

# Coastal Vegetated Shingle

## Annex A - Site profiles

First published 17 December 2010



# Blakeney Point

Norfolk TG015458

Fieldwork Date: 17/10/09

Conservation Status: SAC, SPA, RAMSAR, Biosphere reserve, WHS (Proposed), AONB, NNR, SSSI



## Introduction

Blakeney Point is a particularly good example of a shingle fringing beach and spit system, which is growing westwards from its land-attached proximal end at Salthouse. There are a series of recurved shingle laterals along the length of the spit and particularly at its distal end. These result from wave refraction changes during growth of the spit. The main body of the spit comprises several storm ridges that have been successively deposited and then overlain by aeolian sand, resulting in dunes. In the lee of the shingle ridges and between the shingle laterals, estuarine deposits have been laid down and salt marsh has formed. It is the interdigitation of these three habitats and the interface vegetation between them, that makes Blakeney Point so significant.

## Threats

Blakeney Point receives 100,000 visitors a year. Over 77,000 come by boat from Morston Quay and Blakeney, but nearly 33,000 tramp along the shingle from Cley. Day visitors include ramblers, fishermen, students and, above all, birdwatchers. Most visit the Lifeboat House (National Trust HQ).

The Coastguard watch-house, bought by the NT in 1932 was previously leased to the Girl-Guide Association. It is now leased to a local organisation for use as a private holiday home for families. Hopefully this will reduce the impact on the vegetation nearby. This is an important location for *Frankenia laevis*.

Students, ramblers and birdwatchers are all affecting the conservation of the shingle flora. Currently, footfall damage to the shingle vegetation is markedly increasing, yet these

communities are of equal importance on this site to the seals, birds, dunes and salt-marsh.

The coastal shingle ridge has been retreating into the salt-marsh over many years in successive 'lobes' or fans after storm events. It now appears that the front ridge is markedly narrowing as a result of marine erosion. Near the coastguard watch house lateral, *Suaeda vera* is currently exposed on the foreshore. This species is typically expected to occur on the rear shingle-salt marsh interface.



Footfall damage caused by birdwatchers

There is evidence of a large vehicle's tracks along the top of the main coast ridge. This has made recent deep imprints and damaged large numbers of *Lathyrus japonicus*, *Honckenya peploides* and *Silene uniflora* patches along the whole length of the spit from Cley westwards.

Wood (2001, *Biol. Cons.*, 97, 199-205) has recently examined species persistence and species richness on this site, showing disturbance and site management to be critical.

## Management

Because of the large number of visitors who land on Blakeney Spit and visit the Lifeboat House, boardwalks, fencing and information boards have been erected to help protect the adjacent fragile dune system.

The site is permanently wardened and additional wardens are employed in summer months.

A post and string fence has been erected since 2006 to keep visitors away from the Glaven estuary dredging works, and this is concentrating some walkers along a narrow strip adjacent to the *Suaeda* interface zone.



Vehicle Damage on foreshore

Rabbits and foxes were culled till recently but were then left to regulate each other. The fox population is now being culled once more to reduce impact on the internationally important bird colonies.

There is a very small free car park (c.12 cars) at Salthouse at the eastern end of the site. At Cley, there is a large car park and toilet / bookshop /

restaurant facility owned by the Norfolk Wildlife Trust on the A149 and a charged carpark at the beach. Signs have been erected at Cley car park explaining the importance of the site.

Much of the coast ridge near the Salthouse car park has been re-profiled by bulldozer over many years as sea defence, but this has now ceased. Little vegetation has so far returned.



Re-profiled shingle

## Vegetation

### Pioneer communities

The shingle parts of Blakeney Point support three pioneer communities along with some grassland communities. The foreshore of the spit is steep, and retreating and therefore does not support vegetation.

Much of the lee slope of the spit supports an open pioneer community typical of East Anglian shingle sites. This comprises a *Silene uniflora* – *Glaucium flavum* assemblage with few associates. The cover offered by these species is small and the vast majority of each quadrat remains devoid of vegetation. Occasional associates include *Rumex crispus* and *Senecio jacobaea*. This has been recognised as SH6a by Sneddon & Randall. Compared with the 1993 survey there are more extensive patches of a similar community, but with *Crambe maritima* replacing *Glaucium*; previously recognised as SH6. This is typical of many southern sites, but is now more prevalent in East Anglia in locations where sand in the matrix is low.



Another community that has expanded considerably since 1993 is SH11 *Lathyrus japonicus* pioneer community. Previously present as only one small patch, this is now more extensive between Cley and after the 'Watch-House recurve. Occasional associates include small amounts of *Rumex crispus*, *Glaucium flavum* and *Senecio jacobaea*

Where sand is present as a higher proportion of the substrate, these communities are replaced by a more diverse pioneer community defined by the constant presence of *Honckenya peploides* with *Silene uniflora* SH26. Other indicators of this assemblage are also arenicolous in nature. These include *Ammophila arenaria*, *Sedum acre*, *Phleum arenarium* and *Glaucium flavum*. Many of the patches of this community previously found along the main body of the spit have disappeared, but it is still significant towards the distal end of Blakeney Point.



Circular *Silene*

### Salt Marsh Communities

The major assemblage found along much of the rear of the spit is defined by the dominant presence of *Suaeda vera* with the lichen *Xanthoria parietina* on older branches. This species is frequently found on East Anglian shingle/salt marsh boundaries in Norfolk and parts of Essex. The community closely matches SM25 and includes *Elymus pycnanthus*, but also has typical shingle species around and between *Suaeda* clumps. As the shingle continues retreating and rolling over the marsh, what was once a linear boundary community is becoming

more extensive and is even showing up in places on the foreshore.

Between the recurve grasslands and the adjacent salt-marsh there is a very narrow but significant assemblage on shingle with a clay matrix. This contains three rare species: *Frankenia laevis*, *Limonium belledifolium* and *L. binervosum*. Its closest affinity is with SM21 but has *Suaeda maritima* rather than *S. vera* as a constant and *Atriplex prostrata* and *Beta vulgaris maritima* and *Salicornia* sp. frequent.

### Grassland Communities

On shingly areas of high sand content near the dune system there is an *Ammophila arenaria* - *Ceratodon purpureus* assemblage SH52, typical of foredunes. *Plantago coronopus*, *Festuca rubra*, *Phleum arenarium* and *Sedum acre* are often present.

The shingle laterals support stable grassland communities which reflect the nearby maritime influences on these areas. The most frequent grassland of recurved areas is a *Plantago coronopus* – *Armeria maritima* – *Festuca rubra* assemblage SH33. The salt-marsh influence is also indicated by the occasional presence of *Limonium vulgare* and *Silene uniflora* is also a frequent associate. This community is stable with a major lichen component including *Cladonia furcata*, *C. cervicornis* and *C. foliacea*.

While not obtained for this study, further information on the vegetation of Blakeney is available in UCL (2007)<sup>1</sup>.

<sup>1</sup> John Pearson, Kenneth Taylor, Janet Woodall and David Havill. (2007) *Plants of Blakeney Point, Norfolk, an annotated list with selected distribution maps. Transactions of the Norfolk & Norwich Naturalists' Society Volume 40 Part 1 2007 pp 16-54*

## Extent of Vegetated Shingle

The extent of vegetated shingle at the site is estimated to be 78.9 hectares, however, there is some uncertainty about the shingle towards the

end of the spit. This is a large site and it was only possible to do a brief survey within the context of this study. Further survey is recommended in order to assess the overlapping region with sand dunes.

## Habitat Quality and the presence of key species

### Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	1
<i>Pseudeuophrys obsoleta</i>	a jumping spider	1
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	0
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk`s-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	0
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	0
<i>Scleranthus annuus</i>	Annual Knawel	1
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	5
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	13
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	4
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	7
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	9
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	8
<i>Limonium vulgare</i>	Common Sea-Lavender	23

Source: Norfolk Biodiversity Information Service

### Invasive Species

Blakeney shingle has not suffered from invasive species to date.

# Vegetated Shingle Extent for Blakeney Point



Blakeney Point: Site Profile

# Browndown

Hampshire: SZ578991

Fieldwork Date: 24/09/09

Conservation Status: SSSI (Solent and Southampton Water SPA and Ramsar Site)



## Introduction

Browndown is a classic apposition beach extending to an area of about 64 hectares. It is located on the north Solent shore to the east of Gosport. The shingle accumulation forms a series of ridges to the west of Stokes Bay. To the north the shingle deposits are backed by low clay cliffs capped with plateau gravel. The Alver Valley runs down the eastern side of Browndown and outfalls across the intertidal into Stokes Bay. Browndown is owned and managed by the MoD and is used for a variety of training exercises including amphibious landing. The Alver Valley supports some important biodiversity sites including extensive reed beds and saw sedge fen. The areas of plateau gravel to the north of the Browndown SSSI also support areas of lowland dry heath.

The vegetated shingle habitat at Browndown is remarkable in showing well developed transitions from pioneer shingle communities to acid grassland and heathland. It also contains some interesting examples of shingle oak woodland comprising islands of open grown stunted pedunculate oaks set within the bare shingle.

Military training has left a legacy of disturbance including former firing points and range butts and narrow gauge railway. The current use by the military is largely confined to the central section of the site which is used by vehicles and in particular for amphibious landing practice. This causes localised vehicle damage to the shingle habitat.

Browndown is generally open to public access and is well used by walkers and for bathing. Despite its urban setting and abundance of heathland vegetation, it does not suffer from significant fire damage or other abuses typical of such urban heathlands.

Coastal processes operating on Browndown have not been monitored in any detail, but indications from former Shoreline Management Plans are that shingle deposition is continuing to occur with shingle derived mainly from erosion of cliffs at Brownwich and Chilling shores to the north west being moved to the site via a south easterly longshore drift mechanism.

## Threats

Much of the vegetated shingle on Browndown is in good condition and little disturbed, however, military activity does cause locally significant levels of disturbance and expansion or intensification of this activity would pose a threat to the vegetated shingle habitat.

Public access at current levels does not have a major trampling effect on the vegetated shingle but increased access is likely to result in loss of vegetated shingle and in particular the annual driftline communities as can be seen to the south nearer to Gilkicker Point.

Impacts of disturbance on shingle nesting birds such as ringed-plover may be more significant and have been the subject of recent monitoring.

Shingle deposition seems to be keeping pace with sea level rise if not increasing the extent of Browndown. However, in future it will be important to monitor effects and in particular maintain the shingle supply pathway from the north west of the site.

## Management

Browndown is managed by the MoD as a training facility. An MoD conservation group meets regularly to review management and provide a liaison with Natural England.



Details of any current habitat management are not known although there appears to have been some control of invasive holm oak *Ilex aquifolium*.

## Vegetation

### Pioneer communities

This community has been recorded from Browndown in the past although it was not seen during the 2009 or 2001 survey.

#### *Atriplex prostrata* community

This is a species poor community dominated by the single species – spear-leaved orache *Atriplex prostrata*. Associated species include scattered plants of *Beta vulgaris* ssp *maritima* and *Crambe maritima*. This community often forms transitions to *Silene maritima* pioneer community and plants of this species can occur within this transition zone. At Browndown it forms a distinctive outer driftline zone associated with the flatter surfaces of the upper beach berms.

This community was also recorded in this location in 2000 by Cox and Crowther and it appears to be relatively stable. There are no equivalent descriptions of this community in the NVC or Sneddon and Randall.



*Atriplex prostrata* strandline community at Browndown in 2009, see similar picture taken in 2000 below.

### Secondary pioneer communities

#### *Beta vulgaris* ssp *maritima* community

In the Solent the *Beta vulgaris* ssp *maritima* community occurs on organic enriched strandlines often landward of an *Atriplex prostrata* or *A. littoralis* zone. At Browndown *Beta vulgaris maritima* occurs intermittently along the seaward edge of the site. To landwards, it shows a clear transition to the *Silene maritima* pioneer shingle community or more stabilised coastal grassland within which *Silene maritima* is a prominent component. It is often associated with scattered plants of *Crambe maritima* and occasional species of the *Silene maritima* pioneer and grassland communities such as *Festuca rubra*, *Armeria maritima* and *Plantago lanceolata*.

A *Beta vulgaris maritima* strandline community was described as occurring widely within the Solent by Cox and Crowther in 2001. Here it was



Vegetated shingle at Browndown in 2000 showing wide zone of *Atriplex prostrata* giving way to a well defined *Beta vulgaris* ssp *maritima* zone to the landward (right of photograph).

recorded with a wide range of associated species including *Tripleurospermum maritimum*, *Honckenya peploides*, *Rumex crispus*, *Crambe maritima* and *Elytrigia atherica*. In addition, annual species are also present at low frequency, such as *Atriplex littoralis* and *A. prostrata*.

The Solent examples of this community have affinities with SH17 *Beta vulgaris maritima* - *Solanum dulcamara* - *Tripleurospermum maritimum* community described by Sneddon and Randall, however, the Solent samples tend to lack *Solanum dulcamara* which is a constant of the described SH17 community.

Strandline vegetation dominated by *Beta vulgaris* ssp *maritima* is not specifically described by the NVC, however, Rodwell et al (2000) consider the MC6 *Atriplex hastata* – *Beta vulgaris* ssp *maritima* sea-bird cliff community to occur as a colonising community on shingle as well as seabird cliffs. In both situations the *Beta vulgaris* ssp *maritima* occurs on organic rich, well draining soils in maritime situations.



*Crambe maritima* growing with *Beta vulgaris* ssp *maritima* on the transition to the *Silene maritima* pioneer shingle community in the background

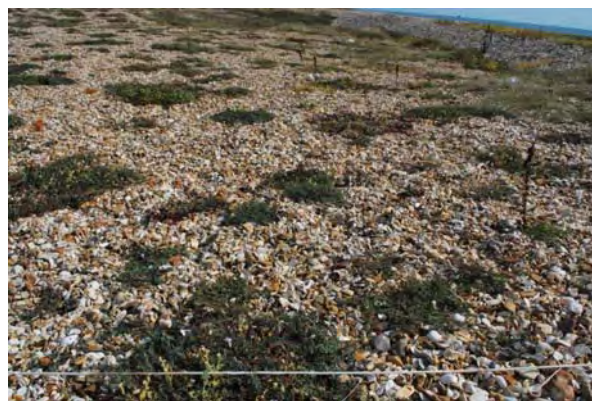
### **Silene maritima and Crambe maritima communities**

#### *SH6 Silene maritima – Crambe maritima pioneer community*

Associated with the *Beta vulgaris maritima* standline is a distinctive community dominated by

the large cabbage-like leaves of *Crambe maritima* and the prostrate mats of *Silene maritima*. It may be that this community develops where there is reduced abundance of organic driftline material present. This is typical of many shingle sites on the south coast of England. At its outer edge, the *Crambe* may occur with few if any associates and maybe described as a separate community. However, to its landward, a number of species of more stabilised shingle communities may occur. Most obvious of these are prostrate mats of sea campion *Silene maritima*. Other associates include scattered clumps of *Beta maritima* ssp *maritima* and *Atriplex prostrata* and tufts of *Festuca rubra*. Despite the presence of these associates, this community remains very open in structure with bare shingle predominating.

At Browdown and a number of other Solent vegetated shingle sites, increasing shingle stability results in declining abundance of *Crambe* and a greater abundance of grasses and other coastal species in particular *Silene maritima* and *Armeria maritima*. In the Solent this community is confined to the Hampshire and West Sussex coast and contrasts with the Isle of Wight Solent shore where *Silene maritima* is absent.



*Silene maritima* pioneer community at Browdown

Landward of the very open *Crambe maritima* community, the abundance of *Silene maritima* and number of associated species increases. Clumps of *Festuca rubra* occur in these more mature stands of vegetation together with a few other coastal species such as *Armeria maritima*. This more grassy community is described by



Sneddon and Randall as SH7 *Silene maritima* dominated pioneer community. At Browdown it was recorded from three quadrats in transect BT2.

#### *SD1 Rumex crispus-Glaucium flavum shingle community*

The yellow horned poppy *Glaucium flavum* has an unusually patchy distribution at Browdown and does not form the prominent classic vegetated shingle zone found in many other vegetated shingle sites. It was recorded in one quadrat in transect BT1 in which the *Glaucium* was associated with a number of species of slightly eutrophic conditions including *Solanum dulcamara* and seedlings of bramble *Rubus fruticosus*. The evidence of scrub invasion also included some seedlings of the locally invasive holm oak *Quercus ilex* and interestingly, plants of wood sage *Teucrium scorodonium*.

Elsewhere on Browdown, some more extensive areas of *Glaucium flavum* dominated SD1 shingle vegetation occur to the south of the buildings of Browdown Camp – again, this area may have slightly more nutrient enriched shingle.

#### **Maritime grassland**

##### *MC5 Armeria maritima-Cerastium diffusum maritime therophyte community*

With increasing stability, the pioneer *Silene maritima* community described above is colonised by a greater diversity of grassland and coastal species and the cover of open bare shingle declines. At Browdown, this pioneer grassland community conforms to the maritime cliff community of MC5. This is not a true grassland but a maritime therophyte community dominated by cushions of *Armeria maritima*. Bare shingle still occupies between 25-33% of the cover. Associated species comprise a mix of coastal species such as *Silene maritima* and *Beta vulgaris* ssp *maritima* and grassland species including *Festuca rubra*, *Agrostis capillaris*, *Galium verum* and *Lotus corniculatus*.

At Browdown, the landward extent of this habitat is marked by transitions to terrestrial shingle heathland and acid grassland vegetation in which the coastal species decline in abundance.

The MC5 vegetation at Browdown also conforms pretty well to SH70 *Festuca rubra* - *Silene maritima* - *Lotus corniculatus* community described by Sneddon and Randall.

#### *Saltmarsh communities*

##### *SM16 Juncus gerardii-Festuca rubra saltmarsh*

Saltmarsh vegetation is not common at Browdown and is largely confined to depressions in the shingle where a type of shingle 'slack' develops. At the eastern end of the site this included an area of rabbit grazed SM16 *Juncus gerardii-Festuca rubra* saltmarsh. The example of this was typical of the NVC vegetation type being dominated by the saltmarsh rush *Juncus gerardii*. Associated species included the lesser centaury *Centaureum pulchellum*, distant sedge *Carex distans* and an abundance of silver weed *Potentilla anserina* forming a short by dense vegetation with no exposed bare shingle.



*Juncus gerardii* and *Potentilla anserina* forming an area of SM16 saltmarsh within a depression in the shingle at Browdown forming a shingle 'slack'

#### **Shingle grassland communities**

#### U4 *Festuca ovina*-*Agrostis capillaris*-*Galium saxatile* acid grassland

Acid grassland occupies the most stable shingle zone at the landward edge of the Browndown vegetated shingle habitat. It is generally heavily rabbit grazed giving a short to very short turf structure. Examples are dominated by the fine leaved grasses, *Agrostis capillaris*, *Festuca ovina* and *Agrostis canina*. These short acid grasslands are species rich and at the time of survey in late September it was difficult to identify all of these. Associated species include *Centaureum erythraea*, *Lotus corniculatus*, *Erica cinerea*, *Viola riviniana*, *Danthonia decumbens* and the hybrid tormentil *Potentilla anglica* x *reptans*. Despite the stable shingle on which this grassland occurs, patches of bare open shingle are still a feature of the community.



*Parched acid grassland on shingle at Browndown marking the landward extent of the vegetated shingle habitat.*



*Very short rabbit grazed acid shingle grassland with hybrid tormentil *Potentilla anglica* x *reptans* and *Viola riviniana**

#### Heathland communities

##### H3 *Ulex minor*-*Agrostis curtisii* heath

On stable areas of shingle to the landward side of Browndown are areas of dry heathland. These are dominated with the heather *Calluna vulgaris* occasionally with tussocks of the bristle bent grass *Agrostis curtisii* and patches of dwarf gorse *Ulex minor*. An interesting feature of this heathland is the presence of the burnet rose *Rosa spinosissima*. This species has a mainly coastal distribution in Hampshire where it is particularly associated with vegetated shingle. Bare shingle is still a prominent feature of this heathland vegetation despite it being located a considerable distance from any obvious maritime influence or disturbance. Classification of this heathland community within the NVC is problematical given the paucity of associated species over much of the area, however, the local presence of *Agrostis curtisii* and *Ulex minor* suggest it is most closely related to the H3 *Ulex minor* – *Agrostis curtisii* community although it lack other constants of the community – *Erica tetralix* and *Molinia caerulea*.





*H3 Ulex minor – Agrostis curtisii heath at Browndown*



*Rosa spinosissima and Calluna vulgaris growing in areas of heathland at Browndown*

### Shingle woodland

*W10 Quercus robur-Pteridium aquilinum-Rubus fruticosus woodland*

A remarkable feature of the shingle vegetation at Browndown is the presence of areas of shingle woodland. This occupies the centre of the site

landward of the maritime influenced shingle communities and often inter-mingling with the shingle heathland. The 'woodland' is no more than 2.5m in height and forms an open savannah type habitat in which stunted open grown pedunculate oaks occur with scattered rowan *Sorbus aucuparia* and holly *Ilex aquifolium*. A feature of this woodland is also the frequent occurrence of the non-native and potentially invasive holm oak *Quercus ilex*, which appears to be colonising the site. Associated with clumps of stunted woodland is an acid woodland ground flora comprised of *Festuca rubra*, *Teucrium scorodonium*, *Lonicera periclymenum*, *Silene nutans*, *Agrostis capillaris*, *Rubus fruticosus* agg., *Hypochaeris radicata* and *Hedera helix*. The presence of the nationally scarce Nottingham catchfly *Silene nutans* is a particular feature of Browndown.



*Interface between shingle heathland and oak woodland at Browndown*

### Extent of vegetated shingle

The extent of vegetated shingle at the site is 52.4 hectares, although the habitat continues along fringing beaches in both directions adjacent (or close) to the site.

### Notable species

Browndown supports an important flora including notable populations of the nationally rare



*Geranium purpureum forsteri* and nationally scarce *Silene nutans*.

The strong population of *Silene nutans* on Browndown also provides the food plant of the nationally rare and Red Data Book white spot moth *Hadena albimacula*.

## Invasive species

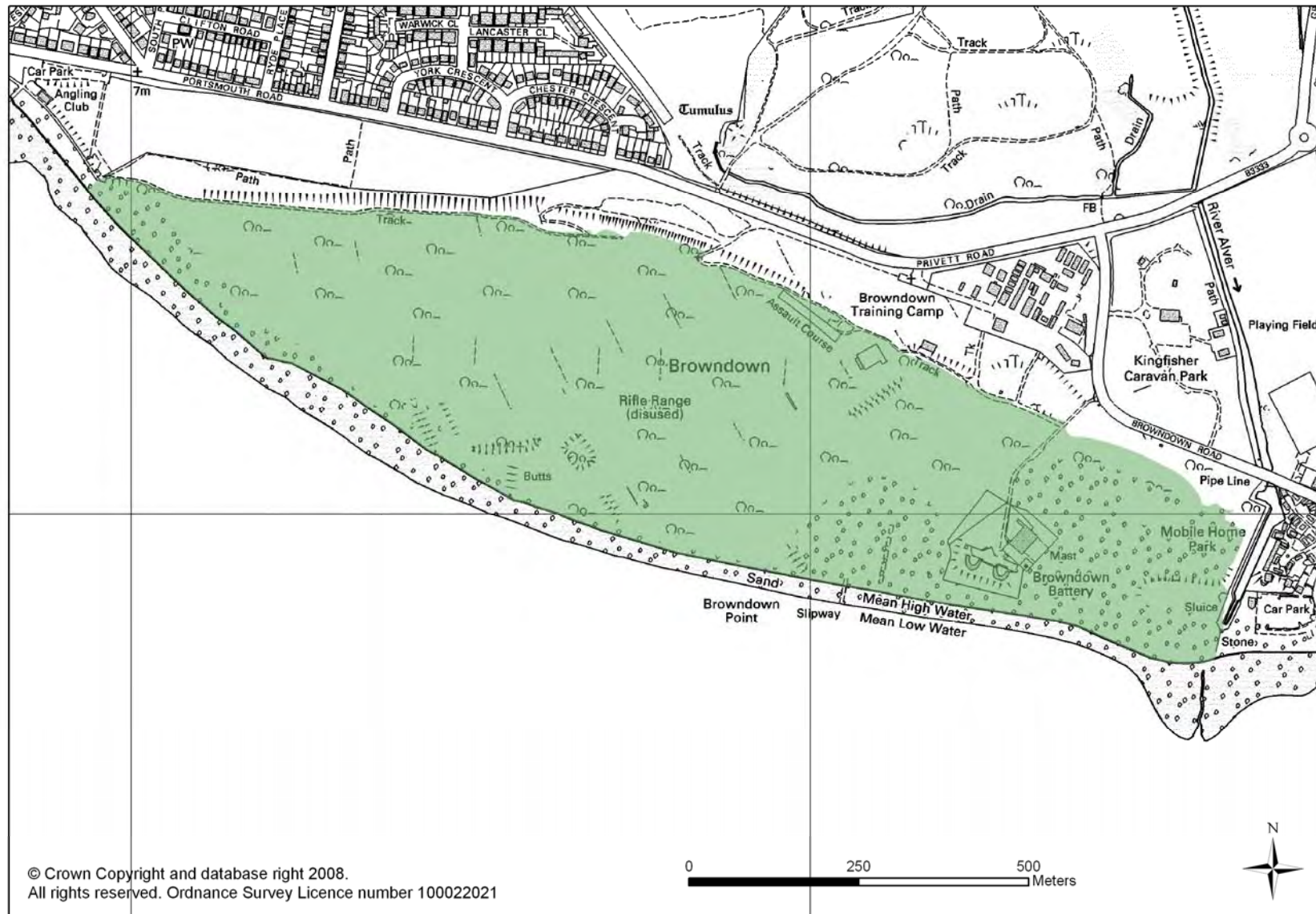
Quercus ilex

## Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	0
<i>Pseudeuophrys obsoleta</i>	a jumping spider	0
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	0
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk's-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	4
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	0
<i>Scleranthus annuus</i>	Annual Knawel	0
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	0
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	0
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	0
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	0
<i>Limonium vulgare</i>	Common Sea-Lavender	4

Source: Hampshire Biodiversity Information Centre

## Vegetated Shingle Extent for Browdown



# Church Norton and Pagham Spits

West Sussex SZ880950

Fieldwork Date: 13/10/09

Conservation Status: Pagham Harbour SSSI,  
Pagham Harbour SPA, Pagham Harbour SPA



## Introduction

Pagham Harbour is a key site for coastal geomorphology. It is significant both as a classic shingle spit landform and for the links that have been demonstrated between the coastal near shore and offshore forms and sediments. The shingle spit system comprises a series of sub-parallel ridges and recurves, marking different phases of extension and frontal accretion. Shingle reaches the beach *via* the intertidal zone, and the so-called 'Pagham delta' and the behaviour of the spits and delta are intimately linked with water and sediment circulation around the Selsey peninsula. The area also provides an excellent example of the role of weed rafting of shingle in coastal sediment budgets.

The western spit, referred to as Church Norton spit, has been growing rapidly to the east in recent years creating new areas of sediment for vegetation to colonise. The eastern spit on the Pagham side of the harbour entrance is more stable. It merges into the sub-urban residential development of Pagham and has been extensively colonised by alien species.

## Threats

The Pagham spit merges into the residential areas of Pagham and is under much greater levels of recreational disturbance and urban edge pressures. Alien plant species are a particular issue and have colonised significant areas of the vegetated shingle.

## Management

Much of the vegetated shingle is managed within the Pagham Harbour Local Nature Reserve.

## Descriptions of Vegetated Shingle Communities and Transitions

### Pioneer Communities

#### *Atriplex prostrata* community

This is a species poor community dominated by *Atriplex prostrata* with some *Crambe maritima*. It is found on the most recently disturbed vegetated shingle and appears characteristic of this location on shingle spits on the central south coast of England. This community is not described by the NVC or Sneddon and Randall. However, it was recorded widely in the Solent Strandline Vegetation Survey of 2000 (Cox and Crowther, 2001). Extensive sheets of this vegetation occur on the southern side of the Church Norton spit occupying the upper beach berm.



*Mats of Atriplex prostrata on the southern side of Church Norton spit occupying the most recently disturbed upper beach berm*



*SH9 Crambe maritima - Solanum dulcamara pioneer community*

Vegetated shingle dominated by *Crambe maritima* covers extensive areas of Church Norton and Pagham Spits. The largest continuous extent of this community is found on Church Norton Spit. The large cabbage like plants of *Crambe maritima* give the vegetation a very distinctive appearance. Associated species are generally rather few, but typically include some *Solanum dulcamara* and locally *Glaucium flavum*. The *Crambe maritima* community shows transitions to more stabilised grass dominated shingle vegetation. In places, it is also colonised by the introduced red valerian *Centranthus ruber*.



*Crambe maritima* dominated vegetated shingle covering extensive areas of Church Norton Spit

**Shingle and maritime grassland**

*SH37 Arrhenatherum elatius grassland*

Much of the vegetated shingle on the stabilised Pagham Spit consists of *Arrhenatherum elatius* shingle grassland. This is described in detail by Sneddon and Randall. This forms an open community in which bare shingle is still a significant component of the habitat. Associated species include scattered plants of *Crambe maritima* linking this community with the more open pioneer community from which it develops. There are also occasional patches of *Silene maritima*, *Sedum anglicum* and *Senecio viscosus*. Species of more stable grassland also occur including the carline thistle *Carlina vulgaris*,

*Leontodon autumnalis* and *Echium vulgare*. Lichens are also a common feature of this community and include several *Cladonia* species.

To the east of the Pagham spit this community fronts the coastal development of Pagham village where it is heavily invaded by the introduced red valerian *Centranthus ruber*. In places, the *Centranthus* is so abundant that it becomes co-dominant with the *Arrhenatherum elatius*.



*Arrhenatherum elatius* shingle grassland with abundant *Centranthus ruber* on the edges of sub-urban Pagham



'Boardwalk' crossing the open *Arrhenatherum elatius* shingle vegetation on Pagham Spit



*Carlina thistle Carlina vulgaris growing in stable Arrhenatherum elatius shingle grassland*

### SH36 *Elymus pycnanthus* - *Festuca rubra* grassland

This grass dominated shingle community is dominated by the sea couch grass *Elytrigia atherica*. In many respects this is similar to the related saltmarsh community SM24 which is also dominated by this species. However, the vegetated shingle version of the community retains extensive areas of open bare shingle (domin score 7). The open shingle habitat is colonised by a diversity of other species including *Festuca rubra*, *Picris echioides*, *Dactylis glomerata*, *Daucus carota* and *Catapodium rigidum*.

As with much of the vegetated shingle at Pagham, this community has also been colonised by *Centranthus ruber*.

This community is limited in its distribution to the northern side of Church Norton spit where it forms part of the transition from the open *Crambe*

*maritima* community to *Atriplex portulacoides* dominated saltmarsh.



*Elytrigia atherica grassland on shingle banks on the northern side of Church Norton Spit with associated plants of Centranthus ruber*

## Saltmarsh Communities

The vegetated shingle shows transitions to typical saltmarsh communities. These are best developed on the northern side of Church Norton Spit where pioneer shingle communities show transitions to both SM14 *Halimione portulacoides* saltmarsh and SM9 *Spartina anglica* saltmarsh.

## Shingle Woodland

Some fragmentary patches of stunted shingle penduculate oak woodland occur along the northern edge of Church Norton Spit. These show similarities to the more extensive examples of this type of shingle vegetation found at Browdown. The canopy is dominated by stunted spreading trees of *Quercus robur* growing from the bare shingle. These occur with abundant stunted blackthorn *Prunus spinosa* suggesting that the oak woodland is a further successional stage from the *Prunus spinosa* shingle scrub described by Sneddon and Randall from a number of northern and west coast sites and recorded in this study at Porlock in Somerset. The dense shade shed by the oak and blackthorn 'canopy' allows little associated vegetation to develop, however, the fringes of the oak canopy are marked by scattered *Crambe maritima* and *Solanum dulcamara* growing in the open shingle. Under the canopy, shade tolerant species such



as *Hedera helix* and *Dryopteris felix-mas* occur together with scrambling plants of *Rubus fruticosus*.



Stunted Pedunculate oak *Quercus robur* 'woodland' growing with *Prunus spinosa* on the northern landward side of Church Norton Spit

### Extent of Vegetated Shingle

The extent of vegetated shingle at the site is 55.8 ha.

### Habitat Quality & Presence of Key Species

#### Notable Species

The Pagham Harbour shingle is reported to support a number of notable plant species including the nationally rare childing pink *Petrorhagia nanteuillii*. The SSSI citation for Pagham Harbour also refers to the presence of the nationally scarce yellow vetch *Vicia lutea* associated with the *Crambe maritima* vegetation.

#### Invasive Species

The vegetated shingle at Pagham is heavily invaded with the non-native red valerian *Centranthus ruber*. This appears to be a frequent and highly invasive species of stable shingle vegetation.

### Target Notes

WPT048 Small inner spit extending north from inner edge of Norton Spit. Old concrete sea defences now collapsed. Fringing zone of *Crambe maritima* dominated vegetated shingle. Crest of ridge with scattered *Sedum anglicum* and *Glaucium flavum* with *Anagalis arvensis*. Western side with shingle strandline community of *Silene maritima*, *Beta vulgaris* ssp *maritima*, *Atriplex hastata* and *Tripleurospermum maritimum*. Transition to surrounding saltmarsh dominated by *Spartina anglica* with associated *Suaeda maritima* dominated saltmarsh pans.

WPT049 End of spit with track around. Un-vegetated, well sorted shingle. Local shell banks of slipper limpet *Crepidula fornicata* and large shingle nodules (5-10cm dia). Lower shore with finer flint shingle (3-5cm dia) with Oyster shells *Ostrea* sp.

WPT050-051 Track at end of vegetated shingle – *Atriplex prostrata*, *Beta vulgaris* ssp *maritima* and *Crambe maritima*.

WPT052 Eastern end of fenced enclosure (single wire and posts). Recurved spit to east of this location with frequent *Crambe maritima* and *Atriplex prostrata* dominated strandline.

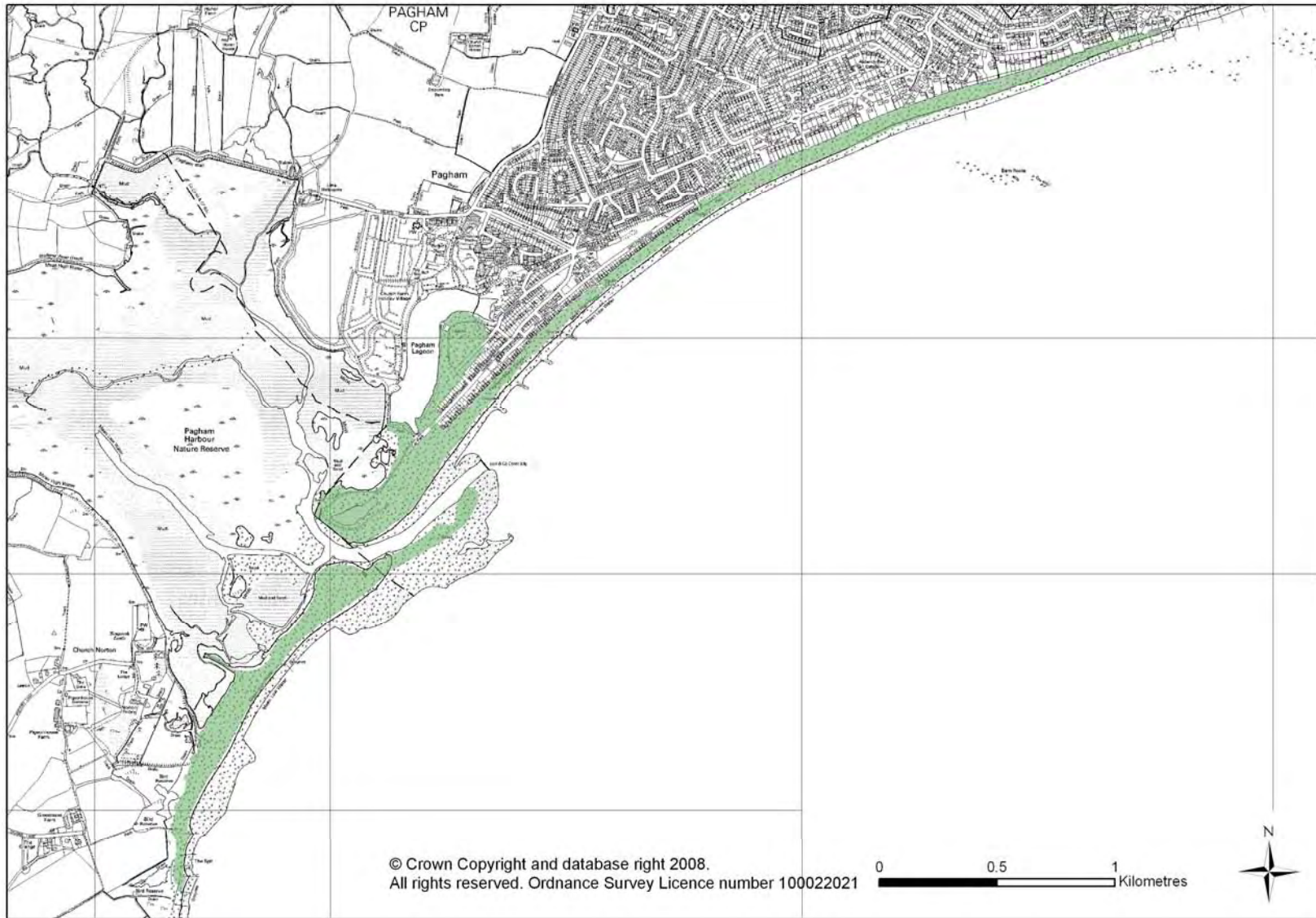
## Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	8
<i>Pseudeuophrys obsoleta</i>	a jumping spider	0
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	0
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk' s-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	24
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	0
<i>Scleranthus annuus</i>	Annual Knawel	0
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	0
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	0
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	0
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	0
<i>Limonium vulgare</i>	Common Sea-Lavender	2

Source: Sussex Records Centre

Site manager's reported the presence of Little Tern and Childing Pink at the site and also that Roseate Tern was a only rare / very rare occasional visitor (Rob Carver *pers comm*).

## Vegetated Shingle Extent Church Norton and Pagham Spits



# Hurst Spit

Hampshire SZ309899

Fieldwork Date: 22/09/09

Conservation Status: Solent Maritime SAC, Solent & Southampton Water SPA and Ramsar Site, Lymington River to Hurst Castle SSSI, New Forest National Park



## Introduction

Hurst Spit guards the western entrance to the Solent and has vitally important coast defence and hydrological functions for the operation of the Solent estuary complex. It forms a classical recurved structure with the neck of the spit known as Hurst Beach extending some 2.4km to the south east of Milford on Sea. This section of the spit was breached in the late 1980s and has subsequently been stabilised and maintained through shingle recharge. The recurved tip of the spit remains unmodified by recent coast defence and extends a further 870m to the north of the Castle and lighthouse located at Hurst Point.

To the east of the spit are located extensive areas of predominantly *Spartina* saltmarsh extending to the entrance of the Lymington River. The outer edges of these support deposits of shell fragments and fine shingle known as chenier banks. These form important gull and tern nesting sites as well as supporting some interesting vegetated shingle habitat. These are described separately.

The vegetated shingle of Hurst Spit shows some interesting transitions from standline communities through more stabilised open shingle habitats to maritime grassland. In the sheltered lee of the shingle ridges there are also transitions to areas of muddy shingle saltmarsh dominated by golden samphire *Inula crithmoides* and sea purslane *Atriplex portulacoides*. A feature of the vegetation of Hurst Spit is the abundance of the nationally rare little robin *Geranium purpureum* ssp *forsteri*. Other uncommon species include the only site in Hampshire for the Sea pea *Lathyrus japonicus* ssp *maritimus* and the nationally scarce dew moth

*Setina irrorella* – a specialist coastal species whose larvae feed on lichen covered stones.

The shingle vegetation of Hurst Beach is heavily influenced by the beach recharge operation. This disrupts the natural sorting of shingle creating a mixed sediment in which coarse shingle is mixed in a matrix of sand and finer shingle particles. The vegetation associated with this mixed sediment is also very mixed and includes elements of both disturbed ground and vegetated shingle.

The outer end of the recurved spit has more naturally sorted shingle forming a succession of ridges with intervening saltmarsh and areas of maritime grassland on stabilised shingle.

## Threats

Hurst Spit is an important visitor attraction with foot passengers arriving at the English Heritage managed castle via a ferry operating from Keyhaven. Many visitors also walk the length of the spit from Milford on Sea. Despite the large numbers of visitors, trampling pressure is confined to a relatively small area around the Castle and Lighthouse and along the crest of Hurst Beach.

The sensitive end of the Spit is used by nesting ringed plover and little terns. Signs are erected in the nesting season to deter visitors from landing or walking around this distal part of the Spit. This is a popular landing site for small boat owners operating from Keyhaven or from the anchorage just inside the Spit entrance and this is sufficient to deter nesting little terns in most years.



The end of Hurst Spit is very popular with local sea anglers and many fish from around the Castle and the sensitive end of the spit.

Coastal processes are still a major threat to the continued function of the spit. Coast defences in Christchurch Bay are thought to have limited shingle supply to Hurst Beach from the west. This is made up for by artificial beach recharge creating an artificially engineered shingle structure. Further coast defences occur around the Castle and effectively anchor the spit in its vicinity.

## Management

The Spit is managed as part of Hampshire County Council's nature reserve. Wardening of the site is undertaken by the County Council's ranger staff and the Keyhaven Harbour Master. Physical management is limited to the protection of nesting sea birds and boats mooring in the lee of the spit.

## Vegetation

### Pioneer Communities

#### *Geranium purpureum* ssp *forsteri* community

Although not sampled with quadrats, this community forms a distinctive zone along the outer edge of the shingle ridge. It is species poor consisting almost solely of this nationally rare Little Robin *Geranium purpureum* ssp *forsteri*. This forms characteristic lines of plants running parallel to the shore. The few associated species include small clumps of *Festuca rubra* and scattered plants of *Rumex crispus* and *Silene maritima*. It shows affinities to community SH2 described by Sneddon and Randall as a *Geranium robertianum* dominated pioneer community in which *Geranium purpureum* ssp *forsteri* is replaced by the more widespread *Geranium robertianum* ssp *maritimum*.



*Geranium purpureum* ssp *forsteri*



Characteristic lines of little robin *Geranium purpureum* ssp *forsteri* colonising the outer edge of the shingle spit

#### *Atriplex littoralis* community

This is another species poor community found at Hurst Spit along organic rich driftlines on the inner side of the spit. In this location, the grass-leaved orache *Atriplex littoralis* occurs in association with sea beet *Beta vulgaris* ssp *maritima* and dense mat of organic detritus washed along the driftline. *Atriplex littoralis* dominated driftline vegetation was recorded as being widespread in the Solent by Cox and Crowther (2001). It is a community that is not described by either the NVC or Sneddon and Randall. Sampled in quadrats WPT 024 A and B.

#### *Atriplex prostrata* community

This is also a very species poor community dominated by the single species – spear-leaved orache *Atriplex prostrata*. On Hurst Spit it was recorded forming a wide band along one of the



beach berms on the outer – western – side of Hurst Beach just north of the Castle. This community was also recorded in this location in 2000 by Cox and Crowther and it appears to be relatively stable. It is not clear how beach management operations affect this section of Hurst Beach. There are no equivalent descriptions of this community in the NVC or Sneddon and Randall. Sampled in quadrat HT4f.



Area of *Atriplex prostrata* strandline community north of Hurst Castle with narrow belt of SD1 *Rumex crispus*-*Glaucium flavum* community to the east (left).

## Secondary Pioneer Communities

### *Beta vulgaris* ssp *maritima* community

This community was recorded only on the outer hook of Hurst Spit where it forms a distinctive zone landwards of the *Atriplex littoralis* zone described above. Again, it occurs in association with high levels of organic detritus along the driftline but appears to be on slightly higher and less disturbed shingle. Associated with the *Beta* are typical saltmarsh species such as sea purslane *Atriplex portulacoides* together with scattered plants of *Silene maritima*, *Festuca rubra* and *Tripleurospermum maritimum*. A *Beta vulgaris maritima* strandline community was described as occurring widely within the Solent by Cox and Crowther in 2001. Here it occurs with wide range of associated species including *Tripleurospermum maritimum*, *Honckenya peploides*, *Rumex crispus*, *Crambe maritima* and *Elytrigia atherica*. In addition, annual species are also present at low frequency, such as *Atriplex littoralis* and *A. prostrata*.

The Solent examples of this community have affinities with SH17 *Beta vulgaris maritima* - *Solanum dulcamara* - *Tripleurospermum maritimum* community described by Sneddon and Randall, however, the Solent samples tend to lack *Solanum dulcamara* which is a constant of the described SH17 community.

Strandline vegetation dominated by *Beta vulgaris* ssp *maritima* is not specifically described by the NVC, however, Rodwell et al (2000) consider the MC6 *Atriplex hastata* – *Beta vulgaris* ssp *maritima* sea-bird cliff community to occur as a colonising community on shingle as well as seabird cliffs. In both situations the *Beta vulgaris* ssp *maritima* occurs on organic rich well draining soils in maritime situations.

### SD1a *Rumex crispus*-*Glaucium flavum* shingle typical sub-community

Examples of this habitat as described by the NVC occur along the inner face of Hurst Beach from north of the Castle much of the way back to the base of the Spit near Milford on Sea. This community contains species a diversity of species associated with the typical sub-community of SD1 including an abundance of the yellow-horned poppy *Glaucium flavum* and *Rumex crispus* together with the rock samphire *Crithmum maritima*, sea kale *Crambe maritima*, sea campion *Silene maritima* and species of more disturbed ground such as colts foot *Tussilago farfara* and sow thistle *Sonchus arvensis*. These disturbed ground species reflect the fact that this shingle community is growing on mechanically deposited shingle used in maintaining the spit structure in which sediment particle size is very mixed and includes a high fraction of finer shingle and sand.

### *Crambe maritima* community

On the outer end of the spit to the south of the Castle are a series of shingle ridges colonised by almost pure *Crambe maritima*. Few species are associated with *Crambe*, although small patches of *Silene maritima* occur further away from the sea and isolated plants of *Beta vulgaris* ssp *maritima* also occur. Further from the sea, the

older deposits of shingle show a well defined transition to shingle grassland communities described below.

This open *Crambe* dominated community is described by Sneddon and Randall as SH6 and is recorded from Chessil Beach in Dorset. The NVC does not provide a good description of this very species poor open community.



*Crambe maritima* in very open sparsely vegetated shingle on ridges to the south of Hurst Castle

#### *Silene maritima* community

Landward of the very open *Crambe maritima* community, the abundance of *Silene maritima* and number of associated species increases. Clumps of *Festuca rubra* occur in these more mature stands of vegetation together with a few other coastal species such as *Plantago coronopus*. A *Silene maritima* pioneer community is described as SH7 by Sneddon and Randall in which *Crambe* is less abundant. The examples of this on Hurst Spit do not fit well into the SH7 description as they appear to be transitional to more grassy dominated vegetation described below.

#### Maritime Grassland

##### MC11 *Festuca rubra*-*Daucus carota* maritime grassland

The most mature shingle has developed a *Festuca rubra* dominated grassland. This typically occurs with *Silene maritima* together with frequent *Armeria maritima* and an unusual abundance of hare's foot clover *Trifolium*

*arvense*. This community also includes calcareous grassland species such as *Anthyllis vulneraria* and *Blackstonia perfoliata* together with *Lotus corniculatus*, *Plantago lanceolata*, *Plantago coronopus* and an abundance of lichens.



Mats of *Silene maritima* and *Festuca rubra* with scattered small plants of *Crambe maritima* in open pioneer shingle grassland

This *Festuca* grassland with an abundance of *Trifolium arvense* was described from a number of shingle grasslands in the Solent by Cox and Crowther.

On more recent or disturbed shingle this grassland shows transitions to *Silene maritima* dominated pioneer vegetation and in turn to the most open and recently disturbed *Crambe maritima* community. A lack of grazing or mowing allows this community to become rather rank and on Hurst Spit it was apparent that it became colonised by sea couch *Elytrigia atherica* in these unmanaged locations.



Maritime *Festuca rubra* grassland with *Silene maritima*, *Armeria maritima* and *Trifolium arvense*



## Saltmarsh Communities

### SM14 *Halimione portulacoides* saltmarsh

The outer end of Hurst Spit supports some stands of almost pure sea purslane *Halimione (Atriplex) portulacoides*. However, unlike typical saltmarsh, it grows here on well sorted shingle. Occasional associates include the sea spurry *Spergularia media* and sea blite *Suaeda maritima*. This community differs from that described by the NVC in lacking *Puccinellia maritima* which is otherwise a constant of SM14 and by the absence of other saltmarsh species such as *Spartina* or *Salicornia*.

It shows transitions to landward to areas of *Inula crithmoides* saltmarsh and towards the strandline to *Beta vulgaris ssp maritima* strandland vegetation.

### SM23 *Elymus pycnanthus* saltmarsh

This upper saltmarsh grassland community is widespread on Hurst Spit where it occurs in two distinct locations. Along the strandline it occurs in areas of stable shingle rich in organic matter with an abundance of *Beta vulgaris ssp maritima* and *Atriplex portulacoides*. This is in many ways a typical example of SM23 saltmarsh grassland although here occurring along a well defined strandline on a sheltered shingle beach where there is significant organic enrichment.



*Elymus pycnanthus (Elytrigia atherica)* community along the strandline with abundant *Atriplex portulacoides* and *Beta vulgaris ssp maritima* with transition to SM26 *Inula crithmoides* saltmarsh on ridge behind and SM14 *Halimione portulacoides* in depression between shingle ridges beyond that.

### SM26 *Inula crithmoides* saltmarsh

Hurst Spit supports some extensive areas of *Inula crithmoides* marsh. This has developed on areas of mature shingle and is a particular feature of the historic inner recurved spits seen north of the Castle. Floristically, the community is very much as described by the NVC with a mix of *Atriplex portulacoides* together with *Elytrigia atherica* and locally *Suaeda maritima* and *Aster tripolium*. It has transitions to more typical saltmarsh communities developed on soft estuarine sediments including *Spartina anglica* marsh, *Salicornia sp* saltmarsh pans and mixed *Halimione (Atriplex) portulacoides* saltmarsh.



Bands of SM26 *Inula crithmoides* marsh along historic shingle ridges with intervening areas of SM14 *Halimione portulacoides* saltmarsh and SM8 *Salicornia* saltmarsh pans.



SM26 *Inula crithmoides* saltmarsh on shingle ridge at the distal end of the recurved spit

## Extent of Vegetated Shingle

The extent of vegetated shingle at the site is 18.2 hectares. This area has not been included in previous inventories.

## Invasive Species

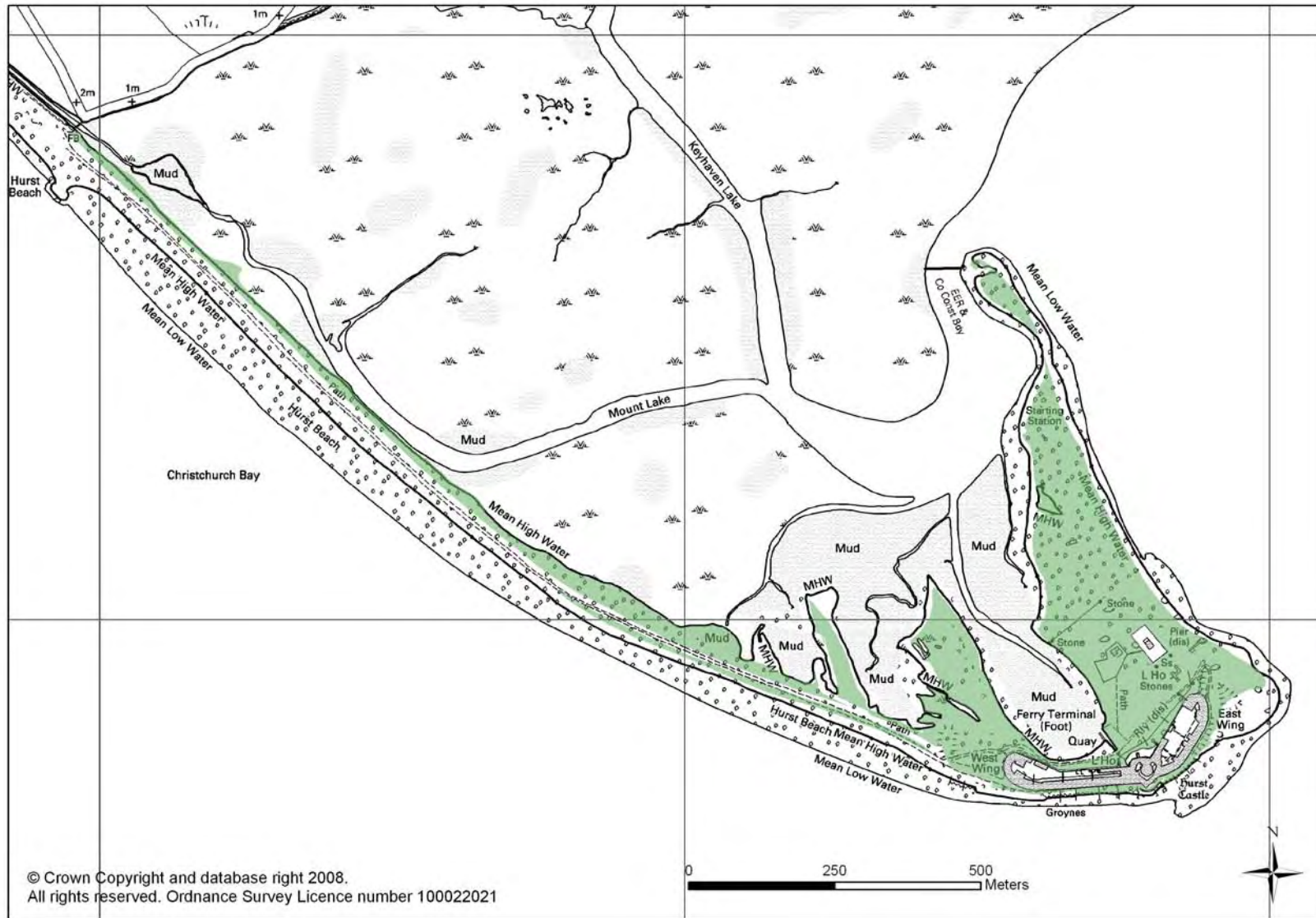
No invasive species were identified.

## Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	0
<i>Pseudeuophrys obsoleta</i>	a jumping spider	0
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	0
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk`s-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	4
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	0
<i>Scleranthus annuus</i>	Annual Knawel	0
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	0
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	0
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	0
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	0
<i>Limonium vulgare</i>	Common Sea-Lavender	6

Source: Hampshire Biodiversity Information Centre

## Vegetated Shingle Extent for Hurst Spit





# Landguard Common

Suffolk TM 285315

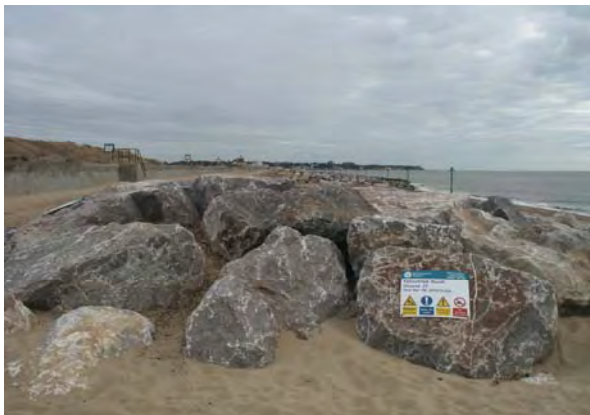
Fieldwork Date: 09/09/09

Conservation Status: SSSI, LNR, Scheduled Monument, Bird Observatory, 31.4h



## Introduction

Landguard Common is a sand and shingle spit that is growing southwards across the Orwell/Stour estuary, which leads into the major ports of Harwich/Parkeston and Felixtowe. The foreshore is composed of mobile shingle backed by a stabilised shingle beach containing a high proportion of sand within the shingle matrix. This site has suffered considerable coastal erosion and there have been major sea defence works (21 fishtail groynes) and beach nourishment over 2007-08.



*The new groyne system*

There is a caravan site immediately to the north and Felixtowe port and the Fort Road to the west. Four hundred and forty plant species have been recorded at this site. Less than 15mm precipitation had been recorded at Landguard in the 6 months preceding survey, so much vegetation was browned off and difficult to identify.

## Threats

There has always been much disturbance at this site with 500 years of military history associated with Landguard Fort. More recently extension of buildings associated with the Felixtowe Docks have encroached onto the Common, accounting for the loss of much vegetated shingle. Hard-surfaced tracks have also been constructed along the site



*Felixtowe Docks*

Levels of recreational pressure on this site are high and increasing, with the presence of a caravan site to the north and car parks to the north-east and south-west. It is a popular site for dog-walking and the northern part of the common is heavily fouled with dog faeces. It is an important site for bird passage-migrant landfall and suffers large numbers of birders in season. It is promoted as a good site for Health Walks by the Council.

The site currently has an extremely high rabbit population. Rabbit grazing is causing local blow-outs of the vegetated surface, especially in the sandier areas. However, numbers are cyclically controlled by myxomatosis.



Enclosure showing rabbit impact on surrounding vegetation

There are two levels of sea defences – a concrete wall protecting the northern section of the common and the more recent establishment of groynes and beach nourishment. Environment Agency have minimised the effects of these works on the vegetated surface, but temporary disturbance has occurred, with pioneer vegetation much more extensive to the south of the affected areas.

Past extraction of shingle from the western section of the Common (outside the reserve) has also impacted on the vegetation and the construction of a concrete track has caused loss. Currently there is no other vehicular access.

## Management

The southern part of the site is a Local Nature Reserve jointly owned by Suffolk County Council and Suffolk Coastal District managed by the Suffolk Wildlife Trust. It is actively warded by the Landguard Ranger. Little Tern/Ringed Plover nesting areas and Stinking Goosefoot (*Chenopodium vulvaria*) sites are seasonally protected by enclosures. Explanatory signs, describing the ecological value of the site, have been erected and are well-maintained. There is a semi-derelict fence separating the reserve area from that part of the spit south-west of Landguard Fort.



Suffolk Wildlife Trust sign

North of the concrete sea-wall that crosses the site, the Common is unmanaged. The site is totally bounded by the sea or by man-made constructions and does not merge into other vegetation types.

## Vegetation

Although quite small, this site supports a wide range of communities from open pioneer assemblages to grassland and scrub. In common with other East Anglian shingle sites, Landguard has experienced a massive increase in foreshore stands of *Crambe maritima* since 1993. This SH9a



*Crambe maritima* on foreshore

pioneer community has few associate species except *Rumex crispus*. This community is virtually absent from the northern part of the site where groynes have recently been constructed but is extremely vigorous in the south. An unusual

aspect of Landguard is the presence of extensive areas of *Euphorbia paralias* with the *Crambe*. This species appears to occur in patches of sandier shingle.



*Euphorbia paralias* on west side of spit

This community is replaced immediately inland by a more diverse, species-rich assemblage on more stable shingle with a sand matrix. This is a *Glaucium flavum* - *Crambe maritima* – *Rumex crispus* pioneer community SH22. This vegetation type has a large number of associated species including *Senecio viscosus*, *Sonchus asper*, *Cirsium vulgare*, *Cerastium fontanum* and the grasses *Festuca rubra*, *Vulpia ciliata* and *Poa pratensis*.

In the central part of the spit, SH 22 gives way to a more arenaceous *Ammophila arenaria* – *Rumex crispus* – *Senecio viscosus* assemblage SH21, where *Anagallis arvensis* and *Arenaria serpyllifolia* are frequent associates.

Over much of the Nature Reserve, these pioneer communities are replaced westward by a species-rich, well-grazed, stable grassland, averaging over 20 species per quadrat. This SH48 grassland is defined by the constant presence of *Festuca rubra*, *Hypnum cupressiforme* and *Lotus corniculatus*. Locally significant are extensive patches of mosses including *Ceratodon purpureus* and the lichens *Peltigera canina*, *Cladonia furcata*, *C. uncialis*, *C. rangiformis* and *C. verticillata*. The dominant herbs are *Hypochoeris radicata*, *Plantago coronopus*, *P. lanceolata*, *Senecio jacobaea* and *Cerastium* spp.

The herb associates may vary according to rabbit grazing intensity.



Desiccated SH48 grassland – September 2009

Nearby to warrens *Erodium cicutarium*, *Geraneum dissectum*, *G. molle*, *Sedum acre*, *Echium vulgare*, *Medicago sativa* and *M. minima* are common. Elsewhere small amounts of *Arrhenatherum elatius* and annual grasses are present. Visually distinct but still keying out as SH 48 is grassland west of the main north-south track on the Reserve. This contains small amounts of prostrate *Rubus fruticosus* and ruderal species such as *Dactylis glomerata* and *Chenopodium album*.

In the northern part of the Common, outside the Reserve, there is a less rich *Festuca rubra* – *Plantago lanceolata* community SH68, in which *Arrhenatherum elatius*, *Poa pratensis*, *Dactylis glomerata*, *Holcus lanatus* and *Senecio jacobaea* are more common and lichens and bryophytes take up less of the area. An area of this community is also found adjacent to the fort, within the Nature Reserve.

SH119 *Rubus fruticosus* – *Arrhenatherum elatius* scrub occurs in small patches within the grassland. Although bramble cover is high, these areas also support *Echium vulgare*, *Picris echioides*, *Senecio jacobaea*, *Cirsium arvense* and *Sedum acre*. An enclosed pond within one area of SH119 is surrounded by *Bolboschoenus maritimus*, *Elytrigia atherica*, *Salix* sp., *Solanum dulcamara* and *Tussilago farfara*.





SH119 scrub within SH68  
grassland

## Invasive Species

None identified.

## Extent of Vegetated Shingle

The extent of vegetated shingle at this site is 27.7 hectares.

## Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	0
<i>Pseudeuophrys obsoleta</i>	a jumping spider	0
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	0
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk`s-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	5
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	0
<i>Scleranthus annuus</i>	Annual Knawel	1
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	1
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	0
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	0
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	0
<i>Limonium vulgare</i>	Common Sea-Lavender	0

Source: National Biodiversity Network

# Vegetated Shingle Extent for Landguard Common



# Lymington Chenier Banks

Hampshire SZ339937, Fieldwork Date: 23/09/2009,

Conservation Status: Solent Maritime SAC, Solent & Southampton Water SPA and Ramsar Site, Hurst Castle & Lymington River Estuary SSSI. New Forest National Park



## Introduction

In the lee of Hurst Spit are a series of saltmarshes extending eastwards to the entrance of the Lymington River estuary. These are of relatively recent origin having formed at the end of the nineteenth century with the spread of the cord grass *Spartina anglica* from Southampton Water. Since the middle of the 20<sup>th</sup> century these marshes have been showing signs of erosion due in part to the phenomenon known as *Spartina* die-back. The rate of erosion has been relatively constant since the 1950s with erosion of the outer marsh edges creating characteristically cliffed marsh edges up to 1.5 metres in height. Wave action hitting the outer edges of the marshes has thrown deposits of shells and fine shingle onto the surface of the saltmarsh to create linear bars or banks of shells and fine shingle known as chenier banks. The evolution and structure of these is described in detail by Neal et al (2002). They classified chenier banks on the east coast of England into four types (Type 1-4).

The cheniers at Lymington appear to conform mostly to Type 1 although there may be some that are large enough to be considered as Type 2. Definitions of chenier type from Neal et al are reproduced in Box 1.

The Lymington chenier banks are composed entirely of marine mollusc shells mixed with a small amount of flint shingle. The shells are derived from the intertidal and shallow subtidal benthic fauna fronting the saltmarshes. These seem to have been sorted by wave action so that the smaller winkle *Littorina* spp. shells are found at the front of the chenier with larger cockle *Cerastoderma* sp. slipper limpet *Crepidula fornicata*, oyster *Ostrea edulis*, carpet shell *Venerupis pullastra* and scallop *Chlamys* sp shells found on the crest of the chenier bank.

The proportion of shell to flint shingle in the chenier is quite variable with some cheniers being composed almost entirely of shell and others with a considerable proportion of shingle. The following photographs illustrate the range of shell and shingle mix found on the chenier banks.

*Type 1 chenier: Small, discrete, arcuate cheniers. 10-20 m wide, 25-100 m long and up to 1 m thick. Usually found at the limit of shell dispersal by longshore drift.*

*Type 2 chenier: Large, discrete cheniers. Up to 50 m wide, 150-250 m long and up to 2 m thick. Relatively narrow at their centre (10-20 m) and dominated by a single, large chenier ridge. Two or more recurved chenier ridges at their distal ends*

*Type 3 chenier: Large, laterally continuous (many 100's m) cheniers. Sets of relict recurves to landward. Wide (many 10's m) sequence of parallel relict and active chenier ridges to seaward. Deposits can be over 2 m in thickness.*

*Type 4 chenier: Laterally continuous (many 100's m), with a low, single chenier ridge to seaward. 20-25 m wide and up to 1.5 m thick. Periodically broken by large across-shore saltmarsh creeks*

*Box 1: Chenier type definitions from Neal et al (2002)*

With the continued erosion of the outer saltmarsh edge, the chenier banks are rolled inland over the saltmarsh. This often leaves a largely bare mud platform in front of the chenier which may become colonised by scattered annual saltmarsh plants of *Sueada maritima* or *Salicornia europaea*.





Example of mixed mollusc shells and shingle on a chenier ridge. Species present include *Littorina* sp., *Oystrea edulis*, *Cerastoderma edule*, *Crepidula fornicata*, *Venerupus pullastra* and *Chlamys* sp.



Lower level chenier dominated by shells of *Littorina* sp. with *Cerastoderma edule* and little or no shingle



Mature chenier with a greater proportion of flint shingle and shells much fragmented

## Management

The chenier banks at Lymington are unmanaged.

## Descriptions of Vegetated Shingle Communities and Transitions

Only one vegetation community can be defined on the chenier banks of the Solent. This community is similar to some of those described by Sneddon and Randall (1993) for Bradwell Shell Bank which is on a similar substrate. It is dominated by the grass-leaved orache *Atriplex littoralis*. It may be sub-divided into an *Atriplex littoralis* sub-community on newly formed cheniers and a more mature and species rich version characterised by an abundance of Ray's knot-grass *Polygonum oxyspermum*.

### Pioneer Communities

#### *Atriplex littoralis* community

The crest of the chenier banks supports a consistent vegetation community dominated by grass-leaved orache *Atriplex littoralis*. On recently formed cheniers this community can be very species poor and sparsely vegetated with only a thin scatter of *Atriplex* plants with less than 10% cover. Associated species may be limited to a few scattered plants of sea blite *Suaeda maritima*. This early stage of colonisation was recorded in quadrats at Tanners Lane (quadrats TT1a – TT1c).

In more mature cheniers to the west of Tanners Lane *Atriplex littoralis* becomes much denser and is joined by sprawling plants of the nationally scarce Ray's knot grass *Polygonum oxyspermum* together with a much greater range of associated species including *Tripleurospermum maritimum*, *Beta vulgaris* ssp *maritima* and *Glaucium flavum*. The most mature and well defined cheniers tended to show increasing quantities of *Glaucium flavum* with cover values of up to 10%. These more mature examples of the community also contained scattered plants of *Sonchus oleraceous*, *Plantago coronopus* and the nationally scarce Borrer's saltmarsh grass *Puccinellia fasciculata*.

Further analysis may show this more mature example of the *Atriplex littoralis* strandline community to be a consistent sub-community

characterised by the presence of the *Polygonum oxyspermum*.

Strandline vegetation communities dominated by *Atriplex littoralis* are not described in the NVC or by Sneddon and Randall, but were recorded widely across the Solent by Cox and Crowther. Shell and fine shingle dominates the substrate which in these samples was mostly composed of fragmented winkles. The seaward extent of these cheniers is defined by a transition to open mud plantforms supporting a scattered plants of *Suaeda maritima* and *Salicornia* species. To landwards the chenier gives way to mature SM14 *Halimione portulacoides* saltmarsh.



*Ray's knotgrass Polygonum oxyspermum* growing with grass-leaved orache *Atriplex littoralis* on a Lymington chenier

## Extent of Vegetated Shingle

In total, these tiny individual sites make up an area of 1.3 hectares within the Keyhaven and Pylewell marshes. However, the relative rarity of this type of shingle structure and the species they support (see below) make it an important addition to the inventory which has not previously been captured.

## Notable Species

Despite being rather species poor and having a limited diversity of vegetation types, the chenier banks at Lymington support two nationally scarce plant species; Ray's knotgrass *Polygonum oxyspermum* and Borrer's saltmarsh grass *Puccinellia fasciculata*. The associated *Halimione portulacoides* saltmarsh also contains the nationally scarce perennial glasswort *Sarcocornia perennis*.

## Invasive Species

None were identified.

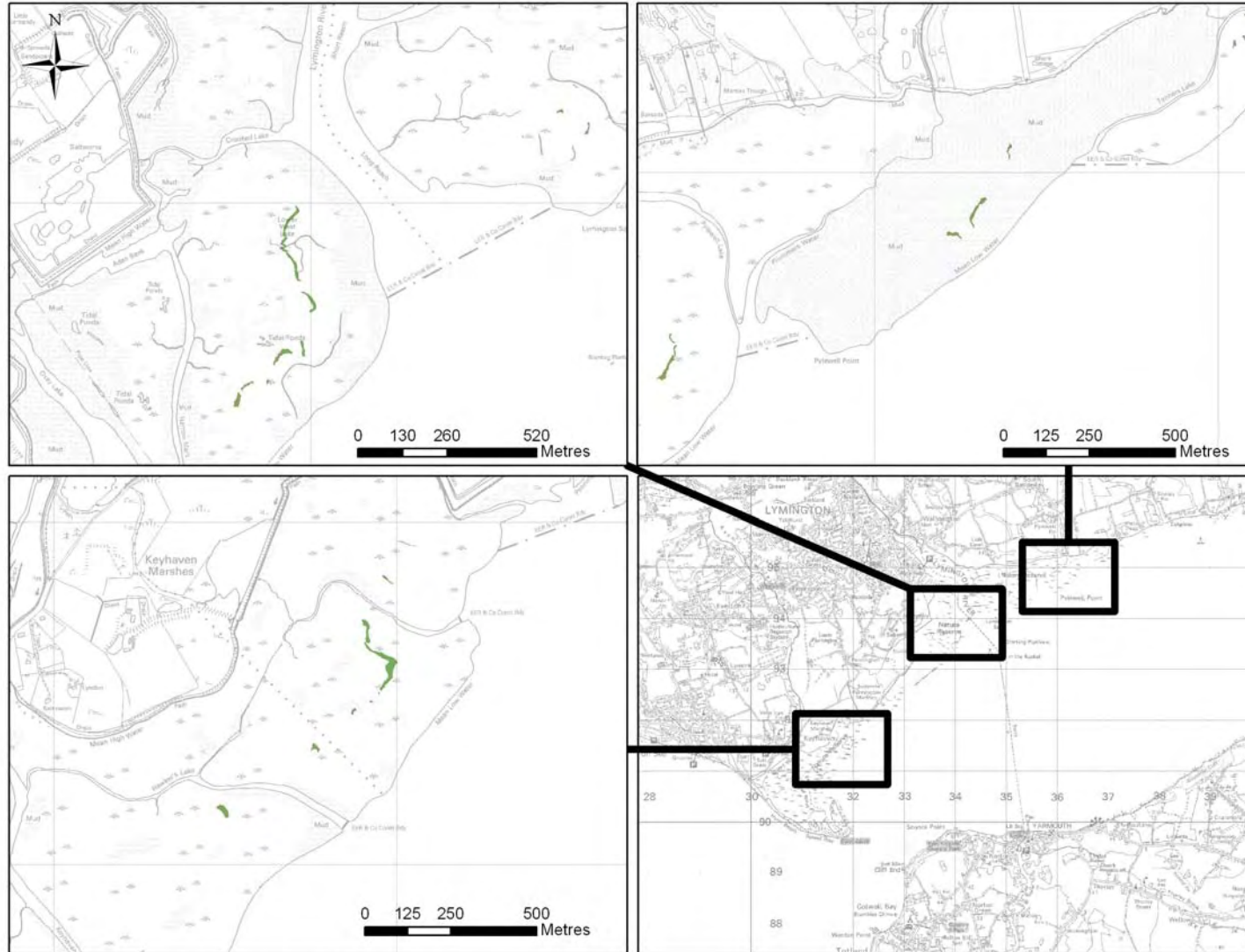
## Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	0
<i>Pseudeuophrys obsoleta</i>	a jumping spider	0
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	0
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk`s-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	9
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	0
<i>Scleranthus annuus</i>	Annual Knawel	0
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	1
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	0
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	0
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	0
<i>Limonium vulgare</i>	Common Sea-Lavender	6

Source: Hampshire Biodiversity Information Centre



## Vegetated Shingle Extent for the Lymington Cheniers



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# Orfordness

Suffolk TM450490

Fieldwork Date: 01/10/09

Conservation Status: RAMSAR, SAC, SPA, NT, SSSI, NNR



## Introduction

Orfordness is a shingle foreland and southward growing spit which has its proximal end attached to the mainland coast at Aldeburgh. Its distal end, North Weir Point, is opposite Shingle Street, some 17km to the south. The growth and decay of the spit influences strongly the location of the River ore estuary and thereby the history of Shingle Street. Indeed breaches of the distal end of Orfordness in the late nineteenth century led to stranding of shingle on the landward side of the estuary and the creation of the lagoon and ridge system north of Shingle Street hamlet.

Orfordness is the largest vegetated shingle spit in Europe and the best-preserved vegetated shingle site in Britain. It is composed of a series of ridges which have been deposited almost parallel to the coast and have resulted in an extensive area of stable shingle fringed by a dynamic coastal ridge to the east and shingle salt marsh vegetation within the estuary. The site holds 12% of British shingle.

2009 has been driest year since 1980s. Much of the Ness is suffering high rates of coastal erosion and steepening, with the area near the lighthouse losing 4m/year over 15 years to 2008. To the north and south of the Ness, slight prograding is occurring, perhaps related to beach nourishment at Slaughden. The site is virtually circumscribed by water and ends northwards at the sea defence works at Slaughden. There is coastal grazing marsh of the King's Marshes north-west of the Ness, but these are topographically distinct from the shingle habitat and the Airfield and King's Marshes are separated from the shingle areas by a natural, tidal saltmarsh creek, Stoney Ditch, and a clay river wall. The site is important for military history as well as the natural environment and

most history visitors remain in the area of previous MoD activity.

## Threats

Historically, there has been a loss of vegetated shingle due to the construction of the MoD compound, and bombing and firing ranges. The major phase of later construction was associated with the AWRE and Cobra Mist early warning system in the 1960s. Vehicular damage during later bomb clearance has caused widespread disturbance to the cusped foreland which is still evident today.

Coastal defence works in the north of the site have led to large-scale removal of shingle and damage to vegetated areas, leading to lowering of the surface and species composition change. The Environment Agency and National Trust have recently developed plans to minimise these threats.



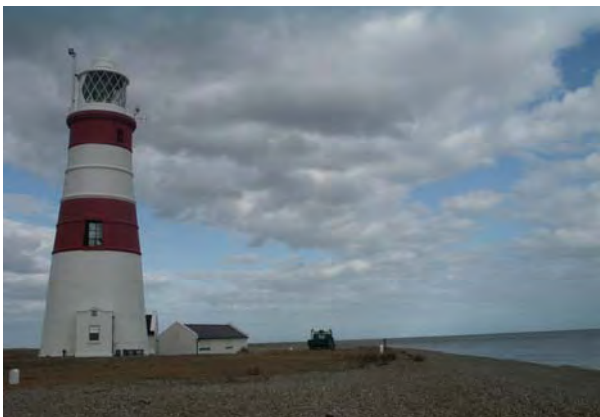
*Environment Agency damage in north of site*

In past decades, groynes at Aldeburgh have starved Orfordness of shingle and increased instability. Current shingle recharge systems are controlling these effects and are currently being monitored. However, the Ness near the lighthouse is currently subject to severe erosion



*Erosion of foreshore by lighthouse*

As a result of erosion, the lighthouse is currently only 20m from HWM. Trinity House plan to decommission the lighthouse at 8m. They are considering if they need a functioning lighthouse at Orfordness and, if so, what alternative structures may be required and what developments may be appropriate, in consultation with Natural England and the NT, on a site with European designations.



*Proximity of lighthouse to foreshore 2009*

Beach anglers entering site from Slaughden in winter pose a continued threat to beach vegetation. Organised fishing matches sponsored

by fishing magazines have lead to increased footfall damage from The Crouch to north of Lighthouse.

There is no control on numbers of fishermen or recreational visitors either by private boat from Orford or from the various boat accesses further south. This has resulted in many more landing points and more crossing paths through the vegetated ridges other than the ONLY official footpath (right of way) from The Crouch. Even this does not reach the beach by 30m, due to accretion at this point. There is ever-increasing evidence of picnics, barbecues, fires, overnight camping, day picnics, and canine damage during the bird breeding season, all causing insidious and increasing degradation of the vegetation. Unofficial visitor numbers have increased in last two decades to around 120 at any one time in summer. Also there has been a marked increase in landing by foreign boats. NT has no resource to control these threats. Large foreshore plants do not suffer but Terns and lichen-heath are particularly susceptible.



*Fire damage near BBQ site*

Orfordness is widely grazed by rabbits and hares which exert a major controlling influence on the shingle vegetation. Fox numbers have been high on many parts of the site and have affected avifaunal successes but currently their numbers are controlled.

## Management

The only official access is by National Trust ferry from Orford Quay, with boats crossing regularly to



the Ness between 1000 and 1400 only, the last ferry leaving the Ness at 1700. This results in maximum visitor numbers of 156/day. These visitors are kept almost entirely to the old military tracks and are only allowed to walk on the foreshore shingle between the Lighthouse and a point 150m south. There were 7000 visitors in 2007, 6500 in 2008 and estimated 8000 in 2009 (at capacity 4 days/week in summer). The Warden suggests that 9000 is capacity.

There is no agricultural activity on the shingle, though the King's Marshes behind the spit are sheep-grazed. An EU LIFE+ Nature project starts in April 2010 and runs for 4 years. The grant includes work to reduce negative impacts on the shingle vegetation by humans, and a suggested compromise is managed access in 4-5 locations and 3-6 cross-ridge paths with boardwalks. It is planned to begin in 2010 and is vital in order to preserve long-term future of healthy vegetation. Tighter management of vehicles onto the site from Slaughden has resulted in marked increases of *Lathyrus japonicus* and *Crambe maritima* on foreshore ridge throughout the site. *Crambe* increased from 4-5 plants in 1994 – now spread throughout the site.

Gated access only, for Environment Agency vehicles collecting shingle for recharge purposes, has much improved vegetation cover behind the foreshore ridge in north of site. A noticeable recoloniser here has been *Geranium robertianum subsp. maritimum*. A long-term monitoring programme is assessing the value of beach recharge at Slaughden. The EA draft Shoreline Management Plan is considering a number of options for the future of the coastal management at Aldeburgh to Slaughden.



Good re-growth of vegetation over old EA extraction area

## Descriptions of Vegetated Shingle Communities and Transitions

Orfordness supports a range of shingle communities from pioneer assemblages through to open grasslands and lichen-moss dominated areas. On the leeward side there is a ribbon of salt-marsh shingle, where there is a silt/clay matrix. The Airfield and King's Marshes are separated from the shingle areas by a natural, tidal saltmarsh creek, Stoney Ditch, and a clay river wall.

### Pioneer Communities

Because Orfordness has experienced both marked erosion in some places and accretion in others, there has been a change in pioneer assemblages over the last 20 years. Where accretion has occurred spreads of *Crambe maritima* with some *Rumex crispus* have grown. This has resulted in SH9a being the most significant foreshore community along parts of the coast ridge along the distal section south of the Narrows.



*Crambe maritima* on accreting foreshore

Where erosion has not been too severe, the foreshore of the spit supports an open flora typical of many east coast sites. This SH11 *Lathyrus japonicus* community also has *Crambe maritima* and *Silene uniflora* as constants. Some quadrats only have these species but elsewhere associates include *Rumex crispus*, *Tripleurospermum maritimum*, *Sedum acre*, *Glaucium flavum*, *Vicia lutea*. This community covers much of the distal point of the spit.



*Lathyrus japonicus* foreshore SH11

In the north of Orfordness, there are several areas that have been excavated, resulting in

topographically lower, disturbed areas. These are often poorly vegetated with up to 90% bare shingle. This SH19 community has *Senecio viscosus* and *Rumex crispus* as major constants and *Beta maritima*, *Sedum acre*, *Cirsium vulgare*, and *Sonchus asper* as common associates. The grasses *Festuca rubra*, *Holcus lanatus* and, increasingly, *Arrhenatherum elatius* also occur and *Geranium robertianum* subspp *maritimum* has recently become more frequent.

### Grassland Communities

The mature Orfordness grassland communities are both characterised by the presence of *Arrhenatherum elatius* as an indicator species but may well be separated by nutrient availability/maturity.

Much of the central-southern part of the spit, south of the Ness comprises a series of parallel ridges and lows vegetated by SH38 *Silene uniflora* – *Hypnum cupressiforme* assemblage with *Arrhenatherum elatius* and *Rumex acetosella* as lesser constants. This is a diverse community, averaging 11 species per quadrat. There is a major lichen element among the associates including *Cladonia arbuscula*, *C. cervicornis*, *C. coniocraea*, *C. furcata*, *C. ciliata* agg. and *C. tenuis*. Other key associates include *Festuca rubra*, *Hypochoeris radicata*, the moss *Brachythecium albicans*, *Cerastium* spp. and *Sedum anglicum*. A unique feature is the abundance on the ground of the normally epiphytic lichens *Parmelia caperata* and *Evernia prunastre*. Patches of *Bryum pendulum* are also present



Lichen-rich SH38 grassland



On the widest part of the spit, the pioneer vegetation is replaced by a species poor SH39 *Silene uniflora* – *Arrhenatherum elatius* community. This assemblage seems to be located in areas of lower nutrient input in which the mosses *Dicranium scoparium*, *Hypnum cupressiforme* and *Rhytidiadelphus squarrosus* are frequent associates. Lichens are present with lesser coverage than in SH38 but include *Cladonia impexa* and *Hypogymnia physodes*. *Festuca rubra* may become locally important and *Senecio jacobaea* is frequent.



*Ulex europaeus* scrub on Orfordness

On the lower lee side of Orfordness, where there is a high silt/clay component within the matrix, a *Festuca rubra* grassland has developed with *Armeria maritima* and *Plantago* spp. as minor constants SH34. This is a relatively species-poor assemblage as a result of the dominance of *Festuca rubra*, but it may also include halophytes such as *Atriplex portulacoides*, *Seriphidium maritimum*, *Beta maritima* and *Limonium vulgare*. The shingle – salt marsh transitional habitat is rare in Britain but is particularly well illustrated at Orfordness and Shingle Street.

### Salt Marsh Communities

Along the muddier gravel shoreline of Orfordness, especially opposite Havergate Island, there is a linear strip of SM9 *Suaeda maritima* salt marsh. This may be partly covered by an algal mat and have occasional plants of *Artemisia maritima* or *Beta maritima*.



Halophytic herbs in SH34 grassland

### Scrub Communities

Small linear areas of SH109 *Ulex europaeus* – *Rubus fruticosus* – *Agrostis capillaris* scrub occur along the official footpath and in one or two other locations on Orfordness. Few other species are present though shade-tolerant mosses such as *Eurynchium praelongum* occur below the gorse bushes.



*Suaeda maritima* shoreline with *Artemisia maritima* and *Beta maritima*

In a few low-lying locations between laterals or where a previous breach has occurred small areas of SM14 *Atriplex portulacoides* salt marsh



are present. This community may be virtually a pure stand or can have *Spergularia media* and *Beta maritima* present.



*Atriplex portulacoides* around breached lagoon

### Extent of Vegetated Shingle

The estimated extent of vegetated shingle at the site is 508.7 hectares.

### Invasive Species

Recent years have seen an increase of red and white valerian (*Centranthus ruber*) and *Arrhenatherum elatius*. The former is only present in any abundance at one location by the Black Beacon, an area of long-disturbed shingle and concrete. In places, the latter may be related to the cessation of herbicide use on the Cobra Mist site, where aviation fuel and systemic herbicides were previously regularly applied. *Arrhenatherum elatius* is invading and replacing lichen heath.



*Crithmum maritimum* on lee coast of Orfordness

Spring Beauty (*Claytonia perfoliata*) is present but not yet spreading as on some parts of the East Anglian coast. *Tamarix gallica* and *T. africana* are also present but are of benefit to passage migrants.

### Rare Species

*Crithmum maritimum* reaches its northern limit on the East Coast at Shingle Street/Orfordness. In the past it has not been recorded from Orfordness but two plants were noticed on the east side in the mid-1990s and more young plants are now present nearby.

National Trust also has records of Red Hemp-Nettle *Galeopsis angustifolia*, Ground Beetle *Bembidion nigropiceum*, Ground Beetle *Anisodactylus poeciloides* at the site as well as the scarier plants: Borrer's Saltmarsh-Grass *Puccinellia fasciculata*, Perennial Glasswort *Sarcocornia perennis*, Suffocated Clover *Trifolium suffocatum* and Cudweed *Filago vulgaris*

The jumping spiders *Sitticus rupicola* and *Euophrys browningi* occur on Orfordness and *Haplodrassus minor* has been seen in the SM9 driftline. National Trust also has records of numerous other Red Data Book invertebrates (e.g. the Weevil *Cueterhynchus verrucatus*).

## Habitat Quality and the Presence of Key Species

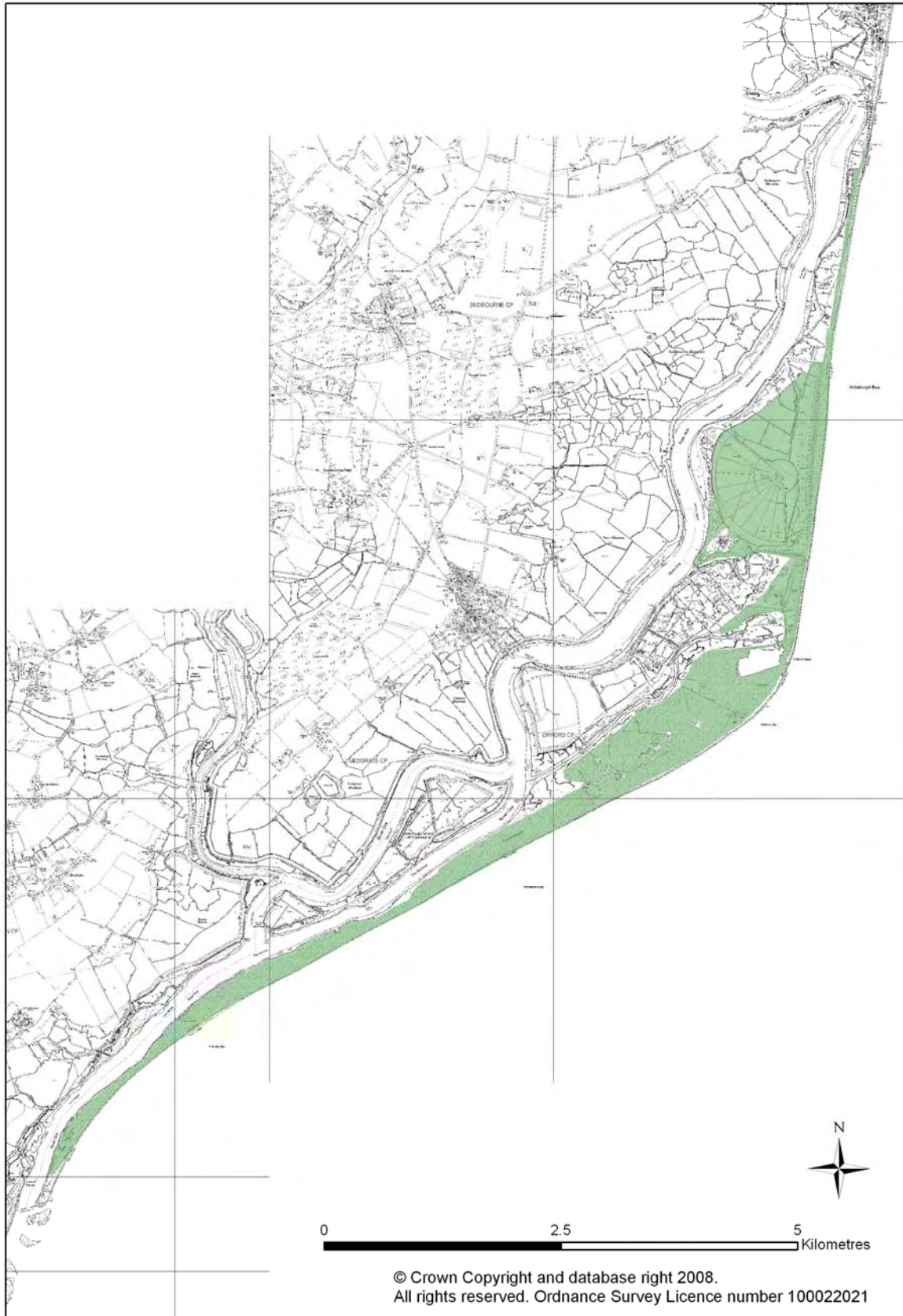
### Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	2
<i>Pseudeuophrys obsoleta</i>	a jumping spider	3
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	0
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk`s-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	1
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	0
<i>Scleranthus annuus</i>	Annual Knawel	0
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	0
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	0
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	0*
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	0
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	0
<i>Limonium vulgare</i>	Common Sea-Lavender	0

Source: National Biodiversity Network

- National Trust has records of this species

## Vegetated Shingle Extent for Orfordness





# Porlock Ridge

Somerset SS890484

Fieldwork Date: 01/10/2009

Conservation Status: Porlock Ridge and Saltmarsh  
SSSI, Exmoor National Park



## Introduction

This site comprises a shingle ridge and associated saltmarsh hinterland extending for a distance of approximately 4 kilometres along the west Somerset coast, immediately north of Porlock village.

Porlock shingle ridge was formed, as sea level rose during the middle part of the Holocene epoch, from shingle eroded from head deposits which masked the sea cliffs to the west after the last glacial period. This major source of coarse sediment has long since disappeared, leaving only a relatively insignificant input of sediment from occasional cliff falls. The inputs of sediment to the beach ridge from this modern source are too small to sustain the earlier beach profile and the increase in the length of the ridge as it continues to rollback, in a lengthening curve, into Porlock Bay. This means that the ridge has been growing steadily thinner ever since it was formed, a condition exacerbated by the further reduction in shingle inputs caused by the construction of groynes at Gore Point at the western extremity of the ridge. The modern ridge was therefore unable to withstand recent extreme storm events and a breach opened during the storm of October 1996 which flooded the low lying marsh hinterland. Rapid evolution of the beach following the breach is providing a unique opportunity to study the development of a coarse sediment barrier system in an open coast location.

## Threats

Coastal processes have been naturalised at this site since the breach of the shingle ridge and hence future threats will depend upon the evolution of the ridge in the face of predicted sea level rise.

At Porlock Weir there is significant spread of alien plant species onto the vegetated shingle, both by naturalisation and planting associated with dwellings.

## Management

Since the shingle ridge was breached in 1996, the shingle ridge has been allowed to develop naturally and has become an important site in the study of coastal processes.

## Descriptions of vegetated shingle communities and transitions

The majority of the Porlock shingle ridge is devoid of vascular plants. However, there are extensive areas of lichen rich boulders, particularly to the east of Porlock Bay. Vegetated shingle is developing on the inner slope of the ridge, particularly to the east of breach although this remains fragmentary and not very extensive.

### Pioneer communities

#### *SD1 Glaucium flavum-Rumex crispus community*

This community occurs locally on the landward face of the shingle ridge west of the breach. This is predominantly an open pioneer shingle community with only a scatter of vascular plants. Most frequent of these are patches of *Festuca rubra* obtaining a cover value of up to 25%. The yellow-horned poppy *Glaucium flavum* is present as scattered plants together with sea mayweed *Tripleurospermum maritimum* and sea campion *Silene maritima*. An interesting feature of this community is the constant presence of Herb Robert *Geranium robertianum*.

This is probably the maritime sub-species *Geranium robertianum* ssp *maritimum*, distinguished from its closely related little robin *Geranium purpureum* ssp *forsteri* by its larger flowers and purple anthers. Other species present in this community included curled dock *Rumex crispus* and bird's foot trefoil *Lotus corniculatus*. In terms of vegetation classification this community fits quite well within SD1 *Glaucium flavum-Rumex crispus* community of the NVC. However, Sneddon and Randall provide a more accurate classification which they term the SH24 *Rumex crispus -Tripleurospermum maritimum-Glaucium flavum* pioneer community.



SD1 *Glaucium flavum-Rumex crispus* Pioneer shingle community on the landward slope of Porlock Beach with scattered *Glaucium flavum*, *Silene maritima*, *Tripleurospermum maritimum* and *Geranium robertianum* ssp *maritimum*



*Geranium robertianum* ssp *maritimum*. A feature of the open pioneer shingle community

**SH70 *Festuca rubra* – *Silene maritima* - *Lotus corniculatus* community**

Associated with the localised patches of vegetated shingle on Porlock Beach is a more grassy community found on the more stabilised shingle. This shows transitions to more typical saltmarsh communities to landward of the Beach.

Whereas many of the associated species remain from the previous community, *Glaucium flavum* is no longer present in this more stable shingle vegetation. This community also has a higher level of organic detritus reflected by the presence of *Beta vulgaris* ssp *maritima*. The open stony nature of the habitat is also reflected in the occasional plants of rock samphire *Crithmum maritimum*.

This community appears transitional between a maritime cliff grassland and shingle community. Sneddon and Randall describe a *Festuca rubra-Silene maritima-Lotus corniculatus* community (SH70) which seems very close to that found at Porlock, although the two quadrat samples at Porlock did not contain *Lotus corniculatus*.



### MC8 *Festuca rubra*-*Armeria maritima* maritime cliff grassland

The transition from open shingle to stable shingle grassland is completed by the presence of areas of matted *Festuca rubra* turf. This occurs landward of the main shingle ridge of secondary ridges that run parallel to it. This grassland is generally species poor with an overwhelming dominance of *Festuca rubra*. Associated species include constant *Beta vulgaris maritima*, *Atriplex portulacoides* and *Armeria maritima*. The presence of *Atriplex portulacoides* reflects the transitions from this community to adjacent saltmarsh. Other associated species include a mix of saltmarsh and coastal grassland species including *Aira caryophylla*, *Lotus corniculatus*, *Rumex crispus*, *Plantago lanceolata*, *Cerastium fontanum* and *Elytrigia atherica*.



MC8 *Festuca rubra*-*Armeria maritima* grassland on shingle ridge landward of the main Porlock Beach with transitions to SM14 *Halimione portulacoides* saltmarsh

### W22 *Prunus spinosa*-*Rubus fruticosus* scrub (SH123 *Prunus spinosa* scrub)

An area of stabilised shingle vegetation occurs to the west of the breach in the shingle ridge. This has developed a low growing blackthorn *Prunus spinosa* scrub vegetation sampled within transect PT1. Sprawling wind pruned bushes of *Prunus spinosa* dominate the vegetation intermixed with *Rubus fruticosus*. Bare shingle remains a prominent feature of the vegetation. Growing amongst the scrub species are more typical vegetated shingle species including *Geranium robertianum* ssp *maritimum* and scattered plants of *Arrhenatherum elatius*. The non-native red

valerian *Centranthus ruber* has also colonised these areas of stable shingle.

Blackthorn scrub is described in the NVC as W22 *Prunus spinosa*-*Rubus fruticosus* community. This is widespread in the UK, being associated with a range of substrates and is not specifically a shingle community. *Prunus spinosa* dominated vegetated shingle has however been described in detail by Sneddon and Randall. The community present at Porlock conforms to their SH123 *Prunus spinosa* scrub community. This is described by them as being found across many western sites, particularly those on the Scottish coast.



W22 *Prunus spinosa*-*Rubus fruticosus* scrub (SH123 *Prunus spinosa* scrub)

### Saltmarsh communities

Saltmarsh communities were recorded at the landward edge of the Porlock shingle ridge. In places, the rolling over of the ridge landwards is smothering saltmarsh communities with fresh shingle fans. The transition from shingle to



saltmarsh is often abrupt with little transitional vegetation.

#### *SM14 Halimione portulacoides saltmarsh*

To the east of the breach, the vegetated shingle ridges show transitions to extensive areas of saltmarsh dominated by sea purslane *Atriplex portulacoides*. This is typical of the SM14 *Halimione portulacoides* saltmarsh community described in the NVC. Associated species include *Suaeda maritima*, *Festuca rubra*, *Aster tripolium* and *Beta vulgaris* spp *maritima*. This is not a vegetated shingle community and appears to have developed only on the softer sediments underlying the shingle deposits.

#### *SM13 Puccinellia maritima saltmarsh*

To the west of the breach towards the village of Porlock Weir the shingle ridge is rolling over landwards to cover areas of SM13 saltmarsh. Sample quadrats were recorded along the edge of the shingle from this community. These conform to the SM13 community description in the NVC being dominated by the saltmarsh grass *Puccinellia maritima*. Associated species include *Suaeda maritima*, *Aster tripolium*, *Salicornia europaea*, *Spergularia maritima*, *Triglochin maritimum*, *Atriplex portulacoides*, *Limonium vulgare* and *Spartina anglica*.



*Shingle fans spreading across SM13 Puccinellia maritima saltmarsh on the inner slope of the Porlock shingle*

## Extent of Vegetated Shingle

The extent of vegetated shingle at the site is 5.2 hectares.

## Invasive species

Alien species are a particular feature of the vegetated shingle at Porlock. To the east of the breach in the shingle ridge are some extensive patches of the introduced broad-leaved everlasting pea *Lathyrus latifolius* colonising the crest of the shingle ridge.

To the west of the breach near the village of Porlock Weir are much larger areas of alien dominated shingle vegetation. These are dominated by the red valerian *Centranthus ruber* occurring in an open savannah like scrub community with the introduced *Buddleja davidii*. Other species found in this alien shingle community include the garden escapes *montbretia* *Crocsmia* sp. and purple toadflax *Linaria purpurea*. Native species are also present and include the grasses *Festuca rubra* and *Arrehenatherum elatius* and sprawling plants of *Clematis vitalba*.

A row of cottages backing onto the shingle ridge have also extended their gardens onto the vegetated shingle where plants of the pampas grass *Cortaderia* sp. appear to have been planted into the shingle.

### **Supplementary Note:**

National Trust Botanist believes the 2009 survey has misidentified narrow-leaved everlasting pea *Lathyrus sylvestris* as the introduced broad-leaved *L. latifolius*. Narrow-leaved everlasting pea was found there in 2010 by Richard Allen (National Trust) as well as during previous survey by Janet Lister, and mentioned in the Somerset flora as being plentiful there in 1896 & 1996.

## Vegetated Shingle extent for Porlock Ridge



# Rye Harbour

East Sussex

Fieldwork Date: 14/10/09

Conservation Status: Rye Harbour SSSI, Dungeness SAC and Dungeness to Pett Level SPA



## Introduction

The shingle beach at Rye Harbour has been accreting in a southerly direction creating a fan-shaped belt of sand and shingle. This belt is narrow in the west of the site and broadens rapidly to the north and east. The shingle ridges to the north of the existing beach represent old shorelines; the most ancient (circa 12th century) is in the west near Camber Castle. These features are of great geomorphological significance, and are also of biological interest. The range of plant and animal communities which have developed reflect the age of the shingle ridges and the degree of maritime climatic influence. Shingle extraction over part of the area has created a series of pools and lakes which range in chemical status from brackish to freshwater; some have marginal stands of tall fen vegetation. Superficial deposits of sands, silts and clays have accumulated between the shingle ridges. These deposits are deepest in the north-west of the site and here the land has been managed as lowland grazing marsh with a network of drainage ditches. The intertidal zone at Rye Harbour consists of a linear saltmarsh on the sheltered west bank of the River Rother and the soft muds and sands of the main beach.

## Threats

The site is threatened by continuing coastal processes which threaten to remove the shingle deposits from in front of Rye Harbour. These are artificially replenished by beach feeding of shingle extracted from the eastern entrance of the river Rother.

## Management

Much of the area is managed as a nature reserve within the Rye Harbour Local Nature Reserve. In the past, a large area of the site has been subject to gravel extraction leaving a series of open water lagoons and associated shingle islands. There are important nesting sites for shingle nesting birds, in particular little and common terns.

## Descriptions of Vegetated Shingle Communities and Transitions

### Pioneer Communities

*SH9 Crambe maritima – Solanum dulcamara pioneer community*

Much of the outer edge of the shingle beach is colonised by virtually mono-specific stands of *Crambe maritima*. This forms a broad zone seaward of the coast road than fronts the shingle deposits within Rye bay. Associated species include locally frequent plants of *Solanum dulcamara* and occasional *Glaucium flavum*.



*Crambe maritima* dominated vegetation within Rye Bay forming the SH9 *Crambe maritima – Solanum dulcamara* pioneer community as described by Sneddon and Randall





SH9 *Crambe maritima*-*Solanum dulcamara* community growing on the edge of the disturbed shingle extraction site at the entrance to Rye Harbour

### SH11 *Lathyrus japonicus* pioneer community

This community occurs in association with the *Crambe maritima* dominated community SH9. It is typically species poor being composed almost entirely of the dense mats of the nationally scarce sea pea *Lathyrus japonicus*. It forms a narrow



Zonation of outer SH9 *Crambe maritima*-*Solanum dulcamara* community with narrow band of SH11 *Lathyrus japonicus* community (grey/brown mats) along the second shingle ridge

## Shingle Grassland Communities

### SH71 *Arrhenatherum elatius* grassland community

Inland of the open pioneer shingle communities that occupy the shingle storm beaches of Rye Bay are extensive areas of *Arrhenatherum elatius* dominated shingle grassland. There is considerable variation in the composition of this grassland ranging from open shingle grassland rich in *Cladonia* lichens and maritime species

zone just inland of the outer edge of the *Crambe maritima* zone associated with the crest of the second beach ridge.



Mats of the nationally scarce sea pea *Lathyrus japonicus* forming the SH11 *Lathyrus japonicus* pioneer shingle community

close to the coast and more species poor representations further away from the sea. In nearly all examples, open patches of bare shingle remain a common feature. In places these are perpetuated by rabbit burrows and scrapes allowing species such as *Glaucium flavum* to colonise the vegetated shingle over 500m from the sea. Other associated species tend to be those of more typical *Arrhenatherum elatius* grassland (described in the NVC as MG1 *Arrhenatherum elatius* grassland). These include *Solanum dulcamara*, *Cirsium arvense*, *Picris echioides*, *Plantago lanceolata* and the grasses *Festuca rubra* and *Agrostis stolonifera*. In places, the introduced red valerian *Centranthus ruber* is also a conspicuous component of this community.

*Arrhenatherum elatius* grassland develops both on natural shingle formations and the disturbed shingle ridges and pits created by mineral extraction. Where the landform has been heavily modified by mineral workings and there is no obvious maritime influence in the vegetation it is difficult to classify it as an example of vegetated shingle. However, where the natural shingle ridges are retained and there are localised plants of coastal species, such as *Glaucium flavum* or *Crambe maritima*, the *Arrhenatherum elatius*

grassland has a distinctive character that separates it from more terrestrial examples of this grassland that would normally fall within MG1 of the NVC.



SH71 *Arrhenatherum elatius* shingle grassland showing a few scattered plants of *Glaucium flavum* within quadrat RT1c. Although disturbed, this community would appear to fall within the vegetated shingle habitat



Extensive areas of *Arrhenatherum elatius* grassland developed in former mineral workings lack obvious maritime influence or natural shingle structure and do not easily conform to a vegetated shingle habitat

#### U1 *Festuca ovina*-*Agrostis capillaris*-*Rumex acetosella* grassland

The oldest shingle deposits at Rye extend inland to the Camber Castle. These support some extensive areas of acid grassland. Although this may have been subject to some agricultural improvement in the past, it is largely semi-natural in character. The area around the Castle is remarkable for retaining well defined shingle deposition ridges. In places, the underlying shingle is exposed at the ground surface – in others, rabbit burrowing also creates open shingle habitat. The survey of the area

undertaken in mid October 2009 was unable to record many of the specialist acid grassland species known to be present in this area.

The grassland sward is dominated by *Agrostis capillaris* with abundant *Rumex acetosella* and *Plantago lanceolata*. In places, there are plants of *Pilosella officinarum*, *Plantago coronopus*, *Galium verum* and *Erodium cicutarium*. Rosette forming composite species area also a feature of the habitat with frequent *Leontodon hispidus* and *Leontodon autumnalis*. Associated grasses include frequent *Anthoxanthum odoratum* with occasional patches of *Arrhenatherum elatius* and *Dactylis glomerata*. Moss and lichen cover is also locally significant with some areas of turf rich in *Cladonia* species.

Although this acid grassland lacks any obvious maritime influence, it is clearly coastal in character and with the clearly defined natural shingle ridges present should be regarded as an example of stable and mature vegetated shingle habitat.



U1 Acid grassland with patches of bare shingle around Camber Castle showing the clearly defined ridges of the natural shingle structure

### Saltmarsh Communities

#### SM22 *Halimione portulacoides*-*Frankenia laevis* saltmarsh

Along the banks of the River Rother towards the entrance of Rye Harbour are areas of *Atriplex portulacoides* saltmarsh. These are bordered to the west by the shingle deposits of Rye Bay. The transition zone between saltmarsh and vegetated shingle support some fine examples of SM22 *Halimione portulacoides*-*Frankenia laevis* salt-



marsh. This forms a narrow but very clearly defined zone running parallel to the main access road to the foreshore. Bare muddy shingle and shingle is a dominant feature of the habitat with scattered mats of *Frankenia laevis* being a conspicuous feature. Associated species include *Festuca rubra*, *Plantago coronopus*, *Beta vulgaris* ssp *maritima*, *Atriplex glabruscula*, *Seriphidium maritimum* and *Suaeda maritima*.

An interesting feature of the habitat is the presence of the introduced Rottingdean sea lavender *Limonium hyblaenum*; a species native of the Mediterranean.



Mats of sea heath *Frankenia laevis* marking the narrow zone between vegetated shingle and saltmarsh

defined zone running parallel to the main



Rosettes of the introduced 'Rottingdean sea lavender' *Limonium hyblaenum* growing with *Frankenia laevis*

## Shingle Scrub

### *W21 Crataegus monogyna-Hedera helix scrub*

To the west of Rye Bay the vegetated shingle forms a complex patchwork with the residential developments of Winchelsea Beach. A particularly interesting area occurs to the north of 'The Ridge'. This is a residential lane running along the crest of a shingle ridge. Residential development lines the northern side of the lane beyond which are some extensive areas of stabilised bare shingle. This is generally devoid of vegetation but fringing this open shingle are areas of shingle scrub. These consist of a mix of *Crataegus monogyna*, *Sambucus nigra*, *Rubus fruticosus* and *Rosa canina*. Around the scrub are frequent patches of *Iris foetidissima* together with *Echium vulgare* and *Dipsacus fullonum*.



*Crataegus monogyna* and *Sambucus nigra* scrub colonising the expanse of bare shingle to the north of 'The Ridge' within the sub-urban area of Winchelsea Beach



## Extent of Vegetated Shingle

The extent of vegetated shingle at the site is

165.0 hectares.

## Key Species

Species	Common Name	Records
Bombus (Subterraneobombus) subterranean	Short Haired Bumble Bee	1
Crepis foetida	Stinking hawk's-beard	7
Galeopsis angustifolia	Red Hemp-Nettle	128
Idaea ochrata subsp. cantiata	Bright Wave	1
Lactuca saligna	Least Lettuce	70
Limonium hyblaenum	Rottingdean Sea-Lavend	2
Philorhizus vectensis	Dromius vectensis	1
Pseudeuophrys obsoleta	Jumping spider	10
Salsola kali subsp. kali	Salsola kali subsp. ka	10
Scleranthus annuus	Annual Knawel	11
Sterna dougallii	Roseate Tern	275
Temnothorax interruptus	Leptothorax interruptu	4

Source: Sussex Biodiversity Record Centre

## Notable Species

Numerous notable species have been recorded from the vegetated shingle habitats of Rye Harbour SSSI. The SSSI citation lists the following nationally scarce and rare species that are associated with the vegetated shingle habitat;

Least lettuce *Lactuca saligna*

Bearded fescue *Vulpia ambigua*

Sea barley *Hordeum marinum*

Slender hare's ear *Bupleurum tenuissimum*

Borrer's saltmarsh grass *Puccinellia fasciculata*,

Stiff saltmarsh grass *Puccinellia rupestris*

Sea pea *Lathyrus japonicus*

Suffocated clover *Trifolium suffocatum*

Sea heath *Frankenia laevis*

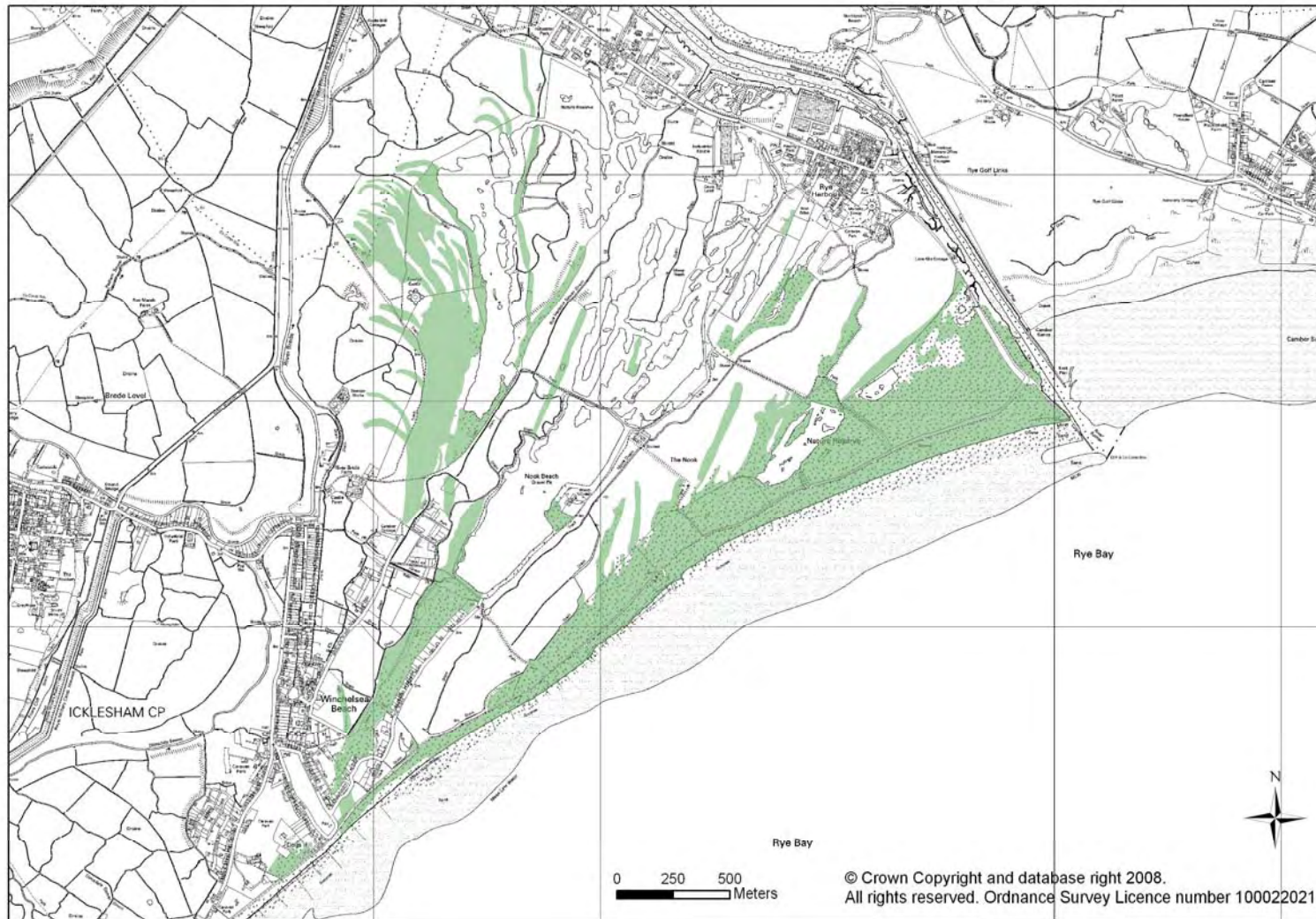
Pygmy footman moth *Eilema pygmaeola*

## Invasive Species

The red valerian *Centranthus ruber* is a conspicuous component of much of the more stable vegetated shingle in particular that associated with the disturbed former mineral workings and the sub-urban areas of Winchelsea Beach.

The alien sea lavender *Limonium hybleaum* does not appear to be particularly invasive although it seems to be strongly associated with the important *Frankenia laevis* saltmarsh-shingle transition. This is particularly well developed at Rye Harbour

## Vegetated Shingle extent for Rye Harbour





# Shingle Street

Suffolk TM360420,

Fieldwork Date: 12/10/09

Conservation Status: RAMSAR, SSSI



## Introduction

Shingle Street is located on the mainland Suffolk coast. It is opposite the distal end of Orfordness, on the west bank of Orford Haven (estuary of the Ore/Alde-Butley estuary). There is an accumulation of shingle on the seaward side of the sea wall in the northern part of the hamlet. It comprises a series of shingle ridges, which have been deposited over London Clay and estuarine silt to form an apposition beach which has enclosed a varying number of saline to brackish lagoons. Shingle Street hamlet is built on a spread of shingle in front of the Oxley Marshes. The shingle ridge system continues as a vegetated unit southwards to the newly constructed sea defence works at East Lane, Bawdsey. Important but declining associated habitats are the brackish and fresh lagoons. Those at Shingle Street were described by Barnes & Heath (1980) and Field & Randall (1986).

The dynamic geomorphology of the site, especially in its northern part, is directly linked with erosion and deposition patterns of the distal point of Orfordness and the adjacent estuary.



*Erosion of northern part of Shingle Street within Ore estuary*

Currently, erosion is happening within the estuary section, progradation along the hamlet coast, and increasing erosion and coastal steepening further south (Pontee 2005).

The site is bounded by salt marsh in the north and by the sea wall in the north-west and south-west. In the central area by the village, the road is effectively the boundary with the Oxley coastal grazing marsh to the west.

## Threats

Shingle Street is widely used for recreation, especially fishing. However, trampling of vegetation is only local and has not markedly increased over time, thanks to limited parking facilities at this site. Historic gravel extraction has led to the formation of a lower-lying area that has now been colonised by salt-marsh related shingle vegetation. Occasional vehicles enter the northern part of the site via the concrete road and have to turn on the shingle at the end.



*Vehicle damage at road end*

Construction of houses over the last century has led to loss of shingle. More is currently being incorporated into garden at the southern end of the village. Currently, marine erosion within the Ore estuary has led to the retreat of the coastal ridge and loss of lagoons and a similar pattern is

being repeated at the Bawdsey end of the site. Conversely the ness in front of the Coastguard cottages is accreting.

## Management

Because the site is privately owned and parking is extremely limited, visitor numbers are relatively low. Good signage at the tiny car park and the provision of a rubbish bin and dog faeces bin has led to a well-managed site.



Signage and litter control at car-park

There is a larger car park at East Road, Bawdsey but this is a long way from the rest of the site and there is little incentive to walk to Shingle Street as there are no facilities on offer. The Suffolk Coast and Heath Path runs through the site but has eroded away at the southern end.

## Descriptions of Vegetated Shingle Communities and Transitions

The most significant changes over the last 20 years have resulted from greater stability/accretion of the central section and the concomitant marked increase in pioneer vegetation. Conversely, much of the spit to the north of the hamlet has been eroded.

In front of the village and southwards toward the second Martello Tower, vast spreads of *Crambe maritima* with some *Rumex crispus* have grown over what was virtually un-vegetated shingle at the time of the 1990 survey. This has resulted in

SH9a being the most significant foreshore community along much of the coast ridge.

Immediately inland, this is replaced by SH11 *Lathyrus japonicus* pioneer community. Each quadrat of this community still contains much bare shingle but major associates include *Glaucium flavum*, *Rumex crispus*, *Arrhenatherum elatius*, *Cirsium arvense*, *Sonchus asper*, *Crepis vesicaria* and *Silene uniflora*.



Shingle Street front ridge. View south

Inland of the pioneer communities, Shingle Street vegetation is composed of *Festuca rubra* grasslands. The most maritime of these SH41, is located immediately behind the storm ridge in the north of the hamlet. It may result from older, inland grassland being re-exposed to marine influences by erosion. It also has some bare shingle but is characterised by the constant presence of *Festuca rubra*, *Arrhenatherum elatius*, *Silene uniflora*, and *Lathyrus japonicus*. Frequent associates in this assemblage include *Plantago lanceolata*, *Aira praecox*, *Rumex crispus*, *Cerastium* spp., and *Vicia* spp., Despite the maritime influences, this is a stable grassland and contains small quantities of bryophytes such as *Hypnum cupressiforme* and *Eurhynchium praelongum*. This community does not occur elsewhere in East Anglia and is primarily northern in distribution.

In the most stable areas up to the sea-wall, more mature *Festuca rubra* grassland occurs. Here, the matrix contains some sand and a more diverse grassland results SH40. Many of the same species are present but *Festuca rubra* may have

a Domin score up to 8, the herbs *Geranium robertianum* ssp. *maritimum* and *Sedum acre* are common and there is a major bryophyte and lichen component, of which the following species are the most common: *Dicranium scoparium*, *Hypnum cupressiforme*, *Eurhynchium praelongum*, *Cladonia furcata*, *C. cervicornis*, *C. rangiformis*, *C. chlorophaea*, *C. crispate* and *Peltigera canina*. Annual grasses and a wide range of clovers and vetches are also locally important within this community. *Lactuca virosa* is a frequent component.

In the depression where Lagoons 6a and 6b are located and towards the salt-marsh in the far north of the site, more silt is present in the shingle matrix and an *Elytrigia atherica* – *Festuca rubra* SH36 community is present. Major associates are

maritime species including *Armeria maritima*, *Atriplex portulacoides*, *Plantago maritima* and *Seriphidium maritimum*. This community merges down-slope into SM16 *Festuca rubra* saltmarsh

In the World War 2 excavations south of Lagoons 6a,6b and around the sea-wall borrow-pits, a different shingle salt-marsh is present. This community keys out to SM14 *Atriplex portulacoides* saltmarsh. However, it is an open community with some bare shingle. As well as *Beta vulgaris maritima*, other associates are *Silene uniflora*, *Senecio viscosus*, *Spergularia marina* and *Parapholis incurva*.

### Extent of Vegetated Shingle

The extent of shingle at this site is 44.0 hectares.

### Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	0
<i>Pseudeuophrys obsoleta</i>	a jumping spider	1
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	0
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk`s-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	0
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	0
<i>Scleranthus annuus</i>	Annual Knawel	0
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	0
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	0
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	0
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	0
<i>Limonium vulgare</i>	Common Sea-Lavender	0

Source: National Biodiversity Network



## Invasive Species

Near the Coastguard Cottages and elsewhere within the hamlet *Centranthus ruber* occurs in both its red and white forms. It normally invades disturbed locations and has not, so far, spread further. *Lupinus arboreus* has occurred in small numbers in the north of the site for many years but has not spread.



*Centranthus ruber* by Coastguard Cottages

In the southern part of Shingle Street *Euphorbia characias* has spread from nearby gardens and is colonising the shingle.



*Euphorbia characias* invasion on shingle

## Rare Species

*Crithmum maritimum* reaches its northern limit on the East Coast at Shingle Street/Orfordness. It

was first recorded on this site by Wolley-Dod in the Nineteenth century.



*Crithmum maritimum* near Lagoons 6a,6b.



*Atriplex portulacoides* marsh on shingle

Small patches of SH109 *Ulex europaeus* – *Rubus fruticosus* scrub and SH119 *Rubus fruticosus* – *Arrhenatherum elatius* scrub occur on the shingle within and around the hamlet.

The jumping spider *Euophrys browningi* was new to science when first taken at Shingle Street but now occurs also at Orfordness.

## Vegetated Shingle Extent for Shingle Street





# Sizewell

Suffolk TM470610

Fieldwork Date: 29/09/09

Conservation Status: Candidate SAC, AONB, SSSI



## Introduction

This site comprises a series of shingle ridges in front of the nuclear power stations at Sizewell. To the north it merges into a fringing beach that becomes increasingly sandy and to the south there is a currently non-vegetated fringing shingle beach that merges with Thorpeness apposition beach. The site is at the sandy extreme of the definition of shingle substrates, with a high proportion of sand within the shingle matrix. The interest in this site is particularly related to the fencing, re-profiling and replanting that was carried out following the construction of the power station (Walmsley & Davy 1997, J.Appl. Ecol., 34, 145-153). Sizewell and Thorpeness are both part of an embayment beach-ridge plain, protecting the remains of a former embayment.



*Fenced and re-profiled section of Sizewell beach*

## Threats

The extent of vegetated shingle at this site has been vastly reduced historically by the construction of the power stations. Although it is, in part, protected by fencing, this is not adequately maintained.

Levels of recreational pressure are high. There is a large car park, toilets and cafe at Sizewell Gap from which there is some authorised (and some unauthorised) vehicular access to the beach in front of the power stations. Access by vehicles associated with the fishing boats is permitted onto the 'Blue Flag' beach. The site is on the route of the Suffolk Coast and Heaths Path.



*Fishing boats at Sizewell beach*

The site currently has an extremely high rabbit population. Rabbit grazing is causing local blow-outs of the vegetated surface, especially in the sandier areas. However, numbers are cyclically controlled by myxomatosis. Dog faeces abound.

The area of the site in front of the power stations continues to suffer dynamic natural coastal erosion since re-profiling.



## Management

There is some poor quality signage put up by British Energy and the protective fencing is inadequately maintained. However, there are some well-maintained boardwalks through the dune areas which somewhat reduce recreational damage but overall the site has degraded since the JNCC survey. In general, the fringing beach south of the fishing boat area at Sizewell through to the southern extent of Thorpeness habitation is too disturbed to be of vegetational value as a result of fires, encroachment, re-profiling and development.



Signage at Sizewell

## Vegetation

The communities found at this site reflect the arenicolous nature of the substrate. New since 1993, when most of the shingle foreshore was devoid of vegetation, is an extensive *Crambe maritima* dominated community SH9a. This occurs almost entirely outside the fenced areas and is currently extremely vigorous. Associated species are *Rumex crispus* and *Glaucium flavum*, both in small quantities.

Behind the *Crambe maritima* zone, the foreshore supports an open *Ammophila arenaria* – *Rumex crispus* – *Senecio viscosus* assemblage SH21. This may contain occasional associates including *Glaucium flavum*, *Sagina apetala*, *Cerastium fontanum*, *Festuca rubra* and *Poa pratensis*.



Sizewell beach, looking south from sandy shingle toward more shingly substrate toward power station

Behind this stretching back to the edge of the power station land is a more stable sandy shingle community, SH59. This is an *Ammophila arenaria* - *Carex arenaria* – *Festuca rubra* grassland, common to sandy sites all across the country. Major associates are *Hypochoeris radicata*, *Cerastium fontanum*, *Plantago lanceolata* and grasses such as *Holcus lanatus*, *Poa pratensis* and *Dactylis glomerata*. Herb species commonly occurring include *Honckenya peploides*, *Ononis repens*, *Galium verum* and *Achillea millefolium*. *Lathyrus japonicus* and *Trifolium striatum* are also present.



Stable grassland at Sizewell

## Extent of Vegetated Shingle

The extent of vegetated shingle is 10.6 hectares. The area beyond about 400m north of the power station is now covered by sand to a depth greater than 30cm and therefore could not be classed as vegetated shingle.

## Invasive Species

*Lupinus arboreus* has occurred in small numbers in the north of the site for many years but has not spread.

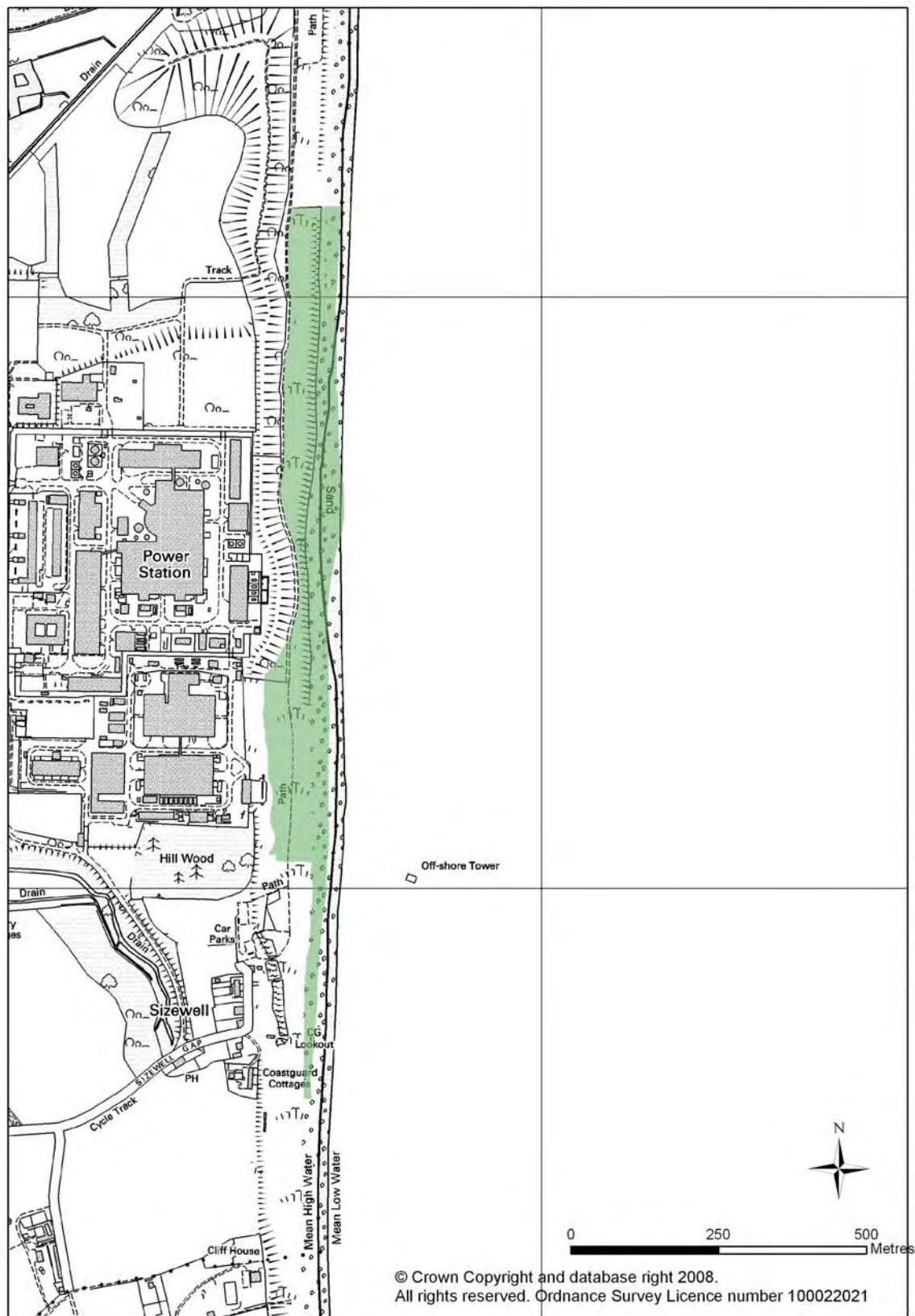
## Habitat Quality and the Presence of Key Species

### Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	0
<i>Pseudeuophrys obsoleta</i>	a jumping spider	0
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	1
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk's-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	16
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	1
<i>Scleranthus annuus</i>	Annual Knawel	0
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	2
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	0
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	0
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	0
<i>Limonium vulgare</i>	Common Sea-Lavender	0

Source: National Biodiversity Network

## Vegetated Shingle Extent for Sizewell





# Thorpeness Haven

Suffolk

Fieldwork Date: 04/10/09

Conservation Status: AONB, RSPB reserve, SSSI



## Introduction

This site comprises the area from the southern end of Thorpeness village to the un-vegetated shingle just north of Aldeburgh at Thorpe Road car park. It extends westwards across Thorpe Road to the drainage channels, where it abuts coastal grazing marsh on the RSPB reserve known as North Warren. The site is important for ground-nesting Ringed Plovers and migrant butterflies, especially Clouded Yellow. The site is on the route of the Suffolk Coast and Heaths Path. The fringing beach seaward of Thorpeness village could be included as far north as the cliff but mostly this is virtually un-vegetated.

The Haven is partly owned by RSPB and partly by Suffolk Coastal District Council. The land is managed through a three-way partnership also involving the Suffolk Wildlife Trust. The site is part of an embayment beach-ridge plain, protecting the remains of a former embayment. It is an apposition beach which has been deposited as a series of shingle ridges to form a larger area of stable shingle. It appears that this site is currently in reasonable equilibrium with maritime forces and limited net accretion is occurring (Pontee 2005, *Maritime Engineering*, 158, 69-83).

## Threats

Although the site is bisected north-south by Thorpe Road, there are few places for vehicles to park and recreational visitors are walkers from either end, as well as some horse-riders. The significance of high recreational use adjacent to the southern car park is the total absence of vegetation around 'The Scallop', a popularly visited sculpture by Maggi Hambling celebrating

Benjamin Britten, which was unveiled in November 2003.



*The Scallop. No vegetation in this area*

The fringing beach under the cliff north of Thorpeness through to the southern extent of Thorpeness habitation is too disturbed to be of great vegetational value as a result of beach fires, encroachment of gardens, re-profiling and housing development.



*Encroachment at Thorpeness Village*

The site is widely grazed by rabbits, but currently numbers are not large as a result of a recent myxomatosis outbreak.

## Management

Along the length of The Haven reserve, several low-cost exclosures (string on posts) have been erected. These have resulted in excellent re-growth of foreshore vegetation and they have become significant locations for *Crambe* and *Lathyrus* communities. Lack of foreshore vegetation outside the exclosures highlights the damage resulting from recreational pressure. South of 'The Sluice', increasing visitor pressure towards the Thorpe Road car park has generally degraded the site except within exclosures. A tarmac path from the car park towards 'The Sluice' and another towards Aldeburgh, have helped reduce the damage to backshore vegetation.



Positive effect of 'string on posts' exclosures

Good signs have been erected highlighting the value of the area for nature conservation. Previous surveys appear not to have included the area west of the Thorpe road but this is integral to the total shingle complex.



Signage at Thorpe Road car park

## Descriptions of Vegetated Shingle Communities and Transitions

In common with most East Anglian shingle sites, there has been a marked development of a *Crambe maritima* dominated community SH9a since 1993. This occurs on the crest of the front ridge, primarily within the exclosure quadrats and is currently extremely vigorous. Associated species are *Rumex crispus* and *Glaucium flavum*, both in small quantities.



Open pioneer *Crambe* community



Immediately inland of this, where there is a sand matrix within the shingle, there is an open pioneer *Rumex crispus* – *Glaucium flavum* community SH24, with arenicolous indicators such as *Eryngium maritimum*, *Euphorbia paralias*, *Honckenya peploides* and *Carex arenaria*. *Crambe maritima* and *Lathyrus japonicus* occur throughout this community as occasional associates. This community is limited to the northern part of the site and is a very open assemblage often over 90% bare shingle.



Stable shingle grassland near 'The Sluice' car park. Includes footfall damage and the apple tree.

Along virtually the whole of Thorpeness Haven, but especially within the string exclosures, there is an SH11 *Lathyrus japonicus* pioneer community with *Glaucium flavum* and *Rumex crispus* as minor constants. This is a relatively open assemblage with around 50% bare shingle. Associates are matrix dependent but may include *Sonchus asper*, *Honckenya peploides*, *Silene uniflora* and *Euphorbia paralias*.



SH11 *Lathyrus* pioneer community near 'The Sluice'

The most extensive community at Thorpeness, stretching from the rear of the front ridge to the Thorpe Road is *Dicranium scoparium* – *Festuca rubra* – *Plantago lanceolata* grassland SH43. This widespread grassland is mainly southern in extent. Its maturity and stability are evidenced by the significant bryophyte and lichen elements including *Hypnum cupressiforme*, *Cladonia cervicornis*, *C. impexa* and *C. furcata*. The grasses *Holcus lanatus* and *Aira praecox* are common associates as are the following herbs: *Sedum anglicum*, *S. acre*, *Achillea millefolium*, *Plantago coronopus*, *Lotus corniculatus*, *Galium verum*, and *Cerastium* spp.

Near the houses at the southern end of the village and to the west of the Thorpe Road, there is a more ruderal shingle grassland, dominated by *Festuca rubra*, *Plantago lanceolata* and *Poa pratensis* SH68. Other common grasses within this community are *Arrhenatherum elatius*, *Holcus lanatus* and *Dactylis glomerata*. *Senecio jacobaea* also occurs extensively.

West of the Thorpe Road, there are two further communities. One is a *Ulex europaeus* – *Rubus fruticosus* – *Agrostis capillaris* scrub SH109, that is currently invading the SH68 grassland. This area is heavily infested with rabbits. The other, which occurs in those areas where moisture is seeping into the shingle from the adjacent river bank, can be recognised as a variant of SH103 *Phragmites australis* wet heath. This is a species poor assemblage with *Festuca rubra*, *Urtica dioica*, *Dactylis glomerata* and *Ammophila arenaria* occurring in a mosaic within the *Phragmites*. There is a surface cover of organic matter over the shingle, which may have been the reason for exclusion of this area from the shingle communities in the past.





*Ulex scrub invading shingle grassland west of Thorpe*

## **Extent of Vegetated Shingle**

The extent of vegetated shingle at this site is 28.1 hectares. This is principally at Thorpeness., however there is also a small patch which occurs to the south of Aldeburgh but the frontage at Aldeburgh itself is too heavily disturbed to support vegetation.

## **Invasive Species**

*Lycium barbarum* from China occurs as an invasive species on the backshore shingle in the north of Thorpeness village.

## **Habitat Quality and the presence of key species**

## Key Species

Species	Common Name	Records
<i>Galeopsis angustifolia</i>	Red Hemp-nettle	0
<i>Pseudeuophrys obsoleta</i>	a jumping spider	0
<i>Philorhizus vectensis</i>	a ground beetle	0
<i>Bombus subterraneus</i>	Short-haired bumble-bee	0
<i>Pyropteron chrysidiformis</i>	Fiery Clearwing	0
<i>Temnothorax interruptus</i>	Long-spined Ant	0
<i>Salticella fasciata</i>	Dune Snail-killing Fly	1
<i>Lactuca saligna</i>	Least Lettuce	0
<i>Crepis foetida</i>	Stinking Hawk`s-Beard	0
<i>Sterna dougallii dougallii</i>	Roseate Tern	16
<i>Thalera fimbrialis</i>	Sussex Emerald	0
<i>Idaea ochrata</i> subsp. <i>cantiata</i>	Bright Wave	1
<i>Scleranthus annuus</i>	Annual Knawel	0
<i>Salsola kali</i> subsp. <i>kali</i>	Prickly Saltwort	2
<i>Limonium bellidifolium</i>	Matted Sea-Lavender	0
<i>Limonium binervosum</i>	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> agg.	Rock Sea-Lavender agg.	0
<i>Limonium binervosum</i> subsp. <i>anglicum</i>	Rock Sea-Lavender	0
<i>Limonium humile</i>	Lax-Flowered Sea-Lavender	0
<i>Limonium vulgare</i>	Common Sea-Lavender	0

Source: National Biodiversity Network

## Vegetated Shingle Extent for Thorpeness Haven

