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

Hamford Water Special Area of Conservation
Site code: UK0030377

Adult Fisher's estuarine moth at Hamford Water, Essex © Keith Tailby from www.ukmoths.org.uk

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Hamford Water SAC.

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

Where this site overlaps with other European Site(s), 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 draft 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	Hamford Water Special Area of Conservation (SAC)
Location	Essex
Site Maps	The designated boundary of this site can be viewed here on the MAGiC website
Designation Date	26 September 2013
Qualifying Features	S4035. *Gortyna borelii lunata*; Fisher's estuarine moth
Designation Area	50.35 ha
Designation Changes	No changes have been made
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)	Hamford Water SSSI
Relationship with other European or International Site designations	Hamford Water SAC falls within the boundary of Hamford Water SPA and Hamford Water Ramsar.

Site background and geography

Hamford Water is a large, shallow estuarine basin situated within the Greater Thames Estuary National Character Area (NCA), a remote and tranquil coastal landscape of shallow creeks, drowned estuaries, low-lying islands, mudflats and broad tracts of tidal salt marsh and reclaimed grazing marsh that lies between the North Sea and the rising ground inland.

The SAC comprises a mosaic of tidal creeks, islands, intertidal mud, sand flats and saltmarshes. Landward of the saltmarsh there is agriculturally unimproved and improved grassland (including grazing marsh), scrub, woodland, hedges, ditches, ponds and reed-beds. The underlying geology consists of Tertiary, Palaeogene clays overlain by Neogene and early Pleistocene crag deposits and fluvial deposits of mud, sand and shingle.

Hamford Water SAC encompasses those areas which support the Fisher's estuarine moth and its larval food plant, the hog's fennel (*Peucedanum officinale*). The moth is found where there is an abundance of both hog's fennel and the coarse grasses required by the moth for egg laying. These areas primarily occur on islands within Hamford Water, along the sea wall area on the mainland and on grassland areas behind the sea wall.

Hamford Water supports the majority of the Essex population of Fisher's estuarine moth and is the most important UK site for this species.

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:

The SAC supports no qualifying habitat.

Qualifying Species:

- S4035 *Gortyna borelii lunata* Fisher's estuarine moth

Fisher's estuarine moth *Gortyna borelii lunata* is a species restricted in the UK to a small area of sea-walls and coastal grassland in north-east Essex and an area on the north Kent coast. It is reliant on areas of rough grassland where Hog's Fennel (*Peucedanum officinale*), its sole larval food-plant, grows. Long coarse grasses, such as Cock's-foot (*Dactylis glomerata*), Couch (*Elytrigia* spp.) and False Oat-grass (*Arrhenatherum elatius*), are required to fulfil the moth's egg laying requirements.

The optimum habitat for the moth is where there is an abundance of both Hog's Fennel and long coarse grasses. The density of Hog's Fennel across a site is important; it must not be too high, as this will prevent there being the required abundance of grasses for egg laying, or too low, as this will reduce the success of freshly hatched larvae migrating to a Hog's Fennel plant. The most favourable density is one Hog's Fennel plant per m^2. Hog's fennel grows within a range of soil conditions and although in the UK it is naturally found in coastal areas, it will grow well inland. Hog's fennel is not tolerant of high levels of soil salinity and always grows above the upper saltmarsh.

The moth has an annual life cycle: it is in the egg stage over the winter, from September/October through to April/early May; the larval stage occurs from April through to August; pupation lasts for about a month during August/September and the flight period starts in early September and runs through to about the third week in October.

The larvae are stem-borers and feed within the stems of Hog's Fennel from April through to June and then below ground within the plant's rootstock during July and August, when a characteristic 'frass' volcano can be found at the base of plants supporting larvae. Pupation occurs below ground within a bored-out chamber between the root-stock of Hog's Fennel and the surrounding soil.

Fisher's Estuarine Moth has a localised distribution in the UK and is found within just two areas: the north Essex coast and the north Kent coast. The main areas of habitat where the moth occurs are low-lying and vulnerable to coastal flooding and encroachment of saltmarsh. It is thought that the largest population of the moth in the UK, which is found on Skipper's Island in Hamford Water, could be lost at any time as a consequence of flooding. The vulnerability of this site was demonstrated in December 2013, when it was inundated in a tidal surge. The moth's habitat was damaged by the flooding, but has since been showing signs of recovery.

A conservation programme has been in operation in Essex since 2006 that aims to create a landscape-scale network of sites for Fisher's Estuarine Moth that are secure from the threats of flooding. This has involved creating areas of the moth's habitat by establishing hog's fennel in suitable localities on higher ground or behind substantial coastal defences. Many of the habitat areas created now support the moth and are on farmland within the Hamford Water area, but outside of the boundary of the SAC.

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

Table 1: Supplementary Advice for Qualifying Features: S4035. *Gortyna borelii lunata*; Fisher's estuarine moth

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Population abundance**	Maintain the abundance of the population at a level which is above 2,000 flying adults per year.	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period. The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or percentage of hog's fennel plants with larval feeding signs. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available. The general monitoring methods are to record an indication of abundance through night-time transect counts of the adult moth and recording the proportion of hog's fennel plants with larval feeding signs.	JNCC (2007) JNCC (2013) NATURAL ENGLAND (2016) RINGWOOD (2014) Natural England can provide results from recent survey work.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Any deterioration in abundance of population should be determined from mean peak transect count or fluctuations in the percentage of hog's fennel plants with larval feeding signs. The moth's larval feeding signs are distinctive and highly visible between mid-July and mid-August. The moth is not readily attracted to light traps and therefore the adult moth should be counted by searching areas of Hog's Fennel with torchlight, after dark. The most appropriate method to use to monitor fluctuations in population levels is to record the incidence of Hog's Fennel plants with larval feeding signs between mid-July and mid-August and adult transect counts between mid-September and mid-October.	
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Maintain the distribution and continuity of the feature's supporting habitat, including its component vegetation types of grassland, where hog's fennel grows.	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability. The distribution and continuity of habitat may be influenced by coastal processes resulting in a loss of habitat and where this occurs effort should be made to create habitat to compensate for the loss. Habitat creation may be outside of the boundary of the SAC, but within the localised area	RINGWOOD (2004) RINGWOOD (2006) RINGWOOD (2008) RINGWOOD *ET AL* (2004)
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Maintain the total extent of grassland habitat which supports Fisher's estuarine moth	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.	JNCC (2007) JNCC (2013) NATURAL ENGLAND (2014)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Fisher's Estuarine Moth requires rough grassland with an abundance of its larval food-plant Hog's Fennel and coarse grasses. Hog's Fennel (*Peucedanum officinale*) is an umbellifer ('Umbrella shaped') plant growing to a height of around 2 metres. It is not very saline-tolerant and although it is generally a coastal plant in the UK, it is always found in the landward zone above the upper saltmarsh. Managed realignment of the coastal zone and the changing maintenance of sea walls is also likely to result in encroachment of saltmarsh into the grassland habitat. Sufficient space should be provided to replicate grassland habitat with hog's fennel within nearby areas of land which are not at risk from sea level rise and coastal realignments. The baseline extent is approximately 50 ha, but areas are being lost to saltmarsh encroachment as a result of coastal processes and gained as a consequence of habitat creation (outside of the SAC boundary).	NATURAL ENGLAND (2016) RINGWOOD (2008) TARPEY (1999)
Supporting habitat: structure/function	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, within typical values for the supporting habitat	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature. Whilst hog's fennel and the coarse grasses are not particularly sensitive to soil type, there will be parameters within which these species will grow. One of the main sensitivities due to the coastal nature of the SAC is soil salinity levels.	RANDALL AND THORNTON (1996) RINGWOOD (2004)
Supporting habitat: structure/function	**Vegetation structure - rough grassland containing hog's fennel and coarse grasses**	Maintain an abundant population of mature Hog's Fennel plants, over three years old, at an optimum density of approximately one suitable plant per m², in a mixed sward with coarse grasses, such as Cock's-foot, Couch and False-	Hog's Fennel is not very saline tolerant and will not survive more than very occasional inundation by the sea. Mature hog's fennel plants are needed to fulfil the moth's larval feeding requirements. Coarse grasses are also needed to provide the necessary egg-laying conditions.	RINGWOOD (2004) RINGWOOD *ET AL* (2004) RINGWOOD (2006)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		oat grass, at >20% cover.		
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Facilitate the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of supporting habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its [habitats/supporting habitats]. This means that this site is considered to be the most vulnerable sites overall and are 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. Where areas of habitat are vulnerable to flooding and saltmarsh encroachment action should be taken to establish suitable habitat on higher ground, either by promoting natural colonisation through scrub clearance and provision of suitable grassland areas or by creating habitat through creating grassland and planting or seeding hog's fennel.	RINGWOOD (2004) RINGWOOD *ET AL* (2004) RINGWOOD (2006) NATURAL ENGLAND (2015)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain concentrations and deposition of air pollutants at or below the site-relevant Critical Load or Level values given for the feature's supporting habitat on the Air Pollution Information System (www.apis.ac.uk).	The supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of the habitat's substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such	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

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	(www.apis.ac.uk). NATURAL ENGLAND (2014)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to Maintain or Restore the structure, functions and supporting processes associated with Fisher's estuarine moth and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. Generally any mowing should be conducted on rotation during August, whilst the species is pupating below ground, cutting no more than a third of the site in any one year. Grazing management should generally be avoided. A bespoke sea wall rotational mowing programme is conducted by the Environment Agency. Encroaching scrub can be target removed over the winter. 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.	NATURAL ENGLAND (2014) RINGWOOD (2004) RINGWOOD *ET AL*. (2004) RINGWOOD (2006) Annual survey data is available from Natural England
Supporting processes (on which the feature and/or its supporting habitat relies)	**Encroachment of scrub**	Restore as necessary a low cover of encroaching scrub within grassland habitat for Hog's Fennel	Scrub encroaching is resulting in a loss of suitable grassland habitat for the moth. There are efforts to control and reduce scrub at the worst affected sites. Clearing scrub and restoring grassland will also provide opportunities for landward migration of hog's fennel and Fisher's estuarine moth, away from the threats of sea level rise.	NATURAL ENGLAND (2014) RINGWOOD (2004)
Supporting	**Water quantity/**	Maintain water quality and	For many SAC features which are dependent on wetland habitats	NATURAL ENGLAND

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
processes (on which the feature and/or its supporting habitat relies)	**quality**	quantity to a standard which provides the necessary conditions to support the feature.	supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. Hog's fennel grows along the banks of borrow-dykes and ditches and is therefore likely to be sensitive to changes in water quality. As Fisher's estuarine moth spends its pupal and some of its larval life cycle stage below ground it may be affected by ground water levels.	(2016) RINGWOOD (2004) RANDALL AND THORNTON (1996)
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

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