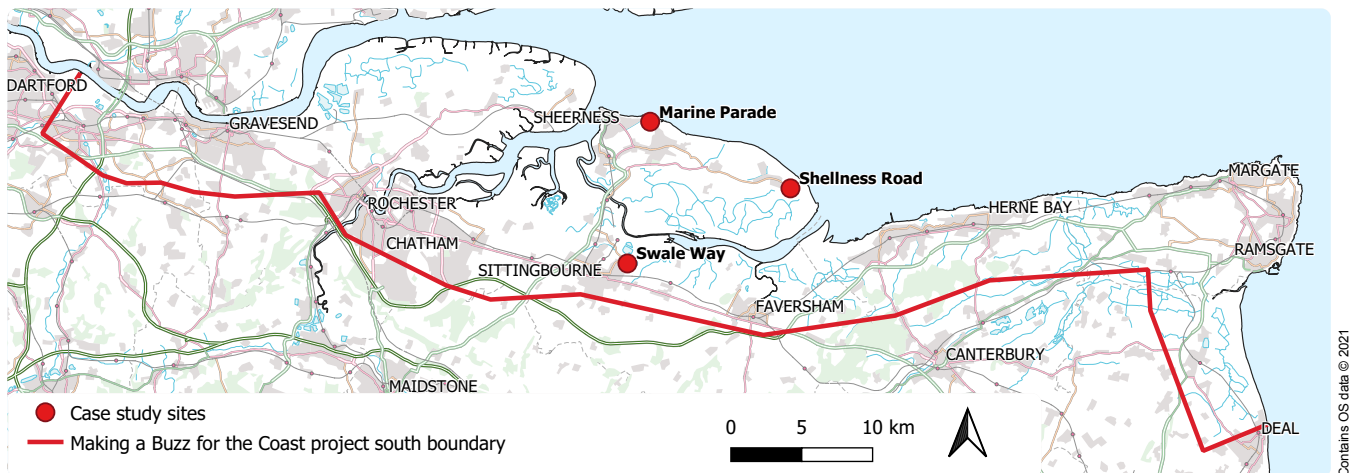


Case Study Bee Roads

Managing roadside nature reserves for bumblebees and other pollinators

Making a Buzz for the Coast

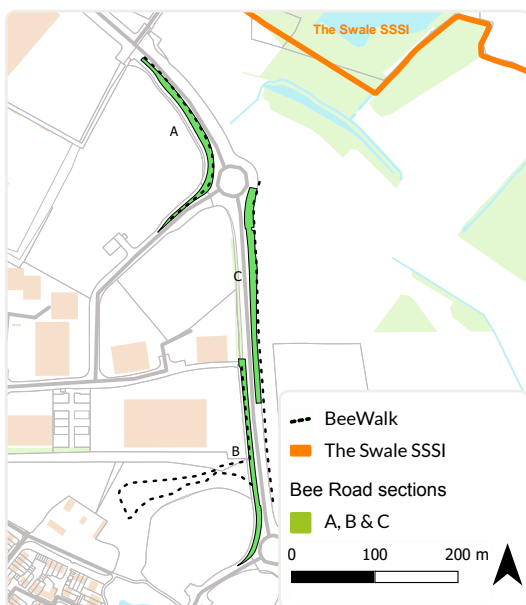
The north Kent coast is recognised nationally for the diversity of bumblebee species it supports with 22 of the 24 UK species, including five of the seven nationally rare and scarce bumblebees. Much of Kent's cultural and economic heritage is intrinsically linked to bees, with a landscape of orchards, arable flowering crops and grassland. Kent's bumblebee diversity can be linked to its varied habitats and the milder southern climate.



The Making a Buzz for the Coast project was set up to re-address the decline and help to conserve wild bees in north Kent. Making a Buzz for the Coast is working to safeguard Kent's wild bees, focusing on coastal areas from Dartford to Deal. The aims of this ambitious project, are 1) to create and restore flower-rich habitat 2) recruit, train and support volunteers to take action for bumblebees and other wild bees 3) raise awareness about the value of these important insects and their conservation needs.

Making a Buzz for the Coast is a multi-partner project led by Bumblebee Conservation Trust (BBCT) and with key partners including Kent Wildlife Trust, Kent County Council, Natural England, Royal Society for the Protection of Birds, Swale Borough Council, Thames Water and Thanet District Council, as well as numerous landowners and supporters. Its primary funder is the National Lottery Heritage Fund.

Kent Wildlife Trust delivers the 'Bee Roads' element of this project, with 13 new Roadside Nature Reserves set up for bees and other pollinators across the Swale. Working in partnership with Kent County Council and Swale Borough Council, these Bee Roads act as corridors, providing better connectivity for insects and allowing wildflowers to thrive.



Site 1. Swale Way Bee Road

Site introduction

Swale Way, north of Sittingbourne town centre, is a relatively new road, with verges generally on embankments sloping away from the road. These areas were sown with a bee-friendly seed mix when the road was built due to the Shrill carder bee (*Bombus sylvarum*) and other rare bumblebees known to be present in the area. Kent Highways own these sites, which now consist of largely neutral grassland with some small areas of scrub such as brambles.

The three sections of Swale Way that make up the Bee Roads cover a total of 0.51ha. Section C was included in the project from 2019. Recent surveys have found that the Shrill carder bee and Brown-banded carder bee (*B. humilis*) are present on the site, as well as a range of other pollinator species.



Grassland management, Swale Way.



Swale Way.



Bee orchid.

Habitat management

The Bee Roads are cut once a year between October and March, ensuring minimal disturbance to bees and other pollinators. A third of the sites are left uncut each year, providing undisturbed habitat for overwintering invertebrates and small mammals. Areas are cut in approximately 20m long sections, with 10m sections left uncut. These works are carried out by brushcutting, which also removes any scrub or saplings that are starting to encroach on the grassland. Larger areas of scrub, such as bramble on Section A, are left intact to provide a greater structural diversity.

The cuttings are collected by raking and then removed from site by Swale Borough Council. Removal of these arisings is important for maintaining and enhancing the diversity of plants on site. This process helps to reduce the nutrient levels and encourage a more varied sward instead of an abundance of more vigorous grasses and other plants that might otherwise dominate.

Goat's rue is present on Section A, which is an invasive non-native species. While it is attractive to bees, it can dominate areas, suppressing the growth of other plant species, so controlling it is important. Following discussions with colleagues in Essex, we trialed removing the Goat's rue by digging the plants out and then seeding the area with Yellow rattle, which can help to suppress other plant species as it is a hemi-parasite. Repeating this process will be key to reducing the spread of the Goat's rue and ultimately trying to remove it completely from the site.

Survey and monitoring overview

Baseline monitoring was carried out in 2017, prior to the start of any habitat management work. In 2018, a bumblebee transect was set up using the BeeWalk methodology, which forms part of Bumblebee Conservation Trust's national monitoring scheme. Bumblebees are counted monthly along this fixed route between March and October each year.

Plant monitoring was carried out on Sections A and B in 2018 and 2019 with help from volunteers. Forty 1m² quadrats were randomly selected across these areas and all plant species were recorded within each. The abundance of each species was estimated and other measurements were taken such as vegetation height and percentage of bare ground.

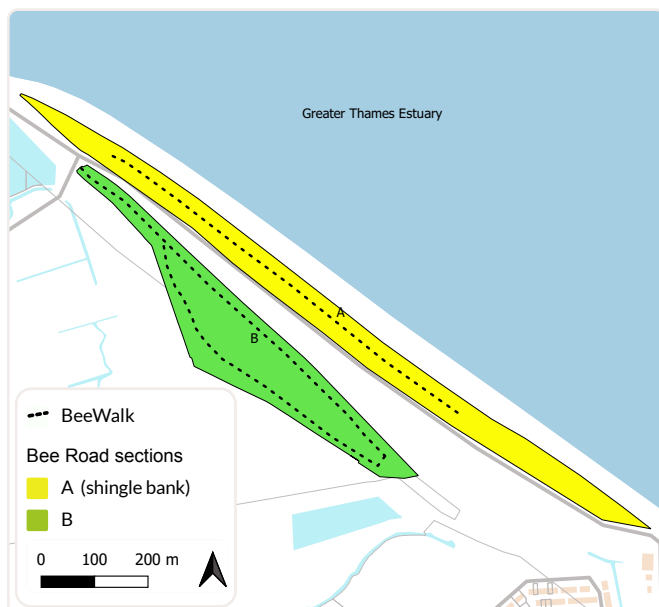
Results

Over the three years of plant monitoring (Table 1), the number of species recorded more than doubled, including the average number of species recorded per quadrat. The plant species diversity of the site increased slightly year on year, indicating that the management works had a beneficial impact on the plant community. In 2019, surveys by the volunteer warden revealed the presence of Bee orchids, which were not previously known from the site. Over 100 spikes were counted in 2019 in an area of Section A that had been managed in the previous winter.

Table 1 – A summary of the plant monitoring from Swale Way Sections A & B. This does not include grasses, sedges and rushes, which were recorded in 2018 and 2019, but not in 2017.

	2017	2018	2019
Total number of species recorded	28	49	61
Average number of plant species per quadrat	4.4	7.4	11.8
Shannon's Diversity Index	3.0	3.3	3.5

The average number of bumblebees recorded on the bumblebee transect per month increased from eight in 2018 to 25 in 2020, perhaps indicating that a higher diversity of plants resulted in more opportunities for bumblebees to forage. In all three years of the BeeWalk, both Brown-banded carder bee and Shril carder bee were recorded. Common vetch and Red clover appeared to be important plants for queens of Brown-banded carder bee.



Site 2. Marine Parade Bee Road

Site introduction

The Marine Parade Bee Road is a shingle bank, acting as a sea defence, with a popular car park on top. This manmade structure was constructed in the late 20th century and has been unmanaged until it became a Bee Road in late 2017. Swale Borough Council own this site, which is adjacent to Barton's Point Coastal Park. There is also an adjacent Bee Road (Section B as shown in the site map), which was taken on as part of the project in 2018.

Section A, which encompasses the shingle bank, covers 1.98ha and is approximately 20m wide. Sloping towards the south-west, this Bee Road is characterised by drought tolerant plants such as Biting stonecrop and Fern grass. The proliferation of flowers such as Lucerne and Red clover attracts a range of bumblebee species, including the rare Red-shanked carder bee (*Bombus ruderarius*) and the Shrill carder bee (*B. sylvarum*).



Marine Parade.



Survey work on shingle bank.



Red-shanked carder bee.

Habitat management

The vegetation on the shingle bank has developed naturally over the decades. Despite no historic habitat management works, the site is generally sparsely vegetated. This is particularly true of the north-western section as there has not been much build up of organic matter and therefore the nutrient levels remain low. The south-eastern section is more well vegetated, dominated by Alexanders, Lucerne and Sea couch-grass.

In winter 2017/18 and 2018/19 the Bee Road was cut in 20m sections, with 10m sections being left uncut. This was carried out by the volunteer team, with cuttings raked and then removed from site by Swale Borough Council. In the winter of 2019/20 there was no need to carry out any further cutting on the north-western section of the site as there was limited vegetation to cut, but the south-eastern section was cut as per the previous years to reduce the vigour of the dominant vegetation, while leaving a third uncut to provide important overwintering habitat for invertebrates and other wildlife.

Alexanders is present on the Bee Road, with a greater quantity on the south-eastern section. It is an important source of pollen and nectar early on in the season for various insects, however, it can be invasive so it is important to monitor it in case it spreads too far across the site. There are also a couple of plants of the non-native Buddleia on the site. Similarly, these are useful plants for pollinators but can be invasive. Control has not been necessary thus far as they have showed no sign of spreading but these are plants to keep an eye on in future years.

Survey and monitoring overview

Plant monitoring was carried out in 2018 and 2019 with help from volunteers. Twenty 1m² quadrats were randomly selected across this area and all plant species were recorded within each. The abundance of each species was estimated and other measurements were taken such as vegetation height and percentage of bare ground.



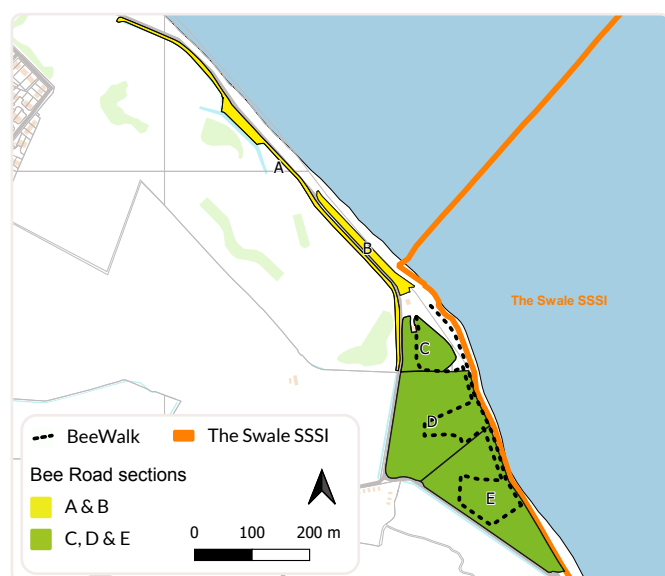
Marine Parade.

Results

Table 2 – A summary of the plant monitoring from Marine Parade Section A.

	2018	2019
Total number of species recorded	37	42
Average number of plant species per quadrat	13.1	11.5
Shannon's Diversity Index	3.3	3.4

With the number of plant species recorded increasing from 2018 to 2019 and the diversity showing a slight upward trend, it appears that management work could be having a positive impact on the plant species assemblage. However, two years of data is a limited quantity so we will look to repeat surveys in future years to better assess the impact of the habitat management work on the plant community.



Site 3. Shellness Road Bee Road

Site introduction

The Shellness Road Bee Road is a large triangular area of rough grassland with small areas of bramble scrub and various ponds and ditches. This is a flat area bounded by a vegetated sea wall and a ditch running alongside the road. In the early 20th century the area formed part of a Royal Air Force airfield. Swale Borough Council own this site, which is part of Leysdown Coastal Park. There are also two adjacent Bee Roads (Sections A & B as shown in the site map).

The three sections of Shellness Road that make up the triangle cover a total of 5.32ha and were included in the project from summer 2018. Section C is less well vegetated than Sections D and E because it was used in the autumn of 2018 as a compound for storing materials and machinery for sea wall repairs. Sections D and E had not been managed in over 40 years so had become quite

rank, dominated by Common couch-grass, False oat-grass and other coarse grass species. However rare plants such as Sea clover and Slender hare's-ear remain in small areas.

Habitat management

The Bee Road is quite a large area, stretching the definition of a Roadside Nature Reserve slightly. While the majority of the 13 Bee Road sites are managed by a volunteer team, the size of the site means that most of the habitat works are carried out by contractors.

Following the sea wall related works in Section C in 2018, the contractors agreed to create a 10m long bee bank as mitigation. This south-facing, crescent-shaped bee bank was constructed using a 360° digger and consisted of rocks at the base, followed by upturned turf and capped by soil then sand. The materials were compacted down to create a more stable structure. More sand was added in the winters of 2018/19 and 2019/20 by the volunteer team as there was not initially enough to provide a complete covering of at least a few centimetres in depth across the



Shellness Road.



Contractor cutting.



Slender hare's ear.



Photo credit: Rosie Bleet

Bee bank construction.

top, south-facing slope and flat ground in front. Some five tonnes of sand were added in total. The aim of this bee bank is to provide sunny, warm areas of bare ground for solitary bees and wasps to nest, which often prefer to burrow into softer, sandy soil.

The aim for the winter of 2019/20 was to cut two-thirds of Sections D and E and remove the cuttings, once earlier on and once just before the spring. However, due to the dense nature of the vegetation, the extremely wet winter period and Covid-19, only one cut was possible and the cuttings were not removed. This was carried out by contractors with a heavy-duty cutter mounted on a tractor, with care taken to avoid the complicated network of ditches and large chunks of concrete on site. In October 2020 and March 2021, contractors carried out a cut with collection and removal of arisings on the same two-thirds of the site as was previously cut.

Survey and monitoring overview

Plant monitoring was carried out in 2019 with help from volunteers. Unfortunately, due to Covid-19 this was unable to be repeated in 2020, but the plan is that it will be repeated in future years and 2019 will serve as a baseline before any management works were carried out. Forty 1m² quadrats were randomly selected across this area and all plant species were recorded within each. The abundance of each species was estimated and other measurements were taken such as vegetation height and percentage of bare ground.

Results

A total of 54 plant species were recording during the monitoring work in 2019. Common and Sea couch-grass, Creeping bent, False oat-grass and Red fescue were the dominant species and as a result there were few foraging opportunities for bumblebees. However, the presence of species such as Common fleabane, Common restharrow, Meadow vetchling and Narrow-leaved Bird's-foot trefoil provides an indication of the plant community that once flourished and could return with continued grassland management. The presence of Slender hare's-ear along the marginal areas of the site was particularly promising, given its listing on the Kent Rare Plant Register.

While removing some vegetation from the bee bank in January 2020, volunteers found a queen Shrill carder bee. This is a very significant finding as there are no documented records of overwintering sites for this species in the UK. It is particularly interesting that it was found on the south-facing side of the bee bank because most bumblebee overwintering sites are observed or suggested to be on north-facing slopes due to these retaining a more constant temperature throughout the winter months.

Looking ahead

The Bee Roads will be incorporated into Kent Wildlife Trust's 'Roadside Nature Reserve' project, with some management works continuing to maintain the sites and their biodiversity. The Bee Road volunteer wardens will continue to be the 'eyes and ears' on the ground and carry out the important BeeWalk transects and some plant monitoring will continue.

