement of species between the remaining parts of the woodland, especially those with limited powers of dispersal.	
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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.	
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types: W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus woodland*	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). 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.	
Structure and function (including its typical species)	**Vegetation structure - old growth, open space, dead wood, age class distribution, woodland edge, regeneration potential, tree and shrub layer and species composition**	Maintain near natural structural development under minimum intervention; fallen dead wood left on site; invasive exotics notably rhododendron should be controlled	All of these attributes are important ecological characteristics of these woodlands but these woodlands are small areas within much larger heathland areas and most have developed for many years with little intervention and are grazed as part of large heathland grazing units. In these circumstances a minimum intervention objective is appropriate rather than attempting anything other than natural control over these attributes. Thus the objective reflects what is most appropriate for the woodland feature, taking account of its known interest, history, past management and the landscape context. For this habitat type, old or over-mature elements of the woodland are particularly characteristic and important features, and their continuity should be a priority.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Vegetation structure - ancient/ veteran tree trees**	Restore at least a third of ancient/veteran trees in open locations or with open halo around them.	Good woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. The objective reflect one deviation from the minimum intervention objective to deal with those cases where secondary woodland has grown up around and veteran trees.	
Structure and function (including its typical species)	**Browsing and grazing by herbivores**	Maintain browsing at a (low) level that allows well developed understorey with no obvious browse line, & lush ground vegetation with some grazing sensitive species evident (bramble, ivy etc.), and tree seedlings and sapling common in gaps.	Herbivores, especially deer, are an integral part of woodland ecosystems. They are important in influencing woodland regeneration, composition and structure and therefore in shaping woodland wildlife communities. In general, both light grazing and browsing is desirable to promote both a diverse woodland structure and continuous seedling establishment. Short periods with no grazing at all can allow fresh natural regeneration of trees, but a long-term absence of herbivores can result in excessively dense thickets of young trees which shade out ground flora and lower plant species. However, heavy grazing by deer or sheep prevents woodland regeneration, and can cause excessive trampling and/or poaching damage, canopy fragmentation, heavy browsing, barkstripping and a heavily grazed sward. Low intensity grazing with cattle/ponies where the woodland is part of the heathland/woodland grazing unit is considered as a natural process;	
Structure and function (including its typical species)	**Regeneration potential**	Maintain the potential for sufficient natural regeneration of desirable trees and shrubs; typically tree seedlings of desirable species (above grazing and browsing height) should be visible in sufficient numbers in gaps, at the wood edge and/or as regrowth as appropriate	The regeneration potential of the woodland feature must be maintained if the wood is to be sustained and survive, both in terms of quantity of regeneration and in terms of appropriate species. Natural processes should predominate and it is recognised that the location of the woodland may change through natural expansion at the edge and development of open areas within.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature • The constant and preferential plants of the NVC community type which forms a key component of a SAC habitat that is present W10 Quercus robur – Pteridium aquilinum – Rubus fruticosus woodland W16 Quercus spp. – Betula spp. – Deschampsia flexuosa woodland • Epiphytic lichens • Dead wood invertebrates	See explanatory notes for this attribute in Table 1	
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature	Invasive or introduced non-native species are a serious potential threat to the biodiversity of native and ancient woods, because they are able to exclude, damage or suppress the growth of native tree, shrub and ground species (and their associated typical species), reduce structural diversity and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). Such species can include Rhododendrons, snowberry, Japanese knotweed, giant hogweed and Himalayan balsam, for example. Similarly, this would include pheasants, rabbits and non-native invertebrate 'pest' species. *Rhododendron* species are the host of the pathogen causing	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Sudden Oak Death so it is desirable that this species is eradicated to remove this risk	
Structure and function (including its typical species)	**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, to within typical values for the habitat.	Soil is the foundation of basic ecosystem function and 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 this Annex I feature.	
Structure and function (including its typical species)	**Root zones of ancient trees**	Maintain the soil structure within and around the root zones of the mature and ancient tree cohort [in or to] an un-compacted condition	The management of land within and around forest habitats which are characterised by ancient trees can be crucial to their individual welfare and long-term continuity, and the landscape they are part of can be just as or even more important. The condition of the soil surrounding such trees will affect their roots, associated mycorrhizal fungi and growth. Plants have difficulty in compacted soil because the mineral grains are pressed together, leaving little space for air and water which are essential for root growth. Unless carefully managed, activities such as construction, forestry management and trampling by grazing livestock and human feet during recreational activity may all contribute to excessive soil compaction around ancient trees.	
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).	See explanatory notes for this attribute in Table 1	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)	**Illumination**	Ensure artificial light is maintained to a level which is unlikely to affect natural phenological cycles and processes to the detriment of the feature and its typical species at this site.	Woodland biodiversity has naturally evolved with natural patterns of light and darkness, so disturbance or modification of those patterns can influence numerous aspects of plant and animal behaviour. For example, light pollution (from direct glare, chronically increased illumination and/or temporary, unexpected fluctuations in lighting) can affect animal navigation, competitive interactions, predator-prey relations, and animal physiology. Flowering and development of trees	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			and plants can also be modified by un-natural illumination which can disrupt natural seasonal responses.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: The objectives for this feature are to allow natural processes to predominate and to accept the resulting ecological conditions. Attributes relating to **age class, open space, veteran trees, regeneration, hydrology, functional connectivity' tree shrub composition** and **woodland edge** removed as not relevant.				

Table 9: Supplementary Advice for Qualifying Features: H91DO. Bog Woodland *

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the feature to 5.25ha	This target is included as there should be no reduction (excluding any trivial loss) in the extent of this feature. Area measurements given may be approximate depending on the nature, age and accuracy of data collection. 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 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. Loss of any woodland area which fragments a site into different parts may interrupt the movement of species between the remaining parts of the woodland, especially those with limited powers of dispersal.	
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	Whilst wet woodland is present across much of the SAC, most of this woodland is of recent origin and is likely to be the result of changes in the catchment of mires causing eutrophication or sedimentation and invasion by willow. The SAC bog woodland feature is restricted to a small area of Morden Bog & Hyde Heath SSSI	
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types: W4 *Betula pubsecens – Molinia caerulea* woodland	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). 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).	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Vegetation structure including canopy cover, open ground, dead wood, old growth, regeneration potential, species composition, age class distribution.**	Maintain near natural structural development under minimum intervention; fallen dead wood left on site; invasive exotics notably rhododendron should be controlled	All of these attributes are important ecological characteristics of woodlands but the bog woodland at Morden has been developing for a long time under near natural conditions. Treacherous ground conditions make intervention difficult and has probably resulted in little past human intervention. In these circumstances a minimum intervention objective is appropriate rather than attempting anything other than natural control over these attributes.	
Structure and function (including its typical species)	**Browsing and grazing by herbivores**	Maintain browsing at a (low) level that allows well developed understorey with no obvious browse line, & lush ground vegetation with some grazing sensitive species evident (bramble, ivy etc.), and tree seedlings and sapling common in gaps.	Herbivores, especially deer, are an integral part of woodland ecosystems. They are important in influencing woodland regeneration, composition and structure and therefore in shaping woodland wildlife communities. In general, both light grazing and browsing is desirable to promote both a diverse woodland structure and continuous seedling establishment.	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature • The constant and preferential plants of the NVC community type which forms a key component of a SAC habitat that is present W4 *Betula pubesens – Molinia caerulea* *Carex paniculata* Epiphytic lichens	See explanatory notes for this attribute in Table 1	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature	Invasive or introduced non-native species are a serious potential threat to the biodiversity of native and ancient woods, because they are able to exclude, damage or suppress the growth of native tree, shrub and ground species (and their associated typical species), reduce structural diversity and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). Such species can include rhododendrons, snowberry, Japanese knotweed, giant hogweed and Himalayan balsam, for example. Similarly, this would include pheasants, rabbits and non-native invertebrate 'pest' species.	
Supporting processes (on which the feature relies)	**Air quality**	Restore 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).	See explanatory notes for this attribute in Table 1	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)	**Hydrology**	At unit and/or catchment 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 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 plants and animals present. Measures to restore natural hydrology in the wider Morden Bog, within which the bog woodland sits, are necessary but it is not thought that the artificial ditches involved are affecting the natural hydrology of the Bog Woodland.	
Supporting processes (on which the feature relies)	**Water Quality**	Maintain water to a standard which provides the necessary conditions to support the feature.	For SAC features such a Bog Woodland which are supported by surface and/or ground water, maintaining the quality of water supply is critical. Poor water quality is likely to adversely affect the structure and function of this natural habitat. The Bog Woodland stand at Morden Bog seems to be fed by a groundwater spring or springs and the difference in vegetation from the surrounding acid mire and wet heath is probably largely a result of a difference in water chemistry. There is	Data on water quality from Wessex Water survey.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			some indication from sampling that calcium is slightly raised suggesting a possible effect from the wider catchment with groundwater influenced by chalk geology to the north or below. Increases in reed in areas surrounding the bog woodland suggests that there may be some eutrophication of this water supply but no effect on the bog woodland itself is apparent. Concentrations of orthophosphate in the water samples were very low (it was not detectable).	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: The objectives for this feature are to allow natural processes to predominate and to accept the resulting ecological conditions. Attributes relating to **age class, open space, veteran trees, regeneration, hydrology, functional connectivity' tree shrub composition** and **woodland edge** removed as not relevant.				

Table 10: Supplementary Advice for Qualifying Features: S1044. *Coenagrion mercuriale*; Southern damselfly

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 at each individual site to a level which is above an appropriate population size given previous population counts and the site's ecological characteristics.	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 and fluctuations in population size, it is difficult to set precise target-values. Targets 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. 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 should be that measured using standard methods, such as peak mean counts or breeding surveys.	Panter, C., Lake, S. & Liley, D. (2016) Southern Damselfly monitoring results 2015/16. Natural England/Footprint Ecology
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	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. Studies have shown relatively little movement between many of the patches suitable habitat connected by the same stream (providing a corridor for movement); where movement was observed it was between adjacent sites. For southern damselfly sites to function as a meta-population,	Adolfo Cordero Rivera (ed) 2006 Forests and Dragonflies. Fourth WDA International Symposium of Odonatology, Pontevedra (Spain), July 2005, pp. 239-258. Thompson, D.J., Purse, B.V. & Rouquette, J.R. (2003) Monitoring the Southern Damselfly Coenagrion Mercuriale. Conserving Natura 2000 Rivers Ecology Series, English Nature, Peterborough, UK.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			new sites within the dispersal range of this species must be established between existing populations. Movements of up 500m by southern damselflies have been readily observed, and longer distances have been achieved along continuous lines of habitat, but rarely over 1km It is recommended therefore, that areas of suitable habitat are within 500m to 1km of existing sites to act as 'stepping stones' that would re-connect these populations.	
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Restore the total extent of the habitat(s) which support the feature: (Streams / wet heath / mire habitats)	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. Due to the specific requirements of this species there will only be small areas of the wider wet heath / mire communities that suitable for southern damselfly.	
Supporting habitat: structure/ function	**Flow: base-rich runnels and heathland seepages /streams**	Restore open, unshaded, shallow lengths of watercourse/mire with permanent discernible flow (approx. 10 cm s-1).	The southern damselfly typically requires base-rich, shallow streams with a constant slow-to-moderate permanent flow and relatively high water temperature although not all of the Dorset heaths sites have these characteristics. Some have developed after historic ball clay working has altered topography and hydrology (Creech, Blue Pool). One (Orchard Cottage mire, Povington) is currently fed by an artificial water supply from an active clay pit. And the sites at Corfe Common are flushes rather than streams without the flow characteristics of a stream.	
Supporting habitat: structure/ function	**Trophic conditions :Base-rich runnels and heathland seepages/ streams**	Restore dystrophic to mesotrophic conditions indicated by a lack of areas of watercourse with encroachment of algae (except brown flocculent algae), bacterial film or invasive tall emergents such as *Juncus*	A wide range of pH is found in watercourses on southern damselfly sites, although the majority of sites fall within the range 7.0–7.5. These conditions ensure sufficient oxygen for larval and egg development and no eutrophication and encroachment of invasive emergents and algae. Detailed water chemistry data is only available for one site –	Natural England water quality monitoring for Dorset Heaths judicial review

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		effusus, J. acutiflorus and *Phragmites* spp.	the fen arm at Hartland Moor. At 4 locations values varied as follows: pH 6.9 – 7.5, Ca 13 – 20.3 mg/l, TON <0.005 – 1.2 mg/l. TP 0.001 – 0.038mg/l. Thus compared with most mires on the Dorset heaths Ca and pH are significantly higher, N is also raised possibly reflecting a source of groundwater from a wider catchment with more influence from agriculture. Other southern damselfly sites are close to the edge of the southern heaths where groundwater is probably influenced by the nearby chalk.	
Supporting habitat: structure/ function	**Trophic conditions: Base-rich runnels and heathland seepages/ streams:trophic conditions**	Restore dystrophic to mesotrophic conditions indicated by a lack of areas of watercourse with encroachment of algae (except brown flocculent algae), bacterial film or invasive tall emergents such as *Juncus effusus, J. acutiflorus* and *Phragmites* spp.	A wide range of pH is found in watercourses on southern damselfly sites, although the majority of sites fall within the range 7.0–7.5. These conditions ensure sufficient oxygen for larval and egg development and no eutrophication and encroachment of invasive emergents and algae.	
Supporting habitat: structure/ function	**Vegetation composition: Base-rich runnels and heathland seepages/ streams**	Restore stream lengths with cover of submerged and semi-emergent, herbaceous macrophytes including some cover of *Hypericum elodes, Potamogeton polygonifolius, or Ranunculus flammula*, with some *Carex* spp. or *Juncus* spp	Southern damselflies usually emerge from the water as final instar larvae by ascending emergent vegetation, rather than by walking onto shore. Tall rushes and sedges are known to have been used and emergence perches for the southern damselfly include semi-emergent plants such as lesser water parsnip *(Berula erecta*), bittersweet (*Solanum dulcamara*), water mint (*Mentha aquatica*) and watercress (*Rorippa nasturtium-aquaticum).* The eggs are laid into water plant tissue and plant species used as oviposition substrates may include fool's *watercress (Apium nodiflorum)*, lesser water parsnip, reed sweet-grass (*Glyceria maxima)*, watercress, brooklime *(Veronica beccabunga*) and blue water-speedwell (*V. anagallisaquatica*), marsh St John's wort *(Hypericum elodes),* bog pondweed (*Potamogeton polygonifolius)* and jointed rush (*Juncus articulatus).*	
Supporting habitat: structure/ function	**Vegetation composition: scrub cover**	Maintain only small areas of tall scrub or trees within 20 metres of watercourse or mire but not on intervening habitat between two areas of population.	Some scattered trees and scrub associated with base-rich runnels and heathland seepages/streams can provide areas for roosting, maturation, feeding, displaying and basking.	

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)	**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	See explanatory notes for this attribute in Table 1. Within the Dorset Heaths, the Southern Damselfly is at the northern edge of its range and is unlikely to be directly affected by any increases in temperature; the primary impact of climate change on this species will be through changes to hydrology of a site.	Natural England 2015 Climate Change Theme Plan and National Biodiversity Climate Change Vulnerability Assessments (NBCCVAs)
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).	See explanatory notes for this attribute in Table 1	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 habitat relies)	**Conservation measures**	Maintain the management measures which are necessary to restore the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. The Southern Damselfly has very particular habitat requirements for a mid-successional management dependent habitat. It is important to ensure that sites holding Southern Damselfly populations are managed according to these requirements, as well as potentially suitable adjacent land. Due to their limited dispersal ability, only small areas of the watercourse should be managed in any one year. In addition, potentially suitable areas close to existing populations or between current populations can be managed to reconnect them.	BDS (2016) – Southern Damselfly Management Handbook
Supporting processes (on which the feature and/or	**Water quantity/ quality**	Maintain water quality and quantity to a standard which provides the necessary conditions to support the feature [	Southern damselfly is dependent on wetland habitats supported by surface and/or ground water and maintaining the quality and quantity of water supply is critical, especially at certain times of year. Poor water quality and inadequate	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
its supporting habitat relies)			quantities of water can adversely affect the structure and function of this habitat type. Water quality information for Hartland Moor is given above. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: Attributes relating to chalk stream habitats have been removed as this SAC is an example of a heathland habitat supporting this species.				

Table 11: Supplementary Advice for Qualifying Features: S1166. *Triturus cristatus*; Great crested newt

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 each individual site to a level which is at or above an appropriate population size given previous population counts and the site's ecological characteristics.	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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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. Estimating the average size of the GCN population will normally be based on the peak count of adults undertaken in the known peak season for the area, and in-year weather conditions; likely to be Mid-April to Mid-May in central areas. The peak count is derived by summing the counts across the site on 'best' night for each season. Considerable natural between-year variation in population counts is frequent.	
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.	
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Maintain the total extent of the habitat(s) which support the feature.	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.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/ function	**Cover of macrophytes**	Maintain a high cover of macrophytes, typically between 50-80%, within ponds	Marginal and emergent vegetation are important components of a great crested newt pond as they provide excellent egg-laying sites. Good plants for this purpose include water forget-me-not *Myosotis scorpioides*, flote/sweet grass *Glyceria fluitans* and great hairy willowherb *Epilobium hirsutum*. They are, however, an integral part of the natural successional change of a waterbody and whilst it is preferable to have a good range and area of marginal plants, they should not extend across the entire water surface. In most circumstances it will be desirable to retain a fringe of marginal and emergent vegetation around at least half of a pond's edge. Where the marginal vegetation is particularly invasive, and provides no specific benefit to crested newts, it may be decided that its complete removal is necessary.	
Supporting habitat: structure/ function	**Permanence of ponds**	Maintain the permanence of water within ponds present within the site	Ponds to include breeding ponds as well as non-breeding ponds, since the latter may be used for foraging or sustaining prey populations. Ponds should have a high degree of permanence, (they never or rarely dry out other than though natural drought) and this may be adversely affected by changes in the supply or flow of water (from either surface water and/or groundwater sources] to the ponds. Great crested newt may use larger temporary ponds which are unsuitable for fish, provided that they contain water over the breeding / tadpole season (February - mid-August) for at least one in every three years.	
Supporting habitat: structure/ function	**Presence of fish and wildfowl**	Ensure fish and wildfowl are absent in all ponds otherwise suitable for GCN.	At high densities waterfowl (i.e. most water birds such as ducks, geese and swans but excluding moorhen) can remove all aquatic vegetation, adversely affect water quality and create turbid pondwater conditions. Some may also actively hunt adult GCNs and their larvae. Similarly fish can be significant predators of GCN larvae. The presence of waterfowl and fish can reduce habitat suitability. These should be wholly absent from sites which support fewer than 5 ponds.	
Supporting habitat: structure/ function	**Presence of ponds**	Maintain the number or surface area of ponds present within the site	Ponds to include breeding ponds as well as non-breeding ponds, since the latter may be used for foraging or sustaining prey populations but only includes ponds in the vicinity of GCN populations since GCN occur only in small parts of the SACs, mainly using ponds that are the result of old clay workings in	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			the Blue Pool and Creech areas. The surface area of a pond is taken from when water reaches its highest level (excluding flooding events), which will usually be in the spring.	
Supporting habitat: structure/ function	**Shading of ponds**	Ensure pond perimeters are generally free of shade (typically no more than 60% cover of the shoreline)	Shading from trees and/or buildings (not including emergent pond vegetation) can negatively affect the abundance of marginal vegetation in ponds, water temperature and the rate of hatching and development of great crested newt eggs and larvae.	
Supporting habitat: structure/ function	**Supporting terrestrial habitat**	Maintain the quality of terrestrial habitat likely to be utilised by Great Crested Newts, with no fragmentation of habitat by significant barriers to newt dispersal.	Great crested newts need both aquatic and terrestrial habitat. Good quality terrestrial habitat, particularly within 500m of the breeding ponds, provides important sheltering, dispersing and foraging conditions and can include all semi-natural habitat along with meadows, rough tussocky grassland, scrub, woodland, Good quality terrestrial habitat for GCNs has structural diversity which can be provided by features such as ditches, loose stone/rocks, rabbit burrows and small mammal holes. Good habitat provides a range of invertebrates, such as earthworms, insects, spiders and slugs, on which GCNs are known to feed. Fragmentation refers to significant barriers to GCN movement such as walls and buildings, but not footpaths or tracks. Newts disperse over land to forage for food, and move between ponds. The distances moved during dispersal vary widely according to habitat quality and availability. At most sites, the majority of adults probably stay within around 250m of the breeding pond but may well travel further if there are areas of high quality foraging and refuge habitat extending beyond this range.	
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	See explanatory notes for this attribute in Table 1	Natural England 2015 Climate Change Theme Plan and National Biodiversity Climate Change Vulnerability Assessments (NBCCVAs)
Supporting processes (on which the	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at	See explanatory notes for this attribute in table 1.	More information about site-relevant Critical Loads and Levels for this SAC is available by using

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature and/or its supporting habitat relies)		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 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity/ quality**	Maintain water quality and quantity to a standard which provides the necessary conditions to support the feature [adviser to provide site-specific standards where available].	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 and inadequate quantities of water can adversely affect the structure and function of this habitat type. Site-specific investigations may be required to establish appropriate water quality standards for the SAC.	
Supporting processes (on which the feature or its supporting habitat relies)	**Water quality**	Maintain the quality of pond waters within the site as indicated by the presence of an abundant and diverse invertebrate community.	As the clarity and chemical status of water bodies supporting GCNs can be subjective, the presence of an abundant and diverse community of freshwater invertebrates can be indicative of suitable water quality standards. Invertebrate groups present should include groups such as mayfly larvae and water shrimps. This will ensure ponds support a healthy (mainly invertebrate) fauna to provide food for developing GCN larvae and adults.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Appendix 1: Dorset Heaths typical plant species

Dry heath - *Calluna vulgaris, Erica cinerea, Ulex gallii, Ulex minor, Agrostis curtisii, Erica tetralix, Galium saxatile, Hypochaeris radicata, Molinia caerulea, Rumex acetosella, Potentilla erecta, Polygala serpyllifolia, Cladonia* sp, Bryophytes.

Wet heath and mire - *Calluna vulgaris, Erica tetralix, Erica ciliaris, Ulex gallii, Ulex minor, Genista anglica, Sphagnum spp, Carex echinata, Carex ovalis, Carex panacea, Carex pulicaris, Drosera intermedia, D. rotundifolia, Eleocharis multicaulis*, *Eriophorum angustifolium, Juncus subnodulosus, Juncus squarrosus, Menyanthes trifoliata, Molinia caerulea, Myrica gale, Narthecium ossifragum,* Pedicularis sylvatica, *Polygala serpyllifolia, Potentilla erecta, Potamogeton polygonifolius*, *Rhynchospora alba, R. fusca, Schoenus nigricans, Trichophorum cespitosum.*