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

Saltfleetby – Theddlethorpe Dunes and Gibraltar Point Special Area of Conservation (SAC)
Site code: UK0030270

Saltfleetby-Theddlethorpe Dunes National Nature Reserve © Natural England

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC.

This advice should therefore be read together with the SAC Conservation Objectives available here.

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

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.

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	Saltfleetby-Theddlethorpe Dunes and Gibraltar Point Special Area of Conservation (SAC)
Location	Lincolnshire
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	960.2ha
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)	Gibraltar Point SSSI, Saltfleetby–Theddlethorpe Dunes SSSI. Both SSSIs extend across a wider area than the SAC.
Relationship with other European or International Site designations	Saltfleetby – Theddlethorpe Dunes is adjacent to the Greater Wash SPA and Humber Estuary SAC. It is also part underpinned by the Humber Estuary SPA. Gibraltar Point is adjacent to The Wash & North Norfolk Coast SAC, The Wash SPA and the Greater Wash SPA. It is also part underpinned by Gibraltar Point SPA.

Site background and geography

Saltfleetby–Theddlethorpe Dunes and Gibraltar Point SAC comprises two dune systems within the Lincolnshire Coast & Marshes National Character Area (NCA Profile 42) separated by about 25km. Saltfleetby–Theddlethorpe Dunes are the larger of the two systems and run between Saltfleet and Mablethope. Gibraltar Point is located further south adjacent to Skegness, close to where the Wash and the North Sea meet.

The dune systems contains good examples of shifting dunes within a complex site that exhibits a range of dune types. The marram *Ammophila arenaria*-dominated dunes are associated with lyme-grass *Leymus arenarius* and sand couch *Elytrigia juncea*. These shifting dunes are part of a successional transition with fixed dunes with dune grassland and sea-buckthorn *Hippophae rhamnoides*. The rapidly-accreting dunes on the seaward sand bars and shingle banks make this an important site for research into the processes of coastal development.

There are extensive areas of fixed dune vegetation within largely intact geomorphologically-active systems. Early successional stages of vegetation exist on the seaward side of the systems with stable swards to landward. The calcium-rich dunes support a rich and diverse flora, dominated in places by red fescue *Festuca rubra* and with unusual species including pyramidal orchid *Anacamptis pyramidalis*, bee orchid *Orchis apifera*, sea-holly *Eryngium maritimum*, lesser meadow-rue *Thalictrum minus* and sea prickly saltwort *Salsola kali*.

This site also supports a good example of dunes with sea-buckthorn *Hippophae rhamnoides* in the main part of its natural range in the UK which, in Britain, is restricted to sand dune. Here it is present in a range of successional stages from early colonisation of mobile dunes to mature scrub, where it becomes associated with other woody species such as elder *Sambucus nigra*, hawthorn *Crataegus monogyna* and occasionally blackthorn *Prunus spinosa*; the ground flora is typically composed of ruderal species.

The dune slacks at this site are part of a successional transition between a range of dune features, and are unusual in having developed from saltmarsh after becoming isolated from tidal inundation by the formation of a line of imbricate fore dunes, a process still active today. There is a range of different communities and the species present depend on the wetness of the slack, its location within the system and the management history. Some of the earlier stage of succession slacks support a very wide range of species characterised by common sedge *Carex nigra* and pennywort *Hydrocotyle vulgare*; this has been encouraged by management. The wetter slacks are of a maritime fen character with tall sedges and rushes, ponds and ditches are also a feature supporting rare plants such as greater water parsnip *Sium latifolium.*

Saltfleetby-Theddlethorpe Dunes supports the only population of breeding Natterjack Toads *Bufo calamita* in Lincolnshire - the most north-easterly in England. This part of the site receives active management to maintain suitable breeding pools and hunting habitat for the toadlets.

The whole of Saltfleetby–Theddlethorpe Dunes and the majority of Gibraltar Point are managed as National Nature Reserves.

About the qualifying features of the SAC

The following section gives you additional, site-specific information about this SAC's qualifying features. These are the natural habitats and/or species for which this SAC has been designated.

Qualifying habitats:

- **H2160 Dunes with *Hippophae rhamnoides***

Dunes with *Hippophae rhamnoides* comprise scrub vegetation on more-or-less stable sand dunes in which sea-buckthorn *H. rhamnoides* is abundant. Sea-buckthorn may either form dense thickets, with sparse nitrophilous associates such as common nettle *Urtica dioica*, or occur as more scattered bushes interspersed with various grasses, typically marram *Ammophila arenaria* and red fescue *Festuca rubra*, and associated herbs of dune grassland. This vegetation corresponds with NVC type SD18 *Hippophae rhamnoides* dune scrub.

This habitat is found at scattered coastal localities around the UK, but as a native vegetation type it is confined to a few sites on the east coast of England (Pearson & Rogers 1962). Elsewhere sea-buckthorn has been planted, and is generally regarded as a conservation problem as it tends to invade other dune habitats and change the nutrient status of the soil where it grows.

Hippophae rhamnoides is considered native on this site and the site supports a good example of this feature in the main part of its natural range in the UK. This habitat develops on dune areas and is present in a range of successional stages from early colonisation to mature scrub associated with other species such as elder *Sambucus nigra*, hawthorn *Crataegus monogyna* and ivy *Hedera helix*, typically associated with an understorey of ruderal species. These stands of scrub are important for both migratory and breeding birds.

An unusual aspect of the *Hippophae rhamnoides* stands here, in contrast with the majority of coastal sites in Europe, is the vigour with which the shrubs are expanding and colonising other habitats. The reasons for this are unconfirmed but low salt deposition (due to the offshore prevailing wind on this east coast), low sand inundation on the white dunes and lower impact of soil fauna (e.g. nematodes) on the

root systems have all been hypothesized. For this reason, a balance needs to be maintained between shrub-covered and open dune habitats at this SAC through active conservation management.

- **H2110 Embryonic shifting dunes**

Embryonic shifting dune vegetation exists in a highly dynamic state and is dependent on the continued operation of physical processes at the dune/beach interface. It is the first type of vegetation to colonise areas of incipient dune formation at the top of a beach. On a prograding dune system this vegetation may be the precursor to the main dune-building vegetation dominated by marram *Ammophila arenaria*. In most cases H2110 Embryonic shifting dunes are transient and will either be displaced by marram-dominated vegetation as the dunes develop H2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") or will be washed away by storms.

The continued supply of new sand from the beach plain into the dune system is therefore vital to the continued existence of this community, even if this sand is derived from within the same system. The habitat type is of exceptional importance as an indicator of the general structural and functional 'health' of a dune system. Creation of new dune habitat, and indeed the long-term survival of the dune system at which it occurs, is often dependent upon the survival of this habitat type as demonstrated by the ephemeral, imbricate ridges that allowed development of saltmarsh in their lea and the embryo swarms at Saltfleetby that may develop after periods of persistent onshore winter winds and have supported the progradation of the dunes there by 35m in 15 years.

- **H2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")**

Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") encompasses most of the vegetation of unstable dunes where there is active sand movement. Under these conditions sand-binding marram *Ammophila arenaria* is always a prominent feature of the vegetation and is usually dominant. In the UK the majority of such vegetation falls within NVC type SD6 *Ammophila arenaria* mobile dune community.

This is a dynamic vegetation type maintained only by change. It can occur on both accreting and eroding dunes, but will rapidly change and disappear if stability is imposed. It rarely occurs in isolation because of its dynamic nature and because it is successionally related to other dune habitats. The habitat type excludes the low, embryonic dunes where occasional exposure to saltwater flooding constrains the growth of marram and where plants of the strandline mingle with salt-tolerant, sand-binding grasses; such vegetation is referable to Annex I type H2110 Embryonic shifting dunes.

The dune system on the composite site Saltfleetby–Theddlethorpe Dunes and Gibraltar Point contains good examples of shifting dunes within a complex site that exhibits a range of dune types. At this site the *Ammophila*-dominated dunes are associated with lyme-grass *Leymus arenarius* and sand couch *Elytrigia juncea*. These shifting dunes are part of a successional transition with H2130 Fixed dunes with herbaceous vegetation and H2160 Dunes with *Hippophae rhamnoides*.

- **H2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes")**

Fixed dune vegetation occurs mainly on the largest dune systems, being those that have the width to allow it to develop. It typically occurs inland of the zone dominated by marram Ammophila arenaria on coastal dunes, and represents the vegetation that replaces marram as the dune stabilises and the organic content of the sand increases.

Within this dune complex there are extensive areas of fixed dune vegetation within largely intact geomorphologically-active systems, with representation of early successional stages on the seaward side, and more stable areas. The lime-rich dunes support a rich and diverse flora, dominated in places by red fescue *Festuca rubra* and with unusual species including pyramidal orchid *Anacamptis pyramidalis*, bee orchid Orchis apifera, sea-holly *Eryngium maritimum*, lesser meadow-rue *Thalictrum*

minus and sea campion *Silene maritima*. The fixed dunes are part of a successional transition, and the rapidly-accreting dunes on the seaward sand bars and shingle banks make this an important site for research into the processes of coastal development.

- **H2190 Humid dune slacks**

Dune slacks are low-lying areas within dune systems that are seasonally flooded and where nutrient levels are low. They occur primarily on the larger dune systems in the UK, especially in the west and north, where the wetter climate favours their development when compared with the generally warmer and/or drier dune systems of continental Europe. The range of communities found is considerable and depends on the structure of the dune system, the successional stage of the dune slack, the chemical composition of the dune sand, and the prevailing climatic conditions.

The Humid dune slacks at this site are part of a successional transition between a range of dune features and have their origins in saltmarsh, becoming freshwater dominated after the formation of dune ridges which isolated the swards from tidal inundation. There is a range of communities present, many of which are species-rich, the more mature resembling maritime fen. The species present depend on the relationship between topography and water table, length of time since isolation from saltwater influence and the management history. Some slacks support a very wide range of species; this has been supported by conservation management.

Qualifying Species:

N/A

References

PEARSON, M.C. 7 ROGERS, J.A. 1962 *Biological flora of the British Isles: Hippophae rhamnoides L*. Journal of Ecology **50**: 501 - 503

Table 1: Supplementary Advice for Qualifying Features: H2110. Embryonic shifting dunes

H2120. Shifting dunes along the shoreline with *Ammophila 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	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Maintain the total extent of the feature to approximately 38 ha **Saltfleetby – Theddlethorpe Dunes** Embryonic dunes – 5.8 ha "White Dunes" – 8.1 ha **Gibraltar Point** Embryonic dunes – 3.6 ha "White Dunes" – 22.7 ha	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis. The H2110 Embryonic shifting dunes feature 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 habitat may be limited in extent. Evidence of natural changes to extent should not justify further 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.	TEP, 2008. *NVC survey of Saltfleetby – Theddlethorpe Dunes SSSI & Gibraltar Point SSSI*. Unpublished report for Natural England (Available from Natural England on request) NATURAL ENGLAND, 2009. *Definition of Favourable Condition – Gibraltar Point SSSI* (Available from Natural England on request) NATURAL ENGLAND, 2009. *Definition of Favourable Condition – Saltfleetby – Theddlethorpe Dunes SSSI – Draft* (Available from Natural England on request) This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Extent and distribution of the feature	Future extent of habitat within the site	**For H2110 Embryonic Shifting Dunes only**	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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
	and ability to respond to seasonal changes	Maintain the ability to absorb seasonal and periodic fluctuations in the extent of the habitat	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. Given an adequate supply of sand and onshore winds, the embryo dunes will continue to build although complete erosion or re-shaping may also be attributable to the wind as well as tidal submersion during spring tides.	
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. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitats. 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. This zone of **H2110 Embryonic 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 the sedimentary processes operating at the site. 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. The distribution of the **H2120 Mobile Dunes** feature strongly relates to the coastal processes (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. 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. The presence of saltmarsh developing on the beach plain influences the location of H2110 embryo dunes, particularly at the Saltfleetby-	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Theddlethorpe sub-site and there has been a long-term trend for such saltmarsh colonisation extending south from the oldest saltmarsh adjacent to the Saltfleet Haven. This trend is mirrored in the development of H2110 embryonic shifting dunes, often transitory, on storm ridges fronting the established northern saltmarsh. At Gibraltar Point, the meandering of Greenshank Creek and movement of offshore sand banks have a significant effect on the development and erosion of shifting and marram dunes along the length of this part of the site.	
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. The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be among the most vulnerable sites overall and likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.	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	Dune topography	**For H2110 Embryonic Shifting Dunes and H2120 Shifting**	Dune topography within the **H2110 Embryonic shifting dunes** can change seasonally and through the years due to wind and tidal events.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(including its typical species)		**Dunes with marram** Maintain a natural dune topography, and allow natural change that is wind driven (some change may be necessary to maintain the continuity of slacks).	Onshore winds in dry conditions can lead to sand-blow and extensive dune building, on this site this tends to be northerly and north-easterly winds with embryo dune formation greatest in the early months of the year. Conversely, strong north-easterly winds coincidental with low pressure and spring tides can cause widespread erosion on the fore-dunes. Accumulations of driftline organic material are important for trapping sand and initiating dune formation. See also 'Functional connectivity with wider coastal sedimentary system' attribute. In the **H2120 Shifting Dunes with Marram** 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.	
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 the 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).	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. Connections with the wider landscape 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 features of the site. Connectivity may take the form of landscape features outside of the designated site boundary which are either important 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 These Annex 1 habitats are an integral element of the 'coastal foredune'	Saltfleet to Gibraltar Point Strategy & Lincolnshire Beach Management 2018-2021 NATURAL ENGLAND, 2014. *Site Improvement Plan - Saltfleetby – Theddlethorpe Dunes & Gibraltar Point SAC*. Available at: http://publications.naturalengland.org.uk/publication/5607448354226176

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			(the beach-dune sand-sharing system). However, it is also important that sediment transport that feeds the beach from offshore is also not interrupted. In some cases sand may come from marram-dominated dunes landward (Shifting dunes along the shore with *Ammophila arenaria*). Since 1991 the preferred sea defence option for the Lincolnshire coast is to hold the line through a series of beach nourishment schemes. A sand re-nourishment programme, Lincshore, was launched in 1994 and provides an artificial supply of sand to the Lincolnshire coast with sand dredged from the seabed and then pumped onto beaches, replacing levels lost to the sea during winter. Sand nourishment occurs between Mablethorpe and Skegness; the need for re-nourishment is assessed annually in January. The effects of this beach nourishment on the SAC features is not fully understood. The approach to coastal flood risk on the Lincolnshire coast between Saltfleet and Gibraltar Point over the next 100 years is being reviewed through the Saltfleet to Gibraltar Point Strategy Review (SGPSR).	
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 SD4 *Elymus farctus ssp. boreali-atlanticus* foredune, SD5 *Leymus arenarius* mobile dune, and SD6 *Ammophila arenaria* mobile dune NVC community types which form a key component of the **H2110 Embryonic Shifting dunes** and **H2120 Shifting Dunes with Marram** features at this SAC	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.	GREATER LINCOLNSHIRE NATURE PARTNERSHIP, 2015. *Lincolnshire Biodiversity Action Plan*. Available at: www.glnp.org.uk/partnership/nature-strategy NATURAL ENGLAND, 2010. *Gibraltar Point NNR management plan 2010-2015* (Available from Natural England on request) NATURAL ENGLAND, 2011. *Saltfleetby NNR management plan 2011-2016* (Available from

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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.	Natural England on request) TEP, 2008. *NVC survey of Saltfleetby – Theddlethorpe Dunes SSS & Gibraltar Point SSSI*. Unpublished report for Natural England (Available from Natural England on request) This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
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. As an east-coast dune system the prevailing wind is off-shore and sand inundation of the shifting marram habitat is accordingly lower at this site than, for example, west-coast systems. Consequently there may be a lower percentage of bare sand in comparison than other systems late in the growing season. However, pulses of sand deposition occur after strong northerly and easterly winter winds – this is a variable factor and some winters e.g. 2018 see high sand blow and deposition whilst others do not. Consequently, high levels of bare sand in late summer may be a particular indicator of recreational pressure as both sub-sites extend to the edge of popular holiday towns: Skegness and Mablethorpe.	
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 habitat used by a wide range of	

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.	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 These Annex 1 features have essentially raw soils with little humus and low nutrient status.	
Structure and function (including its typical species)	Vegetation community composition	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types SD4 *Elymus farctus ssp. boreali-atlanticus* foredune SD5 *Leymus arenarius* mobile dune SD6 *Ammophila arenaria* mobile dune	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). SD6 is 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. The species composition of shifting dunes is constrained by the harsh conditions, but the vegetation is by no means uniform. The 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.*	TEP, 2008. *NVC survey of Saltfleetby – Theddlethorpe Dunes SSS & Gibraltar Point SSSI*. Unpublished report for Natural England (Available from Natural England on request) This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	Vegetation community transitions	**For H2120 Shifting Dunes with Marram** 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.	
Structure and	Vegetation	**For H2110 Embryonic Shifting**	Dense cover of trees and shrubs can smother and shade out smaller and	This attribute will be

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function (including its typical species)	composition: trees and scrub	**Dunes** Ensure scrub and tree cover is absent or rare **For H2120 Shifting Dunes with marram** 80% of the shifting dune frontage should have scrub and tree cover absent or rare across its whole width	more characteristic vegetation of this habitat feature, and interrupt naturally occurring dune processes. The presence of trees and shrubs usually indicates an artificially stabilised system. Active management is required to reduce or contain its cover across this habitat feature. Sea buckthorn is native to this SAC, however it is very invasive; to prevent stabilisation the foreshore / frontal dune should be kept free of *Hippophae rhamnoides*.	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** Maintain 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.	Two types of negative species can occur: invasive non-natives, or species indicative of poor condition (e.g. nettle or creeping thistle). For known or likely invasive species, there should be zero tolerance. 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. Invasive non-native species, such as sycamore *Acer pseudoplatanus*, clematis *Clematis vitalba*, Duke of Argyll's teaplant *Lycium barbarum* and Chinese teaplant *L. chinense* and Mahonia *Mahonia* spp. should be controlled as appropriate. Sea buckthorn is native to this SAC however it is very invasive; to prevent stabilisation the H2110 Embryonic shifting dune and H2120 Shifting Dunes with Marram feature should be kept free of *Hippophae rhamnoides*.	WEAVER, G. 2007. *Setting Conservation Objectives for coastal interest features – dune grassland and Hippophae rhamnoides scrub*. Unpublished report for Natural England (Available on request from Natural England) NATURAL ENGLAND, 2010. *Gibraltar Point NNR management plan 2010-2015* (Available from Natural England on request) NATURAL ENGLAND, 2011. *Saltfleetby NNR management plan 2011-2016* (Available from Natural England on request) NATURAL ENGLAND,

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				2016. *Notes for Saltfleetby – Theddlethorpe Dunes NNR Management Plan*. Unpublished report by Graham Weaver (Coastal Ecologist) (Available on from Natural England ON REQUEST) NATURAL ENGLAND, 2016. *Notes for Gibraltar Point NNR for a management plan*. Unpublished report by Graham Weaver (Coastal Ecologist) (Available on request from Natural England) 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 Shifting dunes** Maintain the cover of this feature at 95% of the wider dune frontage	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, related to broader scale sediment budgets. Where *Leymus arenarius* is present, there can be a continuous floristic transition to marram dominated mobile dunes (H2110 Shifting dunes along the shoreline with *Ammophila arenaria*).	
Supporting processes (on which the	Aeolian (wind-blow) processes	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram**	Allowing natural wind-blow (or 'aeolian') processes to shape the topography of this habitat feature and allow active movement of dry sand is important to its long-term conservation	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature relies)		Maintain the natural movement of sand within the site, resulting from wind blow-outs and blow-throughs. Maintain the ability of wind-blow processes to transport sand from the beach plain to the foredune.	The beach plain needs to be dry to allow sand to be transported into the dune system. Blow-throughs are a natural element of the dynamics of this zone. However, excessive recreational pressure can inhibit vegetation growth in sand building phases. Footfall on these 'soft' habitats can quickly reduce vegetation cover through trampling and then cause erosion gullies on well-trodden routes. This is particularly the case where unofficial visitor routes lead from the end of the surfaced footpaths on the fixed dunes and traverse the outer dunes.	
Supporting processes (on which the feature relies)	Air quality	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** 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).	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 (NH_3), oxides of nitrogen (NO_x) and sulphur dioxide (SO_2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. Target set to Restore because current levels of nitrogen deposition (APIS accessed on 4 February 2019) exceed the critical load for H2110 and H2120 features.	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)	Conservation measures	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** 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. Management should consider the structures and functions of the site as a whole. For these features, direct habitat management is likely to be limited to the management of invasive scrub. Excessive recreational activity can be damaging and may well need to be managed. The main management of Embryonic Shifting Dunes and Shifting Dunes with marram on this SAC is the removal of sea buckthorn seedlings and suckers. This practice has not been applied at Saltfleetby-Theddlethorpe since around 2013 and the expansion of young suckers from established stands into accreting foredunes needs to be checked and in places reversed.	NATURAL ENGLAND, 2010. *Gibraltar Point NNR management plan 2010-2015* (Available from Natural England on request) NATURAL ENGLAND, 2011. *Saltfleetby NNR management plan 2011-2016* (Available from Natural England on request) NATURAL ENGLAND, 2014. *Site Improvement Plan - Saltfleetby – Theddlethorpe Dunes & Gibraltar Point SAC*. Available at: http://publications.naturalengland.org.uk/publication/5607448354226176
Supporting processes (on which the feature relies)	Hydrology	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** At a site level, Maintain natural hydrological processes to provide the conditions necessary to sustain the feature within the site.	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. On a few sites, the development of new Embryonic shifting dunes can lead to new primary dune slacks forming.	
Supporting processes (on which the feature relies)	Water quality	**For H2110 Embryonic Shifting Dunes and H2120 Shifting Dunes with marram** Where the feature is dependent	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		on surface water and/or groundwater, Maintain water quality and quantity to a standard which provides the necessary conditions to support the feature	Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	
Version Control Advice last updated **24 March 2019** following feedback from stakeholders. **Dune topography** additional information included in explanatory notes on embryonic dune formation. **Functional connectivity with wider coastal system** target for sediment movement revised to *Maintain.* **Aeolian (wind blow) processes** target for sand movement revised to *Maintain.* **Conservation measures** additional information included in explanatory notes clarifying situation regarding sea buckthorn.				
Variations from national feature-framework of integrity-guidance:				

Table 2: Supplementary Advice for Qualifying Features: H2130. Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland
H2160. Dunes with *Hippophae rhamnoides*; Dunes with sea-buckthorn
H2190. Humid dune slacks

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of habitat and associated transitions within the site	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** Restore the total extent of the feature to approximately 320 ha, subject to natural change **Saltfleetby – Theddlethorpe Dunes** Fixed dunes – 64.7 ha Dunes with *Hippophae* – 93.1ha Humid dune slacks – 4.7 ha [c.17ha] **Gibraltar Point** Fixed dunes – 59.6 ha Dunes with *Hippophae* – 93.9 ha Humid dune slacks – 3.8 ha [c.14ha]	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The dune slack vegetation recorded in the baseline survey used for this SAC (TEP 2008) is known to under-record the area of true dune slack. The area of wetland at each site is given in square parentheses [thus], the figures being drawn from previous vegetation surveys and detailed knowledge of the sites by reserve staff. 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. Any loss (or gain) from the area of H2130 fixed dunes, H2160 Dunes with *Hippophae* and H2190 humid dune slacks feature from natural physical dynamism 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 unfavourable. An increase in area is favourable unless related to coast protection; evidence of natural changes to extent should not justify further loss to development.	TEP, 2008. *NVC survey of Saltfleetby – Theddlethorpe Dunes SSS & Gibraltar Point SSSI*. Unpublished report for Natural England (Available from Natural England on request) NATURAL ENGLAND, 2009. *Definition of Favourable Condition – Gibraltar Point SSSI* (Available from Natural England on request) NATURAL ENGLAND, 2009. *Definition of Favourable Condition – Saltfleetby – Theddlethorpe Dunes SSSI – Draft* (Available from Natural England on request) This attribute will be periodically monitored as part of Natural England's SSSI

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			In a naturally functioning dune system there is likely to be varying proportions of fixed and mobile dune communities over time; 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. All elements of the wet-dry and early-late succession spectrums should be represented on the site. The dune slacks at both of the component sites of this SAC exhibit a range of vegetation types in addition to SD17 and these are also considered to be typical of the H2190 Humid dune slack feature.	Condition Assessments
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** 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 H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** 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 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.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			It is important to maintain transitions between fixed/semi-fixed dunes and other dune/terrestrial habitats to seaward or landward. In the short term, H2190 Humid dune slacks 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.	
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	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. The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be among most vulnerable sites overall and likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.	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)	Dune topography	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** Maintain a natural dune topography within the fixed	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. Fixed dunes occur where the dune stabilises and the organic content of the soil increases. 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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		dunes, but allow natural changes that are wind driven as some change may be necessary to maintain the continuity of humid dune slacks.	fauna. 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 dune slacks to extend their lives.	
Supporting processes (on which the feature relies)	Functional connectivity with wider coastal sedimentary system and wider landscape	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** Maintain adequate movement of sediment from all key sediment sources (directly from the 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).	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. Connections with the wider landscape 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 features of the site. Connectivity may take the form of landscape features outside of the designated site boundary which are either important 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 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 these features do not depend in the short term on continued inputs of sand, their medium/long term survival does. Since 1991 the preferred sea defence option for the Lincolnshire coast is to hold the line through a series of beach nourishment schemes. A sand re-nourishment programme, Lincshore, was launched in 1994 and provides an artificial supply of sand to the Lincolnshire coast with sand dredged from the seabed and then pumped onto beaches, replacing levels	NATURAL ENGLAND, 2014. *Site Improvement Plan - Saltfleetby – Theddlethorpe Dunes & Gibraltar Point SAC*. Available at: http://publications.naturalengland.org.uk/publication/5607448354226176

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			lost to the sea during winter. Sand nourishment occurs between Mablethorpe and Skegness; the need for re-nourishment is assessed annually in January. The effects of this beach nourishment on the SAC features is not fully understood. The approach to coastal flood risk on the Lincolnshire coast between Saltfleet and Gibraltar Point over the next 100 years is being reviewed through the Saltfleet to Gibraltar Point Strategy Review (SGPSR).	
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** 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 types that form a key component of a SAC habitats that are present: **H2130 Fixed Dunes** SD7 *Ammophila arenaria - Festuca rubra* semi-fixed dune community SD8 *Festuca rubra - Galium verum* fixed dune grassland SD9 *Ammophila arenaria - Arrhenatherum elatius* dune grassland **H2160 Dunes with *Hippophae*** SD18 *Hippophae rhamnoides* dune scrub	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. Target set to Restore because the extent of sea buckthorn scrub needs to be reduced to increase the extent of open dune features. Natterjack toads are present at Saltfleetby-Theddlethorpe Dunes, where	GREATER LINCOLNSHIRE NATURE PARTNERSHIP, 2015. *Lincolnshire Biodiversity Action Plan*. Available at: www.glnp.org.uk/partnership/nature-strategy NATURAL ENGLAND, 2010. *Gibraltar Point NNR management plan 2010-2015* (Available from Natural England on request) NATURAL ENGLAND, 2011. *Saltfleetby NNR management plan 2011-2016* (Available from Natural England on request) TEP, 2008. *NVC survey of Saltfleetby – Theddlethorpe Dunes SSS & Gibraltar Point*

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		H2190 Humid dune slacks SD17 *Potentilla anserina - Carex nigra* dune-slack community Natterjack Toad *Bufo calamita* Marsh Moth *Athetis pallustris*	they are reliant on scrub clearance and intensive management of the breeding pools to remove predators/competitors to ensure that the population continue to exist. The population has suffered from genetic isolation leading to a narrowing of genetic variation and a reduction in fertility. Following the introduction of toadlets from a more varied gene pool it is anticipated that this situation may be resolved in the short-medium term. This SAC supports the last known populations of marsh moth in the UK. The ecology of the moth is little understood but its favoured habitat is around the edge of wetland areas in the transition to dry dune. The female moths are thought to be weak fliers or 'flightless' due to their very small wings and the importance of maintaining this last population is particularly important if dispersal of the population relies solely upon movement of the caterpillars. A breeding population has been known at Saltfleetby for decades but in 2017 the location of a long-suspected second population was identified at Gibraltar Point where it is assumed also to be breeding. Further work to find caterpillars (larvae) is planned for Gibraltar Point in order to confirm a breeding population there.	*SSSI*. Unpublished report for Natural England (Available from Natural England on request) This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	Presence of unvegetated surfaces	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** Restore an appropriate cover of bare ground or sand, which is typically between 5-20% and in patches in a mosaic with vegetated surfaces. Areas of bare sand which are maintained by frequent human disturbance should not increase in extent.	Patches of bare sand are essential for a wide range of typical dune invertebrates, 'dune annual' plants and bryophytes. Sand-dunes on the Lincolnshire coast may exhibit an unusual degree of stability due to the lack of onshore winds and narrow width of the systems. As such, small-scale erosion on some of the sandhills caused by visitors or livestock should not always be considered an issue.	
Structure and function (including its typical	Soils, substrate and nutrient cycling	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks**	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	

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.	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)	Vegetation community composition	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types: **H2130 Fixed Dunes** SD7 *Ammophila arenaria - Festuca rubra* semi-fixed dune community SD8 *Festuca rubra - Galium verum* fixed dune grassland SD9 *Ammophila arenaria - Arrhenatherum elatius* dune grassland **H2160 Dunes with *Hippophae*** SD18 *Hippophae rhamnoides* dune scrub **H2190 Humid dune slacks** SD17 *Potentilla anserina - Carex nigra* dune-slack community	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). For the **H2190 Humid dune slacks 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 dune slacks at both of the component sites of this SAC exhibit a range of vegetation types in addition to SD17 and these are also considered to be typical of the H2190 Humid dune slack feature.	TEP, 2008. *NVC survey of Saltfleetby – Theddlethorpe Dunes SSS & Gibraltar Point SSSI*. Unpublished report for Natural England (Available from Natural England on request) 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 community transitions	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** Restore the habitat in a mosaic with other dune Annex I habitats, and manage transitional areas to restore the full range of ecotones. Maintain the patterns of natural zonations/ transitions; full zonation from beach, inland to fixed dune, should be intact over at least 95% of coastal frontage.	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. 'Restore' has been applied to this attribute because of over-representation of H2160 or because the young and invading growth stages of the *Hippophae rhamnoides* is under represented. One of the rarest transitions both on this site and across the national resource is the dune slack/dry dune ecotone. On this SAC much of the humid dune slack is surrounded by fixed dune recently cleared of scrub or sea buckthorn H2160 scrub. More of this transitional area needs to be cleared of shrubby species and where *Hippophae rhamnoides* is to be retained, the largely mature nature of the stands need to be rejuvenated so that young stands and actively colonising scrub is represented in the ecotone. The transition between mature *Hippophae rhamnoides* and fixed grey dune also needs some diversification of age structure to facilitate seeding/suckering zones without compromising open dune extent targets in the long term. The fixed dune-*Hippophae* transition requires a dynamic approach both in terms of its spatial and temporal representation.	
Structure and function (including its typical species)	Vegetation composition: forb/grass ratio	**For H2190 Humid dune slacks** Restore a typically low vegetation sward with: • >30% cover of forbs • <50% cover of grasses • Occasional bryophytes (e.g. *Calliergonella cuspidatum, Campylium stellatum*).	Low swards required by species such as bog pimpernel *Anagallis tenella*. Drying and eutrophication of the slack can be indicated by increase in 'grassiness'.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function	Vegetation composition:	**For H2130 Fixed dunes**	Dense cover of trees and shrubs can smother and shade out smaller and more characteristic vegetation of this habitat feature, and interrupt	This attribute will be periodically monitored

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(including its typical species)	trees and scrub	Within the SD7 communities on the seaward, younger dune ridges (marram grass and red fescue swards with low forb cover), maintain scrub and tree cover of locally native species of up to 20%. Within the SD8, SD9 and other dune grass communities on the old, landward dune ridges, restore scrub and tree cover of locally native species to between 5% and 10% scattered and in small clumps **For H2190 Humid dune slacks** Within these areas restore scrub and tree cover of locally native species to less than 5%, scattered and in small clumps **For H2160 Dunes with *Hippophae*** *Hippophae* cover across the SAC as a whole should not exceed 20%	naturally occurring dune processes. Usually active management is required to reduce or contain its cover across this habitat feature. Apart from sea buckthorn (where it is native), other trees and shrubs would usually indicate an artificially stabilised system. The extensive scrub on this stretch of coast provides habitat for breeding birds and an important feeding and resting refuge for large numbers of migrant land birds such as fieldfares. Sand dunes are a rare resource nationally – less than 8,000 ha of recognisably dune vegetation remains around the coast of England. For most of their history coastal dunes have been essentially open landscapes maintained as such by variable natural factors and by human usage. A wide range of species of conservation concern occurring on dunes depend on these open conditions. The most recent assessment of the conservation status of the UK's dunes concluded that, apart from sea buckthorn scrub, they were in 'bad, declining' or 'bad, no change' condition. A main reason for this assessment was over-stabilisation and scrub cover. Sea buckthorn is considered native at Saltfleetby-Theddlethorpe Dunes & Gibraltar Point and the SAC is selected as an example of the H2160 Dunes with *Hippophae* feature. Scrub, both sea buckthorn-dominated and 'mixed species', is widespread on this SAC, the most recent vegetation survey of the SAC (2008) showed scrub cover (both *Hippophae* dominated and mixed scrub) at a level of 49.5% of the dune systems The standards for favourable condition of the underpinning dune SSSIs have been tailored to take account of the need to maintain sea buckthorn scrub. This requires an increase in the maximum % cover targets for scrub compared with the UK Common Standards Monitoring generic figures. The 2008 levels were substantially too high and scrub clearance has been undertaken across the SAC since then. Recent analysis of CASI and LIDAR remote sensing data show that present scrub cover across the SAC is 30%: 56.8ha at Gibraltar Point (26% scrub cover) and 68.5ha at Saltfleetby-Theddlethorpe (37% scrub cover). Sea buckthorn is essentially a pioneer species that, over time, becomes	as part of Natural England's SSSI Condition Assessments TEP, 2008. *NVC survey of Saltfleetby – Theddlethorpe Dunes SSS & Gibraltar Point SSSI*. Unpublished report for Natural England (Available from Natural England on request) Analysis of CASI and LIDAR data (Saltfleetby 2012, Gibraltar Point 2014/16)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			out-competed by other shrub and tree species – this is already well advanced in places on the site. The accretion of new dunes will not keep pace with the succession of these currently sea buckthorn-dominated areas into mixed species scrub and woodland. There is a need to manage the *Hippophae* feature to ensure it continues to be represented in these two more vulnerable growth phases as well as establishing an overall balance in the extent of this feature and features characterised by open dune communities (H2110, H2120, H2130 and H2190). The sea buckthorn feature at this SAC should include representation of the three growth phases at both constituent sites (colonising, dominating closed canopy and mature stands senescing and becoming mixed scrub). Appropriate growth stages should be present in association with the other dune features (except H2110 embryo mobile dune and H2120 shifting dunes with marram) but recognising the following principles: • Management of the spatial pattern and distribution of sea buckthorn stands will consider the cyclical nature of succession on sand dunes rather than follow a linear model; it will give due weight to the dynamic nature of dune ecology (including other dune features) and facilitate appropriate fluctuation in the age structure, location and associations of stands with other habitats over time. • Colonising *Hippophae* should not jeopardise the mobile dunes' ability to adapt to changes in sand deposition. Where dunes are prograding a balance needs to be achieved between providing areas where colonisation by sea buckthorn can occur but also ensuring that the inherent mobility of young dunes is not impaired. Where foredunes are eroding the presence of under-cut sea buckthorn shrubs within the new tidal reach acts as a sand fence to inhibit further landward movement of wind blown sand. Similarly, sea buckthorn on the mobile dunes in such a situation may affect the ability of the eroding dune front to realign itself. • The presence of sea buckthorn in dune wetland will need to be compatible with maintaining appropriate water levels/regimes, the requirement of the natterjack toad population *Bufo calamita* for low competition from other amphibians and also the provision of early-	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			and mid-stage successional vegetation and bare ground within the dune slacks. • Stands of suitable senescing sea buckthorn will be allowed to develop into coastal woodland.	
Structure and function (including its typical species)	Vegetation scrub age	**For H2160 Dunes with *Hippophae*** Maintain or restore a diverse age structure amongst the scrub habitat found on the site.	To sustain this feature in the longer-term, there should be a variety of different growth stages present. Each phase of growth associated with sea buckthorn scrub which dominates this feature also represents different microclimatic conditions and microhabitats which may provide shelter or food to other organisms. Therefore, it is important to maintain a mosaic of sea buckthorn in different phases of growth. Typically this age structure should comprise a variety of different ages, typically with 30% of scrub area being in colonising stage (SD18a), and 10% of scrub less than 5 years old and 20% more than 20 years old. Allow 5% of sea buckthorn scrub to develop into dune woodland.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	Vegetation structure diversity	**For the H2130 Fixed dune communities** Restore variation to sward structure, so that typically 30-70% of sward comprises species-rich short turf (between 2-10 cm tall).	A varied vegetation structure and a succession of flowers and seeds through the year are important for maintaining the habitat's diversity. Targets for ratio of short to taller vegetation should be set on a site-specific basis. In addition, a proportion of the short turf area should be <5cm tall. The ratio of short to tall vegetation can be lower (but not <30%) in semi-fixed dune grassland (SD7) where *Ammophila arenaria* (marram grass) is still abundant. Levels and timing of stock grazing should be sufficient to allow adequate seed production.	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 H2190 Humid dune slacks** 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	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. The target relates to the humid dune slack resource across the whole site. 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.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		with more closed vegetation. Early dune slack successional stages at least occasional.	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. The dune slacks on this site are primary slacks, having developed from saltmarsh that became cut off from tidal influence by the extension of a line of embracing dunes. The formation of dune slacks through these processes was completed, at Saltfleetby, in the 19th century and botanical records show that short grazed, open swards here were still present in the 1930s but substantially reduced in area by the 1950s. The slack vegetation at both parts of the SAC now lacks early successional swards and bare ground, although the turf at Gibraltar Point has extensive areas of short grassy habitat attributable to SD17 swards whereas the slack at Saltfleetby is characterised by tall herb fen and swamp communities.	
Structure and function (including its typical species)	Vegetation: undesirable species	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* 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.	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. Undesirable species include*: Rosa* spp.*, Cirsium arvense, Cirsium vulgare, Urtica dioica, Lolium perenne, Arrhenatherum elatius* (not SD9), *Pteridium aquilinum, Rubus fruticosus, Chamaenerion angustifolium, Cynosurus cristatus*, large docks *Rumex* spp., *Senecio jacobaea,* Species such as *Urtica dioica, Cirsium arvense* and *C. vulgare* species are indicative of poor condition because of enrichment. *Senecio jacobaea* is a natural constituent of dune vegetation and should only to be included as a negative indicator where extensive dense stands of robust plants are present.	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)
			Sea buckthorn is considered native at this site but upper levels for each of the dune features apply – see 'Vegetation composition: trees and scrub' attribute, above.	
Structure and function (including its typical species)	Invasive, non-native and/or introduced species	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** 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). Invasive non-native species, such as sycamore *Acer pseudoplatanus*, clematis *Clematis vitalba*, Duke of Argyll's teaplant *Lycium barbarum,* Chinese teaplant *Lycium chinense* and Mahonia *Mahonia spp.* and old man's beard *Clematis vitalba* should be controlled as appropriate.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting processes (on which the feature relies)	Aeolian (wind-blow) processes	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** Maintain the ability of wind-blow processes to transport sand from the beach plain to the foredune.	Allowing natural wind-blow (or 'aeolian') processes to shape the topography of this habitat feature is important to its long-term conservation. The beach plain needs to be dry to allow sand to be transported into the dune system. Allowing natural wind-blow (or 'aeolian') processes to operate and to allow active movement of dry sand is important. Too much stabilised sand will encourage development of the scrub habitat at the expense of open dune habitat. As east coast dune systems, both parts of this site experience very little internal 'blow-out' of sand at present but where opportunities arise, the natural Aeolian processes should not be interfered with.	
Supporting processes (on which the feature relies)	Air quality	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** 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	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	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)
		feature of the site on the Air Pollution Information System (www.apis.ac.uk).	levels for ammonia (NH_3), oxides of nitrogen (NO_x) and sulphur dioxide (SO_2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. Target set to Restore because the current (APIS accessed on 4 February 2019) levels of nitrogen and acid deposition exceed critical loads for the features.	
Supporting processes (on which the feature relies)	Conservation measures	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** 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 these features 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 the Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSIs and/or management agreements. Although 'natural processes' are given a high priority in sustaining site and feature integrity in dunes, active management (including livestock grazing) is sometimes required. Management includes scrub cutting, mowing, grazing, turf-stripping and re-wetting. Mowing can prolong the younger species-rich stage of slack succession but cannot reverse the process. Reverse the fall in water tables (if anthropogenic) and/or removal of trees and scrub combined with follow-up grazing management. 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	NATURAL ENGLAND, 2014. *Site Improvement Plan - Saltfleetby – Theddlethorpe Dunes & Gibraltar Point SAC*. Available at: http://publications.naturalengland.org.uk/publication/5607448354226176

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			threatened species typical of dune slacks. Management practices that remove nutrients (N) from the 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. Target set to Restore because there is insufficient grazing at Saltfleetby, works are required to set back the succession in the main dune slacks at both Saltfleetby and Gibraltar Point and to manage sea buckthorn across the SAC.	
Supporting processes (on which the feature relies)	Hydrology	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** 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	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and 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. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Hydrology can be influenced by dune topography, vegetation, substrate, flow regimes 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. 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 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. Target set to Restore because current levels of water loss are damaging the features. The main drivers of water loss are evapotranspiration from trees/scrub at both component sites and evaporation from 'The Mere' at Gibraltar Point. Agricultural drainage in adjacent fields may be a	NATURAL ENGLAND, 2014. *Site Improvement Plan - Saltfleetby – Theddlethorpe Dunes & Gibraltar Point SAC*. Available at: http://publications.naturalengland.org.uk/publication/5607448354226176

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			contributing factor at Saltfleetby-Theddlethorpe Dunes.	
Supporting processes (on which the feature relies)	Water quality	**For H2130 Fixed dunes, H2160 Dunes with *Hippophae* and H2190 Humid dune slacks** Where the feature is dependent on surface water and/or groundwater, 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 and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. The target is set to 'restore' because of impacts affecting water quantity.	NATURAL ENGLAND, 2014. *Site Improvement Plan - Saltfleetby – Theddlethorpe Dunes & Gibraltar Point SAC*. Available at: http://publications.naturalengland.org.uk/publication/5607448354226176
Version Control Advice last updated: **24 March 2019** following stakeholder feedback. **Vegetation community transitions** Further information included in explanatory notes to explain why a restore target has been set. **Vegetation composition: trees and shrubs** Further information added to explanatory notes to expand on role of sea-buckthorn. **Aeolian (wind blow) processes** Target revised to *Maintain.* Additional information included in explanatory notes to expand on origins of dune slacks.				
Variations from national feature-framework of integrity-guidance: N/A				