2022 Updating Vegetated Shingle Survey,

Shingle Street, Suffolk

For the residents of

Shingle Street

Contents

Executive summary

As part of the "Touching the Tide" a community based project for the Suffolk Coasts and Heath AONB Shingle Street was surveyed to assess the condition of the shingle vegetation within an area of unit 33 of the Site of Special Scientific Importance (SSSI). Shingle Street is located on the mainland Suffolk coast. It is opposite the southern end of Orfordness spit, on the west bank of Orford Haven (estuary of the Ore/Alde-Butley estuary). There has been an accumulation of shingle on the seaward side of the sea wall and to the east 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. To the north of the hamlet the shingle bank has enclosed a number of saline lagoons. Shingle Street itself is built on a spread of shingle in front of the Oxley Marshes.

An updating survey was carried out in 2013 with additional surveys in 2014 and June 2018, this was carried out to assess if there had been any significant changes to the shingle floral communities along the same transects since the 2012 survey.

This current survey was carried out in July 2022 this was again to add data to assess any continued trends and changes in the vegetation along the shingle between the two main car parks at Shingle Street.

Since 2000 the area of shingle at Shingle Street has nearly grown year on year (using Google Earth) 2020 – 2022 being the exception;

- 2000 – 9.966ha
- 2008 – 12.937ha
- 2012 – 12.925ha
- 2020 – 16.291ha
- 2022 – 15.416ha

Between the first survey in 2012 and the current survey (2020), the area of shingle within the recording area has grown by approximately 2.491 hectares (from approximately 12.925 to a 15.416 hectares). The survey area has increased by approximately 5.45 hectares between 2000 and 2012. These time periods show a considerable increase in area of shingle habitat in a relatively short period of time, with an increase of between approximately 0.247 hectares per year. In the same time period, the southern end of Orfordness has retreated by almost 800 metres to the north.

The shingle has increased along the seaward side of Shingle Street. With the increase in the shingle, this allowed the vegetated shingle to increase across the newly created land.

Using the JNCC Common Standards Monitoring Guidance for Vegetated Coastal Shingle Habitats, the following comments were made on the condition assessment (Natural England, 2011); (this assessment has not been updated since the 2013 assessment (Emma Hay).

"The vegetated shingle features were deemed to be in Unfavourable no change condition due to failing targets on species composition and recreational pressures being unresolved. There has been a significant change in pattern of erosion (in the south) /accretion (in the north) due to natural coastal processes, but also possibly due to the rock revetment placed at East Lane, Bawdsey."

"[there were] several areas devoid of any vegetated substrate within the habitat as a result of anthropogenic activities. Overall area is trampled throughout but bigger plants are growing vigorously, although there is very little lichen type shingle vegetation. Site not reaching its potential"

The Joint Nature conservation Committee (JNCC) guidelines recommend that there should be "no loss of vegetated substrate within the habitat as a result of anthropogenic activities" but, searches of historic aerial online mapping data suggests that there has been little appreciable change in the areas of disturbance since 2000. The 2012 survey report concluded that, due to the substantial accretion described above, there has in fact been a considerable increase in the area of land holding Vegetated Shingle Communities, this still holds true following this 2022 survey.

The JNCC guidelines say that the there should be no loss of vegetated substrate due to anthropogenic activities. These surveys have shown that while there is limited additional loss by anthropogenic activities, there has been limited development of the vegetated habitat because of these activities. By disturbing the shingle this has prevented vegetation colonisation, so an indirect loss through prevention of a natural development of the shingle community. The 2022 survey supports this conclusion, shingle accretion has continued at Shingle Street over the survey period with now the inclusion of two new saline lagoon features. One of which is used regularly by swimmers and a large number of visitors from the northern car park.

The survey has continued to show that there is significant anthropogenic disturbance to the area's leading from the northern car park to the new lagoon, the river's edge and the sea. To a lesser extent along either side of the shell line leading from the southern end of the Coast Guard Cottages to the sea. The trampling from the northern car park has not grown discernibly since 2000, but the survey has shown that continued disturbance has reduced the potential for the less robust vegetation to develop, though where Sea Kale has developed in the walk zone to the beach the plants are apparently avoided by the public, though no other species have started to develop.

The grassland communities of False Oat-grass *Arrhenatherium elatius* has continued to develop over the survey period away from the paths of disturbance. Increasing from 4.19 hectares in 2012 to 5.55 hectares in 2022. Although all the vegetated shingle across the entire site shows that it has all been walked on over the years, with no areas untrodden. This trampling is limited and not as extensive as from the routes from the car parks and along the shell line. There has been a continued increase in the invasive species from the gardens into the maturing acid grassland development nearer to the houses.

There was a near complete lack of Orache species on the upper high tide line this year, possibly due to various reasons; increased disturbance, lack of rain, larger shingle deposition being the other main possible reason. There is still a lack of lichen development across the site, most likely due to footfall across the site.

The results of this survey could be used to help inform future condition assessments for part of unit 33 of the Alde – Ore Estuary SSSI, as a valuable source of information about how this site and the communities within it have changed during the monitoring period.

1. Background and Objectives

In May 2013 to July 2016 a project called "Touching the Tide" was a Lottery Funded community-based project for the Suffolk Coasts and Heath AONB working from Benacre to Bawdsey.

As part of the Touching the Tide project, Shingle Street was surveyed to assess the condition of the shingle vegetation within a portion of Unit 33 of the Site of Special Scientific Interest (SSSI). The main objective was to assess if the impacts of human footfall over the shingle was having significant detrimental effect on the shingle communities present.

Shingle Street is located on the mainland Suffolk coast. It is opposite the southern end of Orfordness spit, on the west bank of Orford Haven (estuary of the Ore/Alde-Butley estuary).

Shingle Street is located on the mainland Suffolk coast. It is opposite the southern end of Orfordness spit, on the west bank of Orford Haven (estuary of the Ore/Alde-Butley estuary). There has been a continued accumulation of shingle on the seaward side of the hamlet since the 1970's. It comprises a series of shingle ridges, which have been deposited over London Clay and estuarine silt to form an apposition beach. To the north of the hamlet the shingle bank has enclosed a number of saline lagoons. Shingle Street itself is built on a spread of shingle in front of the Oxley Marshes.

Shingle coastal habitats are dynamic environments, dominated by waves and storm events. They are constantly changing and these changes often manifest as forms of erosion, but can also take on the form of accretion (addition to the land), such as the development of shingle beaches as seen at Shingle Street.

A large proportion of the Suffolk coastline (approx. 60km) is comprised of shingle structures of some description.

As part of a report by Natural England stating that the site was considered in an unfavourable condition, a volunteer aided survey was carried out to gain more data to be able to follow the condition of the shingle beach to see if there is significant annual deterioration or improvement.

As part of this project the community of Shingle Street wanted to assess the possible effects of foot passage over the shingle to ascertain if there is significant impact of the SSSI unit 33 and the protected flora.

2. Methodology
Botany
Shingle survey transect instructions

1. Transects were started from the highest strandline (HS) (indicated by a line of seaweed and/or detritus left by the sea). This may not always be the newest strandline, especially later in the season. Where the HS could not be determined, the top of the highest ridge (HR) along the shore, seaward of the majority of the vegetation was used. A Global Positioning System (GPS) position was taken at the start of each transect. If the transect started from HS, the top of HR was recorded.
2. Transects were run perpendicular to the shore where possible. A 50 metre measuring tape was run along the ground inland from the start point (Note: a picture from either end of each transect was taken).
3. Once the measuring tape was laid out a pile of pebbles or canes were placed at 10 metre intervals along the tape, this created a visual representation of the 10m sections required for the survey data sheets. With the measuring tape as the central line a rough estimate of 2.5 m either side was established. This gave the recording area for each 10 metre section of the transect.
4. Where possible, complete transects up to 100m were made, where the beach was longer than 100 m, a second transect from the end of the first was started and recorded on the second recording sheet, marking it in the "Sheet no". The transects did not go beyond 200 metres.
5. The transect line was walked twice, once up the beach and once down the beach, recording the following:

    5.1- Estimate % of bare shingle over 10 m sections and recorded against distance up beach. Then, estimated height of vegetation and % cover in each height category: L = (low) cropped and/or prostrate, M = (medium) up to waist high, H = (high) above the waist. Exposed shingle in soil/sand

was recorded as Es and bare soil/sand as S, the total for vegetation cover and bare ground adding up to 100%.
5.2 – Only the presence of the species listed on the recording sheet within ≈2.5 m either side of the measuring tape were recorded. The first and last occurrence of each species was measured from the seaward side (e.g. Yellow Horned-poppy, first = 11 m, last = 65 m) as well as noting within which "10 m sections" they appeared.
5.3 – The shingle characteristics were filled in, roughly estimating to nearest 5%, percentage of shingle fitting into each category at the start, middle and the end of transect.
5.4 - The presence or evidence for any vehicular activity, fire damage, trampling etc were recorded, with the distance at which these features were found.

6. Once the first transect was complete, the next transect start point was located roughly 50 to 100 metres from the last transect (parallel to shore). This process was repeated for the 14 transects carried out during this survey.
7. A V or W-shaped walk was made (depending on length of transects) between transects and recorded any of the pre-selected species not already found in transects.
8. After all the transect surveys had been carried out a species list was made across the site using the methodology below.

In this "sample site specific survey", the emphasis was on covering the area and detecting as many of the species as possible. The three main areas of the site were chosen by the surveyor, and a list compiled for each of these areas. This enabled the surveyor to establish habitat de-lineation across the site.
Each area had estimates of vegetation cover:

D – Dominant (over 70% cover)
A – Abundant (70-50% cover)
C – Common (50–30 % cover)
F – Frequent (10-30% cover)
O – Occasional (3-10% cover)
R – Rare (less than 3% cover)

Following the community participation survey on the ground an additional survey was carried out using a drone to record the vegetation along each of the transects with high quality, using a method that will be easily repeatable in the future for monitoring large scale changes in the larger species within the community.

3. Results

The survey has shown that the site has had continued development of shingle across the site with the northern section of the site receiving the greatest deposition as seen in Figure 2.

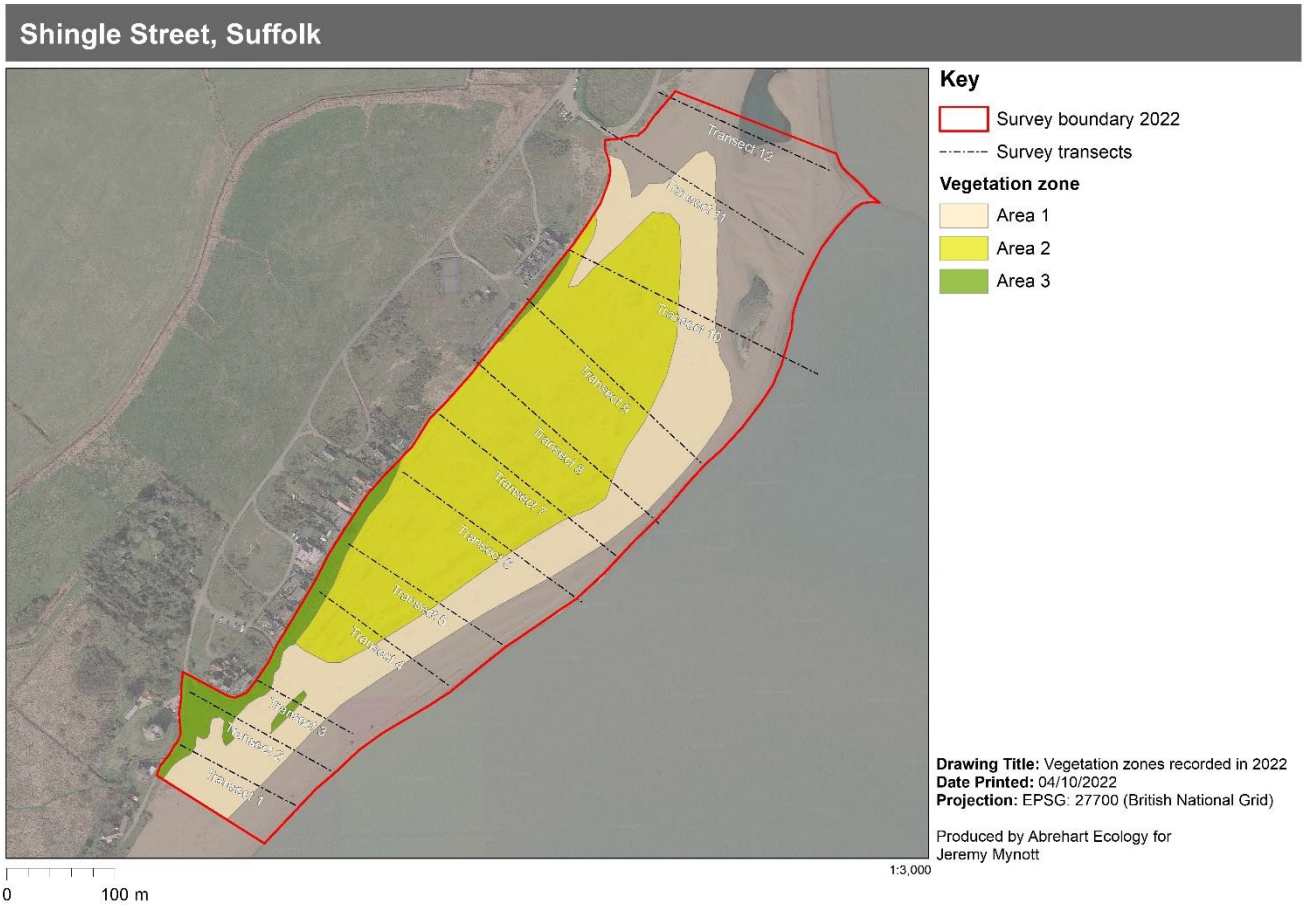

Figure 1- Aerial image showing vegetation zones at Shingle Street in 2022.

Figure 2- Aerial image showing increases in shingle accretion from 2000 – 2022 at Shingle Street.

Since 2000 the area of shingle at Shingle Street has roughly grown year on year (using Google Earth);

- 2000 – 9.966ha
- 2008 – 12.937ha
- 2012 – 12.925ha
- 2020 – 16.291ha
- 2022 – 15.416ha

The results below show the main communities present across the survey area using the National Vegetation Classification (NVC), it is one of the key common standards developed for nature conservation agencies. NVC provides a comprehensive classification and description of the plant communities of Britain, each systematically named and arranged and with standardised descriptions for each. The communities have not changed in their botanical composition over the survey period, all that has changed is the extent of these communities.

Area 1 – Dominated with Sea Kale, Curled Dock, Yellow-horned Poppy with some Sea Pea. NVC SD1 *Rumex crispus – Glaucium flavum* shingle (typical community), *Lathyrus japonicus* (sub-community).

This was the main community (see figure 2.2) across the majority of the seaward side of the survey area. This community was abundant where there has been a considerable deposition of new material since 2000 (Google Earth images). This has resulted in SH9a *Crambe maritima - Rumex crispus littoreus* pioneer community being the most significant foreshore community along much of the coast ridge.

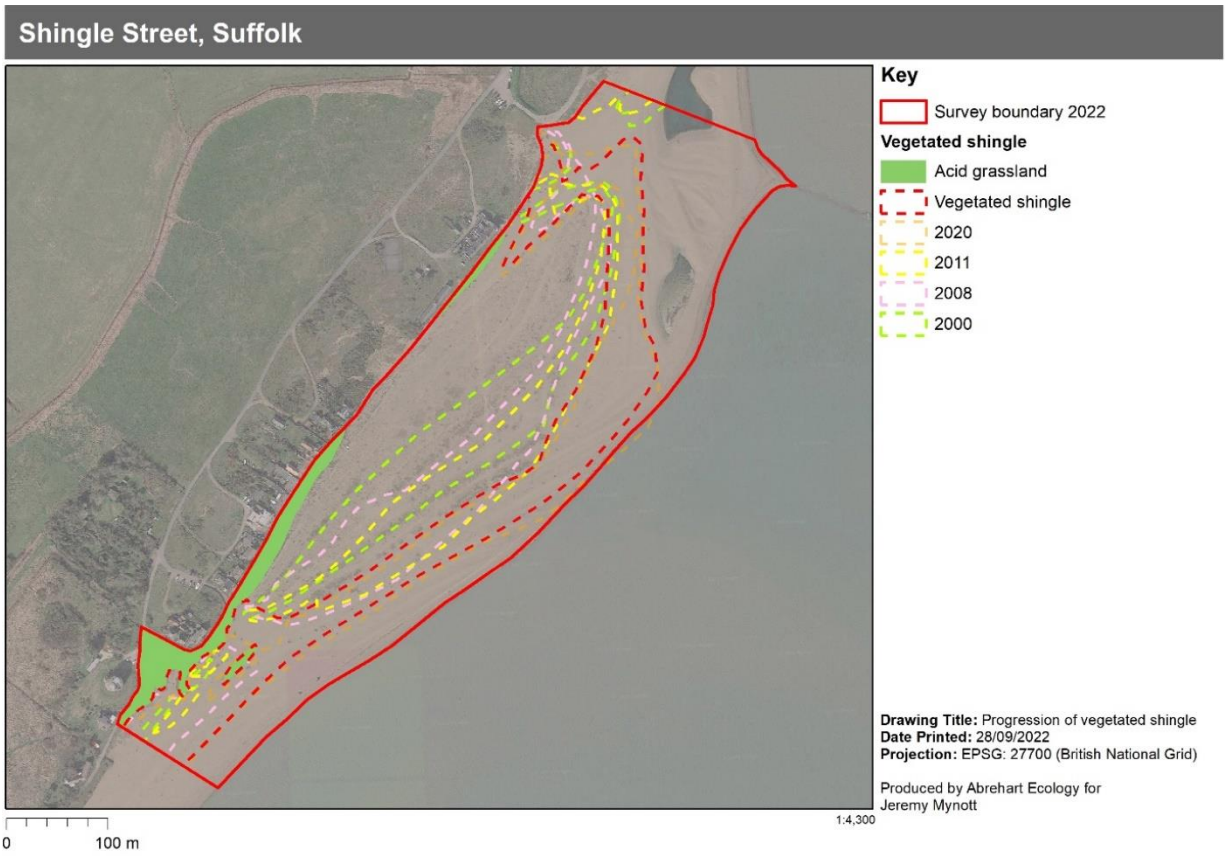

Figure 3- Aerial image showing increases in vegetated shingle accretion from 2000 – 2022 at Shingle Street. (Vegetated shingle areas are in between the two dashed coloured lines for that year)

Area 2 – Dominated with Sea Kale, Curled Dock, Yellow-horned Poppy with some Sea Pea but, with a noticeable amount of False-oat Grass on the tops of the larger ridges, though not within the troughs of the shingle ridges. NVC SD1 *Rumex crispus – Glaucium flavum* shingle (typical community), *Lathyrus Japonicus* (sub-community) with *Arrhenatherum elatius – Silene uniflora* – Communities.

Lichen development across the shingle was limited, in addition there was a distinct lack of Orache species in the shingle in between the car parks.

This community consisted of the majority of the remaining area of fairly exposed shingle inland of the above community in 3.1. Immediately inland, the SH9a *Crambe maritima - Rumex crispus littoreus* pioneer community is replaced by SH11 *Lathyrus japonicus* pioneer community. Within this section of all the transects this community still contains a considerable proportion of bare shingle with some stronger associates with *Glaucium flavum, Rumex crispus, Arrhenatherum elatius,* creeping thistle -*Cirsium arvense,* prickly sow-thistle -*Sonchus asper, B*eaked hawk's-beard - *Crepis vesicaria* and Sea Campion - *Silene uniflora.*

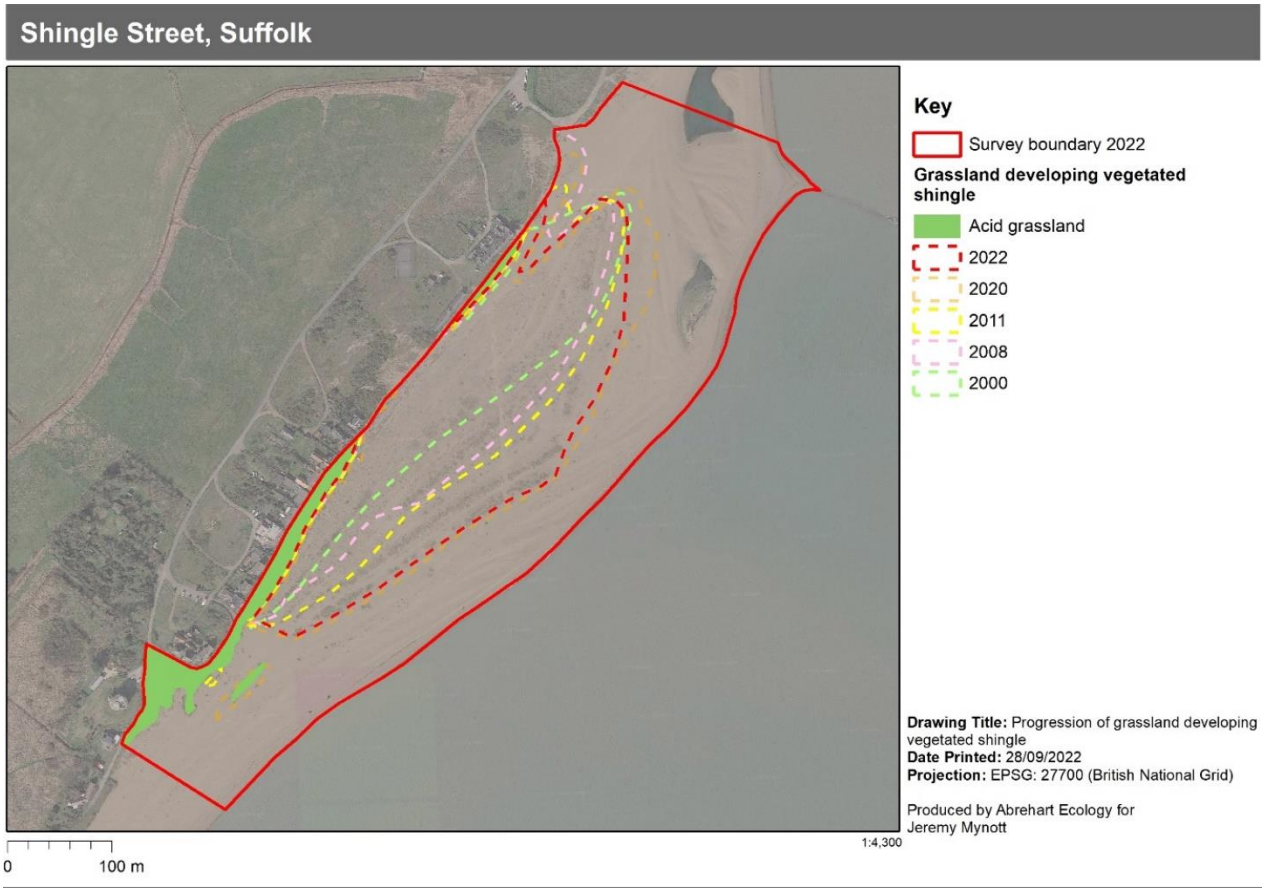

Figure 4- Aerial image showing increases in grassland vegetated shingle accretion from 2000 – 2022 at Shingle Street.

Area 3 – Dominated with red fescue and fine bent grasses with sheep's sorrel common in the grass with many uncommon species of vetch too with yellow vetch *Vicia lutea* found occasionally.
NVC U1 *Festuca rubra, Agrostis capillaris, Rumex acetosella* grasslands (typical community)

Inland of these pioneer communities (see figure 2.2, 3.1 and 3.2 above) the Shingle Street vegetation around the footpath is composed of *Festuca rubra* grasslands. The most maritime of these is the SH41 community (see below for full description) which is located immediately behind the SD1 communities. It may result from older, inland grassland having being re-exposed to marine influences by increased footfall or by erosion in the past. 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 Ribwort Plantain - *Plantago lanceolata,* early hair-grass - *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 area has changed very little across the survey period.

The areas of low plant density (leading away from the car parking areas) have always been so, with continued trampling evident from the Google Earth images from 2000.

Non-native Plant Species
Along the habitat on front of the houses within the hamlet Red Valerian - *Centranthus ruber* occurs in both its red and white forms. It currently is spreading in small stands into the more mature vegetated shingle at a low density at present. Rose Campion - *Lychnis coronarium* was also found in one area outside a property near to the footpath (TM3675242693). These non-native species can very quickly become dominant in areas of shingle reducing the native flora and as such should be monitoured as a feature of the shingle community.

General discussion

Area 1 – Primary habitat closest to the shoreline, dominated with sea kale, curled dock, yellow-horned poppy with some *sea pea. NVC SD1 Rumex crispus – Glaucium flavum shingle (*typical community*), Lathyrus japonicus (*sub-community*).*

Area 1 was the second most dominant vegetation communities found within the survey area (see Figure 2), as in 2012. This community contains a number of species resistant to trampling once a certain size is reached, such as sea kale, sea pea and sea beet, which were abundant within this habitat type. However, a healthy and functioning community of this type requires a larger diversity of species than that present throughout much of this habitat type at Shingle Street. For example, less hardy species such as orache were almost absent from this habitat.

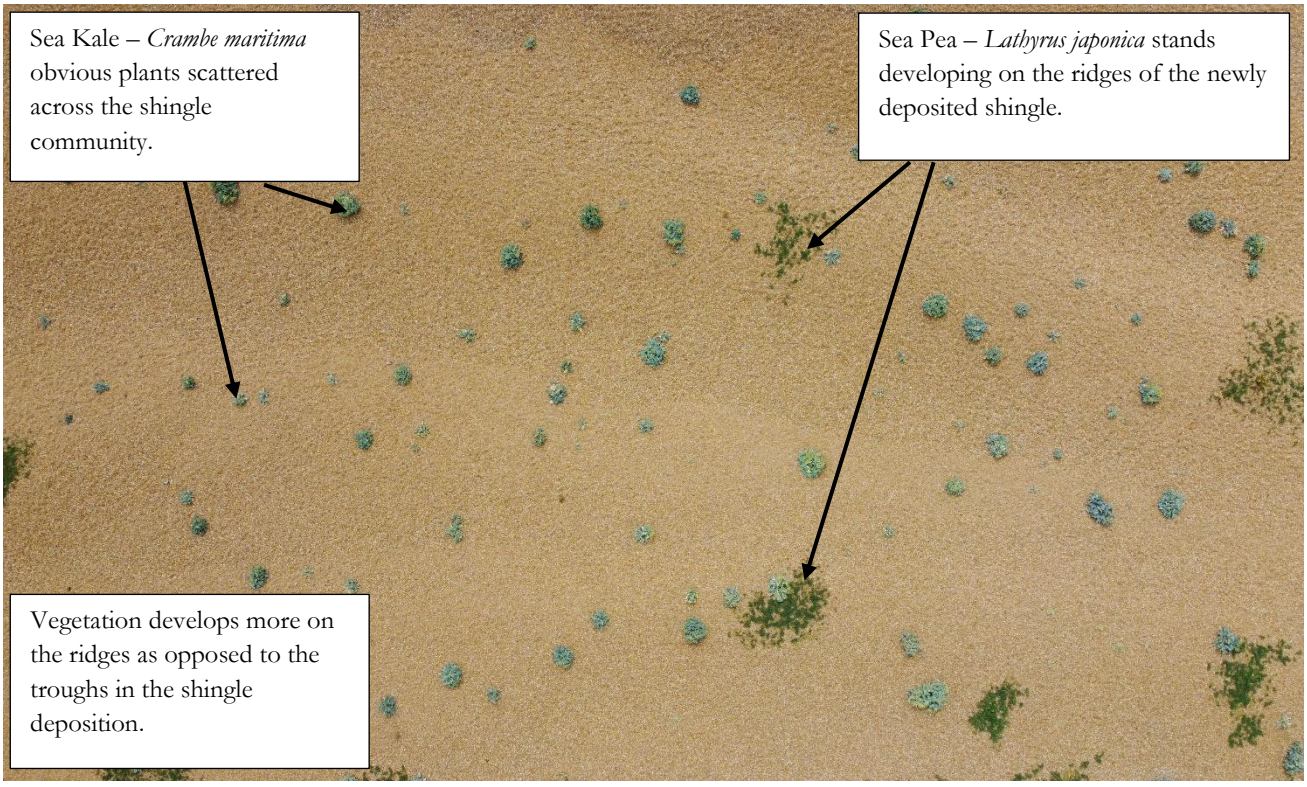

Figure 5- Aerial image showing scattered nature of the developing shingle communities.

It has been evident over the survey period that the shingle deposition occurring here appears to follow a pattern of deposition and then a storm event with some erosion of a shingle feature followed by deposition of shingle on the northern edge of the site. This has allowed two lagoons to develop in the north of the site. One is filled by percolation at high tides and the other larger one is permanently filled.

These transient features may be lost in future storm events.

The sediments across the ridges and furrows have not changed over time, with predominantly larger pebbles on the crests, though this can vary according to the storm type and the material deposited. Where there is a range of shingle deposited the floral communities support a greater range of species. With the ridges holding more diversity than the troughs.

Area 2 – Dominated *with sea kale, curled dock, yellow-horned poppy with some sea pea but*, with a noticeable amount *of False-oat Grass. NVC SD1 Rumex crispus – Glaucium flavum shingle (typical community), Lathyrus Japonicus (sub-community) with Arrhenatherum elatius – Silene uniflora* – Communities.

This area of habitat comprises the largest extent of the survey area in 2022 where in 2012 it was less abundant than the shingle community. The occurrence of grasses within this habitat type has also increased. The

anthropogenic influence on this area is still evident with no areas of shingle being untrodden. This is unsurprising as the area is popular with visitors and over the ten-year period foot passage will have left no stone untrodden. The trampling effect is lower here than at the busy spots leading away from the car parks with the exception of the route following the shell line.

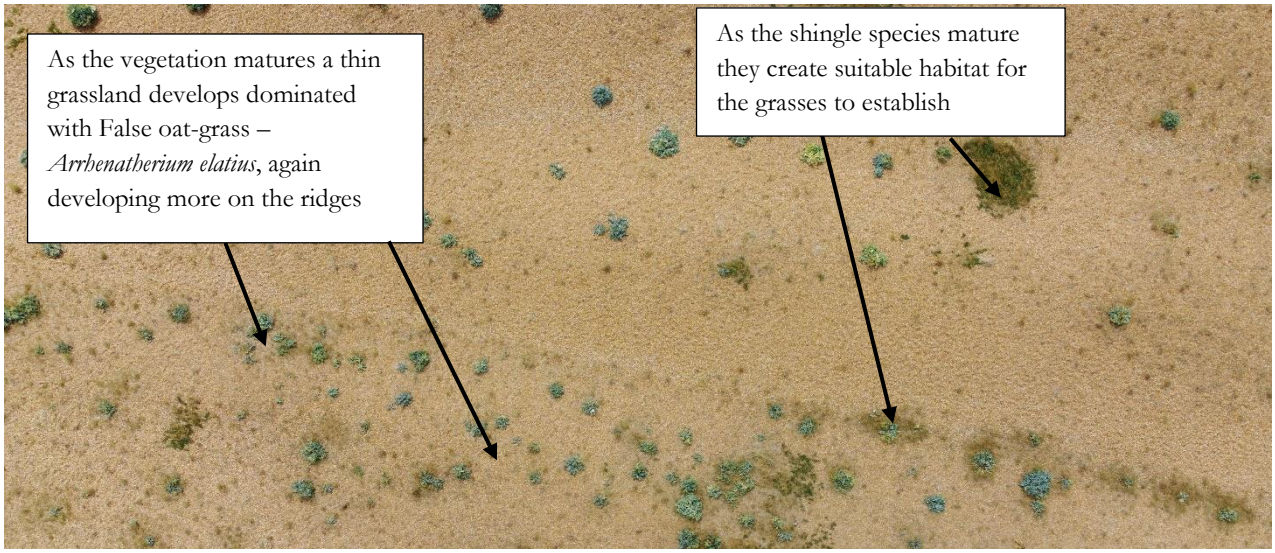

Figure 6- Aerial image showing scattered nature of the developing shingle communities with greater areas supporting grasses especially on the ridges.

Area 3 – Dominated with red fescue and fine bent grasses with sheep's sorrel common in the grass with many uncommon species of vetch too. NVC U1 *Festuca rubra, Agrostis capillaris, Rumex acetosella* grasslands (typical community).

The area of this grassland community was also noted to have increased in extent from 0.35 hectares in 2000 to 0.6 hectares in 2022, the community is slowly spreading out into the grass dominated shingle community. This will take a long time to develop at any speed as it is reliant on more soils within the substrate to develop. Invasive species such as Red Valerian were frequent, and species diversity in this area appeared to be the highest within the site.

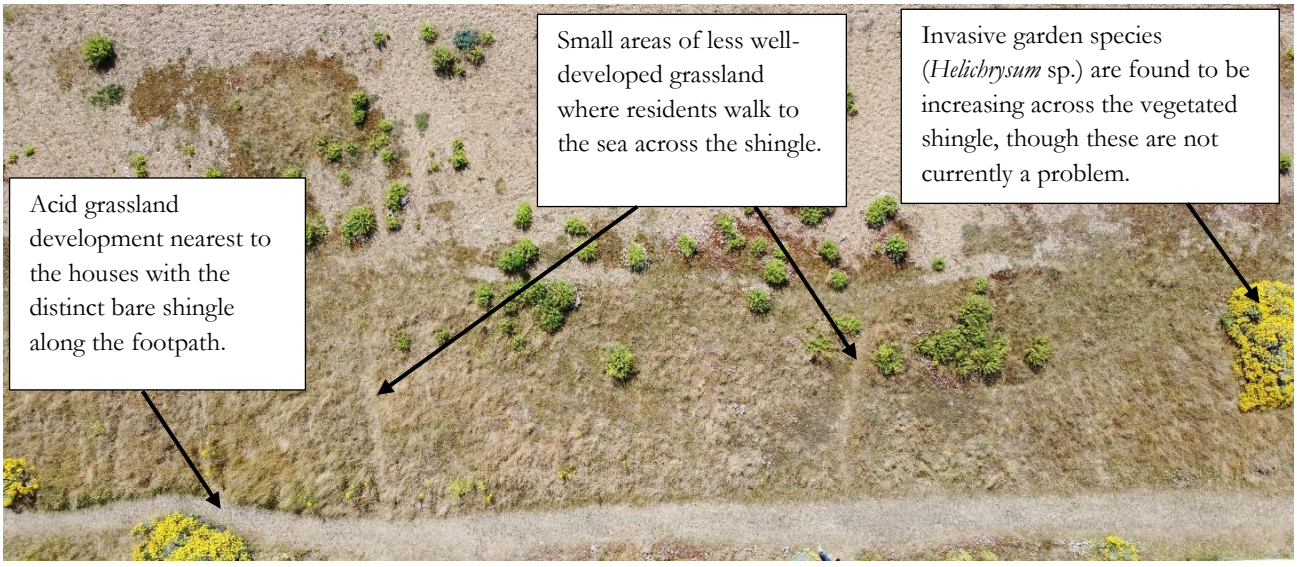

Figure 7- Aerial image showing the narrow strip of acid grassland development close to the houses.

Limitations of the survey

This survey has some limitations. There is in some variability in the detail and accuracy of the data recorded along each transect by the different surveying groups, though this does not affect the overall conclusions of the Survey. The use of a drone to record the transects was very useful to provide a control to the collected data sets.

The interpretation and conclusions which can be drawn from individual transects is therefore limited. Nonetheless, the Survey has yielded a sufficiently good general picture of species presence and absence along the transect routes.

Causes for concern and future threats

Pressures at Shingle Street

Natural pressures

The main natural pressure on the site has not changed for the site, as is the case with the unpredictable nature of the coastal processes of erosion and deposition along the foreshore. Over the survey period a significant change in the size of the shingle has occurred, with a continued annual increase, and the creation of two new lagoons. This is an on-going event at the site as this section of the coast is very dynamic. The main natural pressures on the shingle vegetation still exist, with the main pressure being erosion from the shingle or being buried under new depositions. Shingle species have evolved some adaptations to cope with these issues. Sea Kale (*Crambe maritima*) and Yellow horned-Poppy (*Glaucium flavum*) both have a very long tap root which can grow up to 2 meters. These roots can be driven down through the shingle to allow the plant access to fresh water supplies.

Recently (since 2000) there has been a considerable deposition of material along the length of the site greatly increasing its area, demonstrating the give and take nature of this dynamic habitat there has been an increase of 5.5 hectares of shingle in this period, adding a third to the area of the site.

Human pressures

The effects of human pressures on the site are as damaging as those of the natural processes of the shingle deposition and erosion. With the fact that the natural processes can be more dramatic over a shorter period of time. Shingle Street only has two small car parks, but increased number of visitors has increased parking on the roadside verges leading into the hamlet too. This increase in visitor numbers has meant that the vegetation is not establishing at the same rate as within the rest of the area under survey, the anthropogenic disturbance has prevented vegetation growth and establishment.

Fishermen accessing the shore along the site can leave camping debris and discarded waste from fishing.

Access impacts do appear to be concentrated along the two routes from the car parks to the sea, and along the immediate high tide mark where the majority of people walk along the shore edge. The level of impact along the more mature vegetated shingle was limited to occasional dog walkers and the locals accessing the sea for regular swims. In contrast the lack of litter (and dog mess) in the mature shingle indicates that levels of foot traffic here are still relatively low, as does the relatively well-preserved nature of the crisp shingle ridges. There is a lack of diversity in the shingle flora and lichen establishment is limited, due to the footfall over the shingle.

Again, there was noticeable continued reduction in the vegetation along the sides of shell line as was visible on the ground and from the aerial images from google earth.

Shingle Surveys

Data gathering to carry out continued assessment is important to allow further monitoring of changes over time.

Successional changes to the flora on the site have been developing across the whole survey except in the two areas where there is access from the car parks through to the sea.

Southern car park, in 2000 there was no vegetation growth in the section leading from the car park to the sea. Since then, the vegetation has grown either side of the route taken by the public to the sea and has stayed at

around 1,370 m² since 2008, with the more robust species of Sea Kale still growing across some areas of this zone and in particular the outer edges nearer the sea. On the ridges to the north and south there is near normal development along the ridges with Sea Pea *Lathyrus japonica* and *Arrhenatherium elatius* developing. The troughs still supported a limited flora as is the case with other areas of the site.

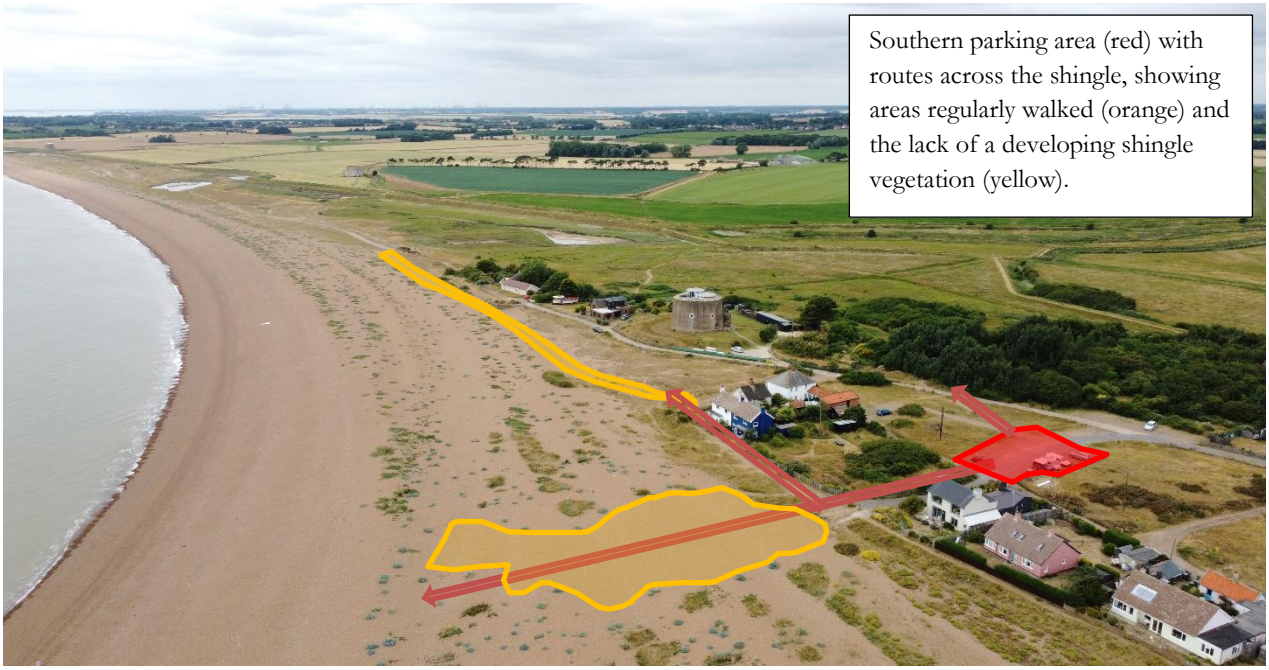

Figure 8- Aerial image showing parking and areas affected by anthropogenic pressures across the shingle.

The third area of influence is the area from the south of the main house leading in front of the Martello tower. This area has had no discernible changes in the flora or area that has been disturbed over the years. In fact, it now appears that the vegetation has developed marginally, and the area of loose shingle and sand has reduced. This may be the effect of more people using the northern car park.

Northern car park, in 2000 there was very limited vegetation in the northern section of the site, with the development of the land here being relatively recent. In the following years there was continued disturbance of the area by foot passage from the car park to the sea. A small area of vegetation developed in front of 'The Beacons' in 2007 but in subsequent years the shingle was eroded and rebuilt across this area ending with the current

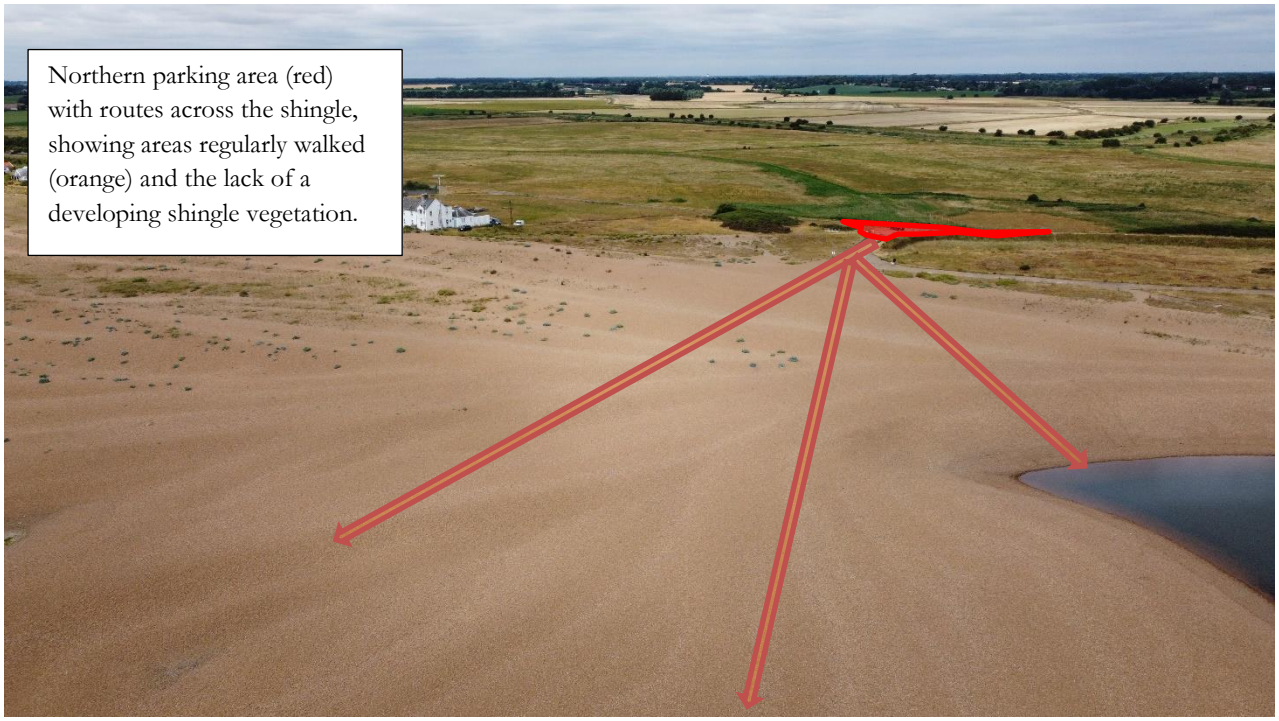

Figure 9- Aerial image showing the lack of vegetation development across areas of shingle from the northern car park.

development of a lagoon 100m long. This lagoon, along with publicity about the area being a secret beach and post lockdown, has been visited more frequently, especially in the summer and at weekends. This all being said the area of current disturbance has not changed over the time period with the same area of larger loose shingle present. There has been some limited development with a small number of Sea Kale plants surviving the footfall to the lagoon and beach. It is apparent that all other species with shorter root systems have been unable to establish in the loose shingle.

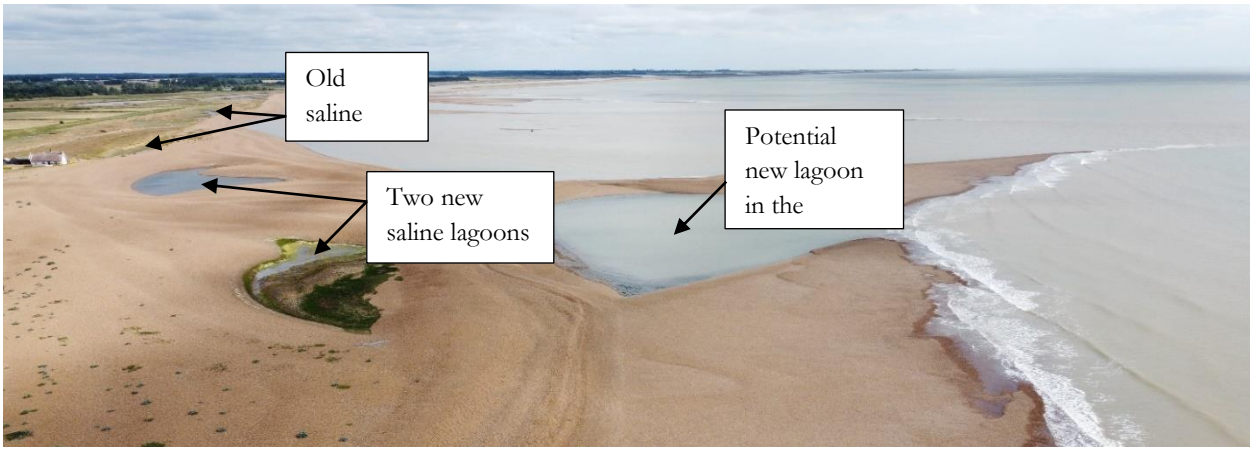

Figure 10- Aerial image showing increases in grassland vegetated shingle accretion from 2000 – 2020 at Shingle Street.

Conclusion

- Continued monitoring of the numbers of people using the car parks.
- Non-native plants should be monitoured to assess their spread across the shingle.
- A repeat survey should be carried out in 2024 to continue to assess the changes on the site to include a drone survey along with the ground-based volunteer survey.

5. References

This report to be cited as:
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6. Acknowledgements

We would like to thank the owners of the Shingle Street SSSI for their help with recording on the site and to especially to Jeremy Mynott for commissioning the teaching and recording of this site.

Vegetated Shingle Survey at Shingle Street, Suffolk, June 2022 for the Shingle Street community.

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