

Gilkicker Weevil Monitoring Report

Browdown SSSI, Gilkicker Heritage Area, and Fort Gilkicker



Becky Banbury Morgan
August 2018

Acknowledgements

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Executive Summary

Hampshire and Isle of Wight Wildlife Trust undertook surveys to establish the presence of Gilkicker Weevils at Browdown SSSI, Gilkicker Heritage Area, and Fort Gilkicker, on the South Hampshire Coast. These sites are all coastal sites, with areas of coastal vegetated shingle beach habitat, the preferred habitat of the Gilkicker Weevil. Within the UK, the species is confined to these three sites.

Three surveys were undertaken during June and July 2018, during which habitat extent was recorded and areas of Common Bird's-foot-trefoil, the host plant of the Gilkicker Weevil, were suction sampled.

Nine Gilkicker Weevils were recorded across the three surveys. Habitat availability for the weevil was found to be limited in extent.

Recommendations for future management of the sites for the Gilkicker Weevil focus on protecting existing habitat and, where possible, increasing habitat extent.

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Image 1: Gilkicker Weevil, *Pachytychius haematocephalus*

1. INTRODUCTION

1.1. Site Description

Three sites were surveyed: Browndown SSSI (SZ585988), the Gilkicker Heritage Area (SZ604975), and Fort Gilkicker (SZ606975). The sites are located to the south-west of the town of Gosport on the south Hampshire coast (Map 1). Both sites are situated on coastal vegetated shingle beach, with coastal scrub habitat.

Browndown SSSI is a 64ha site currently in the ownership of the MoD. It is used for MoD training purposes, alongside being managed for conservation.

The Gilkicker Heritage Area is a 45ha stretch of coastline primarily owned by Gosport Borough Council. It is designated as a Countryside Heritage site by Hampshire County Council, to recognise the historic, landscape, and natural value of the area. Within the Gilkicker Heritage Area is the privately-owned Fort Gilkicker, which is currently undergoing development into residential accommodation.

1.2. Factor Monitored (e.g. Scheme of Works or Management Technique)

The aim of the surveys was to determine ongoing presence of the Gilkicker Weevil at each of the sites.

The sites were last surveyed in 2008 by David Rumble and Richard Hedley for the Hampshire and Isle of Wight Wildlife Trust, and had been previously surveyed in 2000.

The surveys aimed to investigate whether the species is still present at the sites and, if so, the current species distribution. There was particular interest in the status of the species at Fort Gilkicker, given the recent developments on and around the Fort.

1.3. Gilkicker Weevil

1.3.1. Ecology

The Gilkicker Weevil, *Pachytychius haematocephalus*, is a small weevil in the family *Curculionidae*. It is around 3-4mm in length, with a distinctive reddish rostrum (Arkive 2018). The species is distributed across a large area of Europe, from southern France across into central Europe and northwards into the Channel Islands and the UK. It is most abundant towards the southern edge of its range (Harvey et al. 2003). In the UK, its presence is currently confirmed only in Hampshire; this is likely to be the northern extreme of the species range. There are individual historical records for Dorset (1947) and Wiltshire (1864) (NBN Atlas 2018). Within Hampshire, the species is confined to the area of coastal shingle between Gilkicker Point – which gave the species its name - and Browndown.

The preferred habitat of the Gilkicker weevil is exposed partially-vegetated coastal grassland and shingle. It is thought that the species requires a hot, potentially even frost-free, microclimate, indicated by its presence only on exposed, maritime sites within the UK, where the climate may be more favourable (Harvey et al. 2003). For this reason, it prefers areas of very short vegetation.

The host plant of the Gilkicker Weevil is Common Birds'-foot-trefoil, *Lotus corniculatus*. The larvae feed within the pods of the plant on the unripe seeds, and the adults overwinter by digging themselves into the roots of the plant (Harvey et al. 2003). Because of this specificity in host plant usage, the Gilkicker Weevil requires areas of coastal shingle and grassland where Common Bird's-foot-trefoil is present, and where the vegetation structure is early successional but reasonably stable, in order to ensure a continuous cover of the plant.

Previous records from within the UK indicate that adults may be active between February and June, however surveys carried out at the site in September have failed to find any active adults, suggesting that the species may go to ground in early autumn (Harvey et al. 2003). The highest levels of activity appear to be in June.

It is assumed that the adults are limited in their dispersal ability (Harvey et al. 2003). There is very little information about other ecological requirements of the species.

1.3.2. ***Conservation Status***

There is very little information about the status of the Gilkicker Weevil: the species has not yet been assessed for the IUCN Red List, but is thought to be relatively common across the southern extent of its range. Within the UK, the species was previously included as a UK BAP Species, but was removed from the BAP List in 2007. However, the species remains listed as a Hampshire BAP Species, and in 2003 a Local Species Action Plan for the Gilkicker Weevil was produced by Hampshire Biodiversity Partnership.

The restriction of the species to only two sites in Hampshire makes the population very vulnerable to local extinction, whether through natural demographic change or stochastic events, such as development, unsympathetic management, trampling, and storm damage.

1.3.3. ***Historic Information for Site***

Prior to the production of the Gilkicker Weevil Species Action Plan (2003), several surveys were carried out to determine presence of the species at both sites. In 2000, hand searching identified the presence of a single weevil approximately 250m west of Fort Gilkicker, while portable suction sampling along the stretch of coast between Browndown SSSI and Gilkicker point identified the species as occurring within the area.

A further survey was carried out in 2008 by the Hampshire and Isle of Wight Wildlife Trust, though the results of this survey were not formally recorded. Browndown SSSI, Gilkicker Heritage Area, and Fort Gilkicker were all surveyed, and low densities of the species were found spread across both sites, with lower densities found at Fort Gilkicker.

During the 2000 survey period, additional sites along the West Hampshire coast with suitable habitat were visited, but no individuals were found at any of these sites. There is no evidence that the species is present at any other sites in Hampshire, or elsewhere in the UK.

1.4. **Aim of Study**

The study aimed to survey the sites where the Gilkicker Weevil had been previously recorded, in order to establish whether the species is still present, its distribution within the sites, and the potential impact that the development of Fort Gilkicker might have.

Additionally, the study aimed to set up a program to monitor the distribution of Common Bird's-foot-trefoil at each of the sites.

2. MONITORING PLAN AND METHODOLOGY

Three surveys were undertaken, on 26/06/2018; 12/07/2018; and 31/07/2018 respectively. Locations at Browndown SSSI and on publicly-accessible land at Gilkicker Heritage Area were surveyed on all three occasions, while the privately-owned land at Fort Gilkicker was surveyed only once, on 31/07/2018. The first survey was conducted by Becky Banbury Morgan, Sarah Boswell, Chris Lycett and Dave Rumble. Dave Rumble had conducted previous surveys for the Gilkicker Weevil on these sites, and provided expertise on the survey methodology and selection of survey locations. The second and third surveys were carried out by Becky Banbury Morgan and Mariko Whyte. Surveys were undertaken with permission from Natural England, the Ministry of Defence, and Gosport Borough Council. Fort Gilkicker is now under private ownership, and the area is not accessible to the public. Permission was granted to survey the site on 31/07/2018.

In addition to sampling to determine presence of Gilkicker Weevils, a rough estimate of habitat extent was calculated. Concerns were raised by surveyors that the extent of Common Bird's-foot-trefoil had decreased since previous surveys, particularly at Gilkicker Heritage Area, and so current extent was recorded, to provide a baseline estimate for future surveys and monitoring work.

2.1. Selection of Survey Locations

A total of six transects were planned across Browndown SSSI and Gilkicker Heritage Area: a total of three transects at each site. These transects aimed to extend the area surveyed in 2008, in order to encompass a larger area of each site and determine whether the Gilkicker Weevil is present across the whole site. Initial plans were that patches of Common Bird's-foot-trefoil would be sampled randomly where they intersected with the transect. However, the planned transects had to be significantly modified following site visits. Since the Gilkicker Weevil is dependent on the presence of Common Bird's-foot-trefoil as its host plant, it is only worthwhile sampling areas of vegetation with Common Bird's-foot-trefoil present. Assessment of a wide area of both sites indicated that Common Bird's-foot-trefoil was present only on 3 of the 6 transects planned: 2 transects at Browndown SSSI, and 1 transect at Fort Gilkicker. It was not present elsewhere on either of the sites.

Common Bird's-foot-trefoil cover was particularly patchy at Gilkicker Heritage Area, where extensive searching located only 9 clumps of the plant. In order to maximise the number of samples, all clumps were sampled, despite not being located along a linear transect (see Map 5).

At Browndown SSSI, Common Bird's-foot-trefoil cover was slightly higher, being particularly concentrated within one area of roughly 50x50m. One transect was conducted through the centre of this area, with random sampling of clumps of vegetation along the transect. Another transect was conducted slightly to the north of the area, where Common Bird's-foot-trefoil cover was patchier, and so, as at Gilkicker Heritage Area, all clumps of the plant within the broader area of the transect were located and sampled. On the third survey, no patches of Common Bird's-foot-trefoil were found along this transect, and so the transect was not used (see Map 2).

Prior to visiting, no information was available about the habitat suitability at Fort Gilkicker, although anecdotal information indicated that in 2008 the slopes of the fort had been surveyed. Upon arrival, the site was assessed, and all five clumps of Common Bird's-foot-trefoil found were sampled. As at the other sites, these did not follow a set transect (see Map 5).

2.2. Suction Sampling

All samples were taken using the suction sampling method. A suction sampler appears like a modified leaf-blower, modified to collect invertebrates by securing a fine mesh net or piece of fabric inside the collecting tube (Drake et al. 2007). Suction sampling was chosen as the sample method because of its effectiveness in sampling invertebrates from short-cropped vegetation (Dennis et al. 2005), and in cases where invertebrates may be hard to find by hand-searching, for example because of the density of vegetation or the location of the invertebrate at the base of the vegetation structure (Ausden and Drake 2009), both of which are issues to consider in the case of the Gilkicker Weevil. The technique is also effective on sparsely vegetated ground, such as coastal shingle (Ausden and Drake 2009).

To carry out sampling, a 50x50cm quadrat was placed over each clump of Common Birds'-foot-trefoil selected for sampling. Suction sampling was carried out within this quadrat for a period of 1 minute, ensuring that all areas within the quadrat were equally sampled. The contents of the bag were then emptied into a tray, and searched for a minimum of five minutes to identify any Gilkicker Weevils present in the sample. Following the search, the contents of the sample were returned to the area of vegetation that they came from.

2.3. Habitat Extent

A GPS logger was used to record the locations of all clumps of Common Bird's-foot-trefoil at Browdown SSSI, Gilkicker Heritage Area, and Fort Gilkicker. This information was mapped, and used to provide a visual estimate of habitat extent (see Maps 4 and 7). Because of the variation in density of Common Bird's-foot-trefoil across the sites, an estimate of area of habitat cover was not generated.

2.4. Survey Limitations

Although the survey was planned so as to be random and replicable, the scarcity of Common Bird's-foot-trefoil at both sites meant that sampling was primarily targeted, not random, and at Gilkicker Heritage Area and Fort Gilkicker all plants present were sampled. This was necessary in order to ensure a sufficient number of samples was taken, but means that results from future surveys may not be easily comparable with this one.

The limited survey extent means that it is not possible to generate an estimate of population size, and it will be challenging to draw any firm conclusions on population change in the future. Because of the small sample size, it is difficult to generate a measure of population density; however if habitat extent, and therefore sample size, increased, the survey method should be suitable to generate an estimate of population density in the future. The survey offers a baseline with which the results of future surveys may be compared; however these results are most useful simply to prove presence of the species.

Although suction sampling is much more effective than other methods of sampling, such as hand-searching and sweep-netting, it is not 100% effective in collecting all invertebrates present, particularly if they are able to attach to the vegetation. It is possible therefore, that not all Gilkicker Weevils present were sampled. However, sampling collected a wide range of other weevil species in high abundance, and so it seems likely that this is a reasonably effective method for sampling weevils, and results reflect the actual population size of the Gilkicker Weevil.

The surveys took place over a period of 5 weeks during the summer. This is a relatively short survey period, and means that survey results may be disproportionately influenced by the environmental conditions during this time. All three surveys took place during a period of extreme drought. The impacts of this may mean that the results of the survey may not be fully representative of the actual population size.

3. RESULTS AND ANALYSIS

3.1. Results

3.1.1. *Habitat Extent*

Searches indicated that Common Bird's-foot-trefoil, the host plant of the Gilkicker Weevil, has a highly localised distribution within each of the sites. Although searches for the plant were carried out over a wide area of each site, only small patches of Bird's-foot-trefoil were found. At Browdown SSSI, the host plant is restricted to an area of approximately 50x50m, while at Gilkicker Heritage Area, only 9 clumps of the plant were found across the whole site. Across both sites, the areas of Common Bird's-foot-trefoil are less than 15cm high and located on exposed vegetated shingle, making them likely to be suitable habitat for the Gilkicker Weevil.

At Fort Gilkicker, two patches of Common Bird's-foot-trefoil were found on the slopes of the fort. Vegetation on the slopes of the fort was on average over 50cm high, and so it is unlikely that this would be suitable habitat for the Gilkicker Weevil. In addition to the patches on the slope, three patches of Common Bird's-foot-trefoil were found on the vegetated shingle at the base of the fort. This appeared to be much more favourable habitat for the weevil.

While the searches were not fully comprehensive, and some individual plants may have been missed, these results suggest that the population of the Gilkicker Weevil is present only in a tiny area of habitat.

3.1.2. *Presence of Gilkicker Weevils*

Seven Gilkicker Weevils were recorded on the first survey visit; none were recorded on the second survey visit; and two were recorded on the third survey visit (see Table 1; Maps 3 and 6).

Of the seven recorded on the first visit, 5 were recorded from 12 samples at Browndown SSSI, and 2 were recorded from 9 samples at Gilkicker Heritage Area. On the final visit, both weevils were found in the same patch of Common Bird's-foot-trefoil at Browndown SSSI. No Gilkicker Weevils were recorded from the single survey at Fort Gilkicker.

Gilkicker Weevil Records			
Site	Date	Number of Weevils	Grid Reference
Browndown SSSI	26.06.18	1	SZ 58572 98808
		1	SZ 58501 98832
		2	SZ 58493 98835
		1	SZ 58540 98836
Gilkicker Heritage Area	26.06.18	1	SZ 60522 97537
		1	SZ 60532 97529
Browndown SSSI	31.07.18	2	SZ 58556 98809

Table 1: Gilkicker Weevil Records

4. DISCUSSION AND RECOMMENDATIONS

4.1. Presence of Gilkicker Weevil

The results of the surveys indicate that the Gilkicker Weevil is still present at both Browndown SSSI and within the Gilkicker Heritage Area. The fact that no weevils were recorded at Fort Gilkicker on the single survey undertaken there cannot be taken as proof of their absence, as the survey was highly limited in extent and was not repeated. As the results of previous surveys were not formally recorded, it is not possible to draw any conclusions about demographic trends of the Gilkicker Weevil population.

Although the weevils were recorded, they were present only at very low densities. This is consistent with the results of previous surveys, which also found low numbers of individuals (Harvey et al. 2003). It appears that the species may naturally occur at low densities; however there is probably an additional influence from habitat availability. 7 out of 9 of the individuals recorded were found at Browndown SSSI, where Common Bird's-foot-trefoil is most abundant and present in relatively continuous cover across an area of approximately 50x50m. Despite the small size, the quality of this area of habitat appears to have had a positive impact on Gilkicker Weevil abundance.

In contrast, anecdotal evidence suggests that abundance of Common Bird's-foot-trefoil has declined at Gilkicker Heritage Area. Patches of Common Bird's-foot-trefoil are small (often less than 30cm diameter), and isolated. The particularly low levels of habitat availability at this site may explain why only two individuals were recorded at the site across the three surveys.

Despite the Gilkicker Weevil being previously recorded on the slopes of Fort Gilkicker (Harvey et al. 2003), the habitat does not currently appear to be suitable. Vegetation growth and scrub encroachment has meant that Common Bird's-foot-trefoil is only present in two isolated patches and created an unsuitable microclimate for the Gilkicker weevil.

Although seven individuals were recorded on the first survey, none were recorded on the second survey, and only two on the third survey. One factor that may explain this decrease in sampling success was a period of prolonged heat and drought experienced in June and July. Records suggest that between 1st June and 28th July only 8.9mm of rain fell, much lower than the historic average of around 40mm per month. There was high rainfall on 29th July, however this was followed by more hot weather and would have had little impact on vegetation before the final survey. As a result of the drought, the habitat became visibly desiccated, and many patches of Common Bird's-foot-trefoil dried out completely, become difficult to identify. This was most evident on the final survey, where there were no visible areas of Common Bird's-foot-trefoil remaining on transect 2 at Browndown SSSI, resulting in this transect being abandoned.

There is very little information available to suggest how drought might affect the behaviour and abundance of the Gilkicker Weevil. Past studies have theorised that the weevil prefers high temperatures, and so it may have benefited from the heatwave. However, the desiccation of its host plant is likely to have a negative impact. With no fresh vegetation aboveground to feed on, it is possible that individuals would have moved down to the base of the plant, potentially even burrowing down to the roots, as is done when overwintering. This would have made collecting the species with a suction sampler challenging, and could partially explain the low number of individuals recorded.

4.2. Management Recommendations

The population of Gilkicker Weevil at these sites is probably limited by habitat availability. Therefore, any attempts to increase the cover of Common Bird's-foot-trefoil at the sites would have a positive impact on the species. It is recommended that efforts focus particularly on Gilkicker Heritage Area and Fort Gilkicker, where there are no areas of continuous host plant cover. Management at Gilkicker Heritage Area to create an area of dense Common Bird's-foot-trefoil cover similar to that at Browndown SSSI would be highly beneficial, and would hopefully increase population size. This could be achieved through fencing off important areas of habitat, either on a permanent or rotating basis, to prevent trampling and allowing Common Bird's-foot-trefoil to naturally expand its range.

In addition to creating new areas of habitat, it is important to protect existing habitat. Harvey et al. (2003) identify that the species is affected by coastal development, disturbance from trampling or vehicles (at Browndown SSSI) and coastal erosion. Future developments and management plans should take this into account to minimise disturbance wherever possible. In addition, providing information to members of the public about how they can minimise their impact on the site could be effective at reducing trampling.

Finally, the species is vulnerable to habitat loss through scrub encroachment (Harvey et al. 2003). This is particularly evident on the slopes of Fort Gilkicker, where vegetation height is over 50cm in many places, and areas of scrub and bramble are present. Management on the slope of the Fort to remove scrub and reduce vegetation height would encourage growth of Common Bird's-foot-trefoil and provide further suitable habitat. Given that there are historical records for the species presence on the slope, habitat improvement here could be particularly worthwhile.

4.3. Recommended Amendments to Methodology

Future surveys should be spread over the full period of optimum adult activity, with the first survey conducted at the end of May/beginning of June, and continuing through to mid-August. This would increase the chance of locating the weevils, and also buffer against the impacts of extreme weather events on the Gilkicker Weevil.

4.4. Future Work

Given the status of the Gilkicker Weevil within the UK, and its restriction to this small area of coastline, continued monitoring of the population would be worthwhile.

This survey has established a baseline measure for the extent of Common Bird's-foot-trefoil at each of the sites, and its distribution at each of the sites should continue to be monitored. This will provide essential information on habitat availability for the Gilkicker Weevil, and assist in monitoring the health of the Gilkicker Weevil population.

Previous work has suggested identifying further sites along the south coast for potential species introduction. This is an area that could be explored further in the future. The species is clearly at the northern edge of its range in the UK, and so the range of suitable sites may be heavily limited. However, as the climate warms, more sites may become suitable for the species, and introductions could offer the population in the UK much greater stability.

5. CONCLUSION

In total, 9 Gilkicker Weevils were recorded across three survey visits to Browdown SSSI and Gilkicker Heritage Area during June and July, indicating that the species is still present at these sites. The species was recorded at very low densities, most likely as a result of limited habitat availability and sub-optimal environmental conditions during the survey period.

No Gilkicker Weevils were recorded on the single survey visit to Fort Gilkicker; however, given that this survey was undertaken at the end of a long period of drought, and no repeat surveys were conducted, this cannot be taken as evidence for the absence of the species from the Fort. Future surveys will be required to establish presence or absence of a population at the Fort.

Future management for the Gilkicker Weevil should focus on protecting existing habitat and, where possible, increasing habitat extent.

6. REFERENCES

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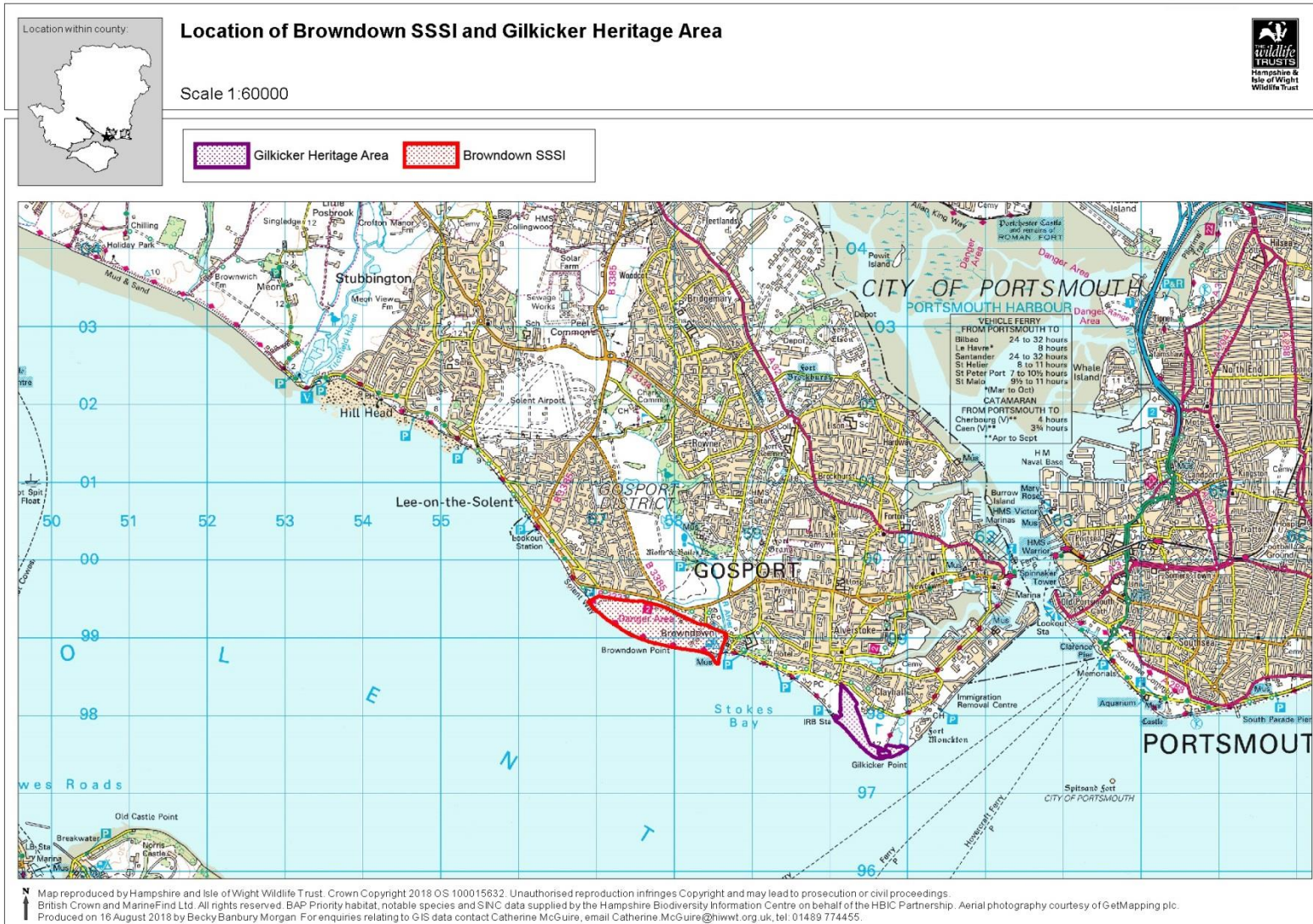
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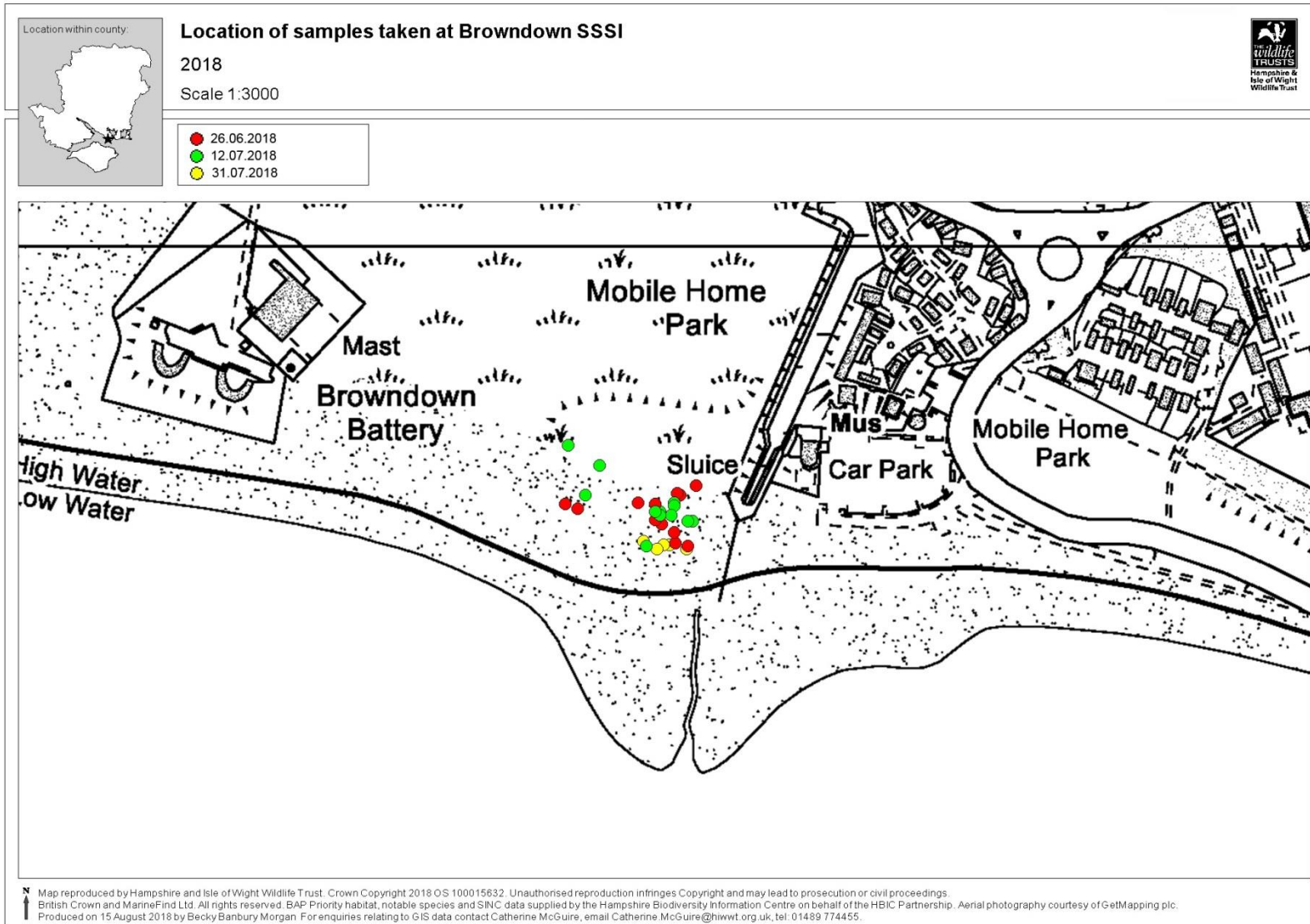
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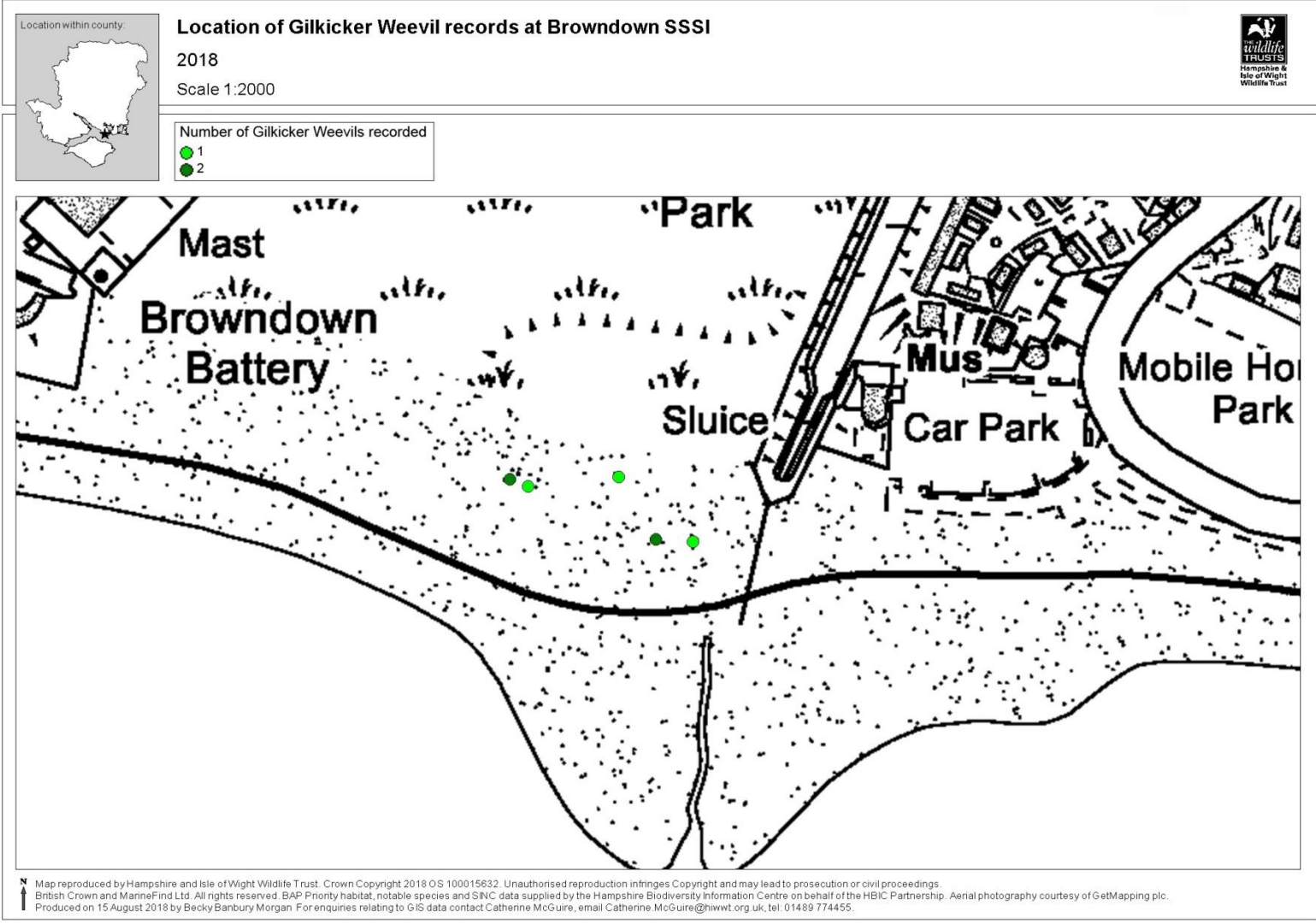
MAPS



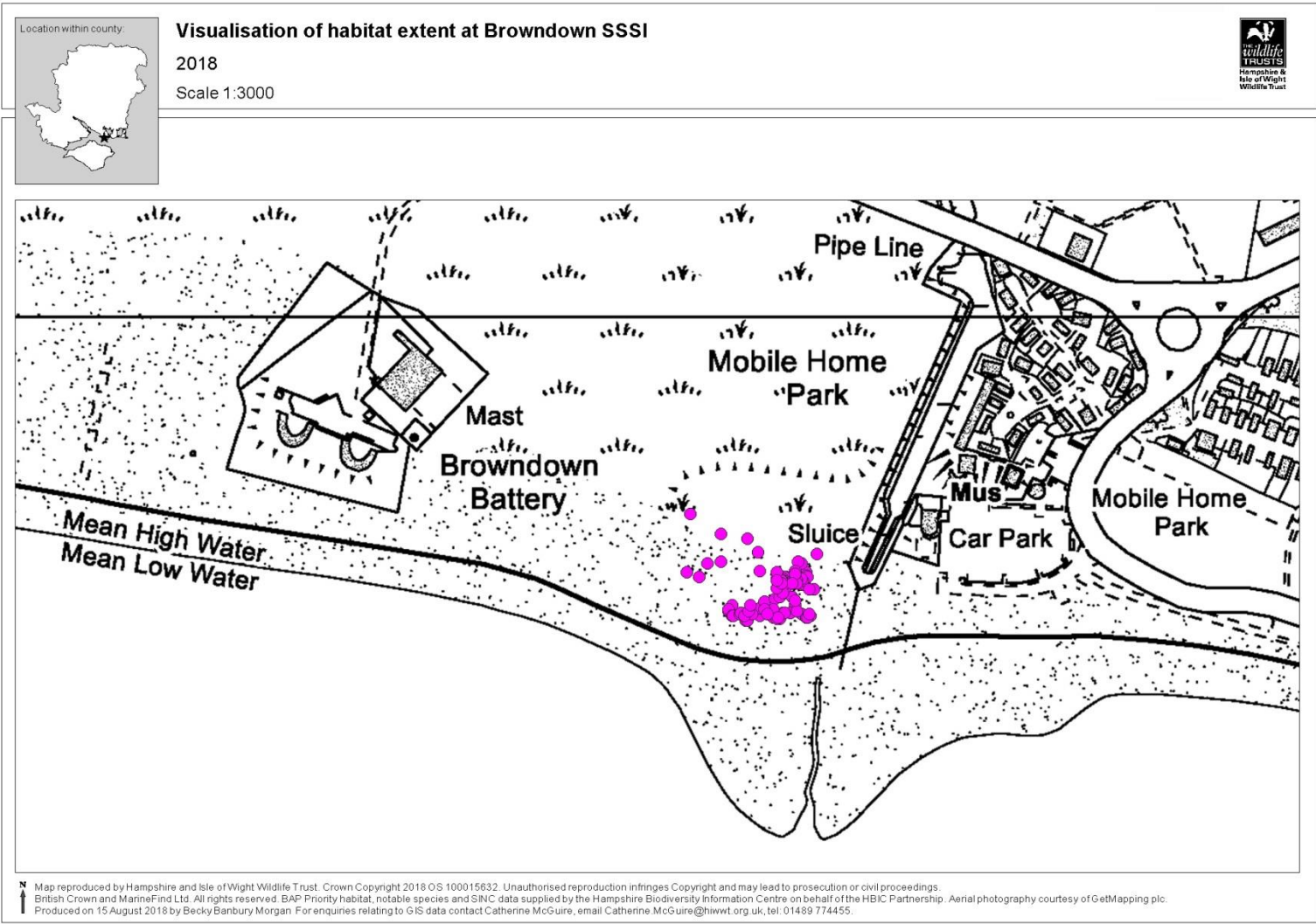
Map 1: Location of Browdown SSSI and Gilkicker Heritage Area on the South Hampshire Coast.



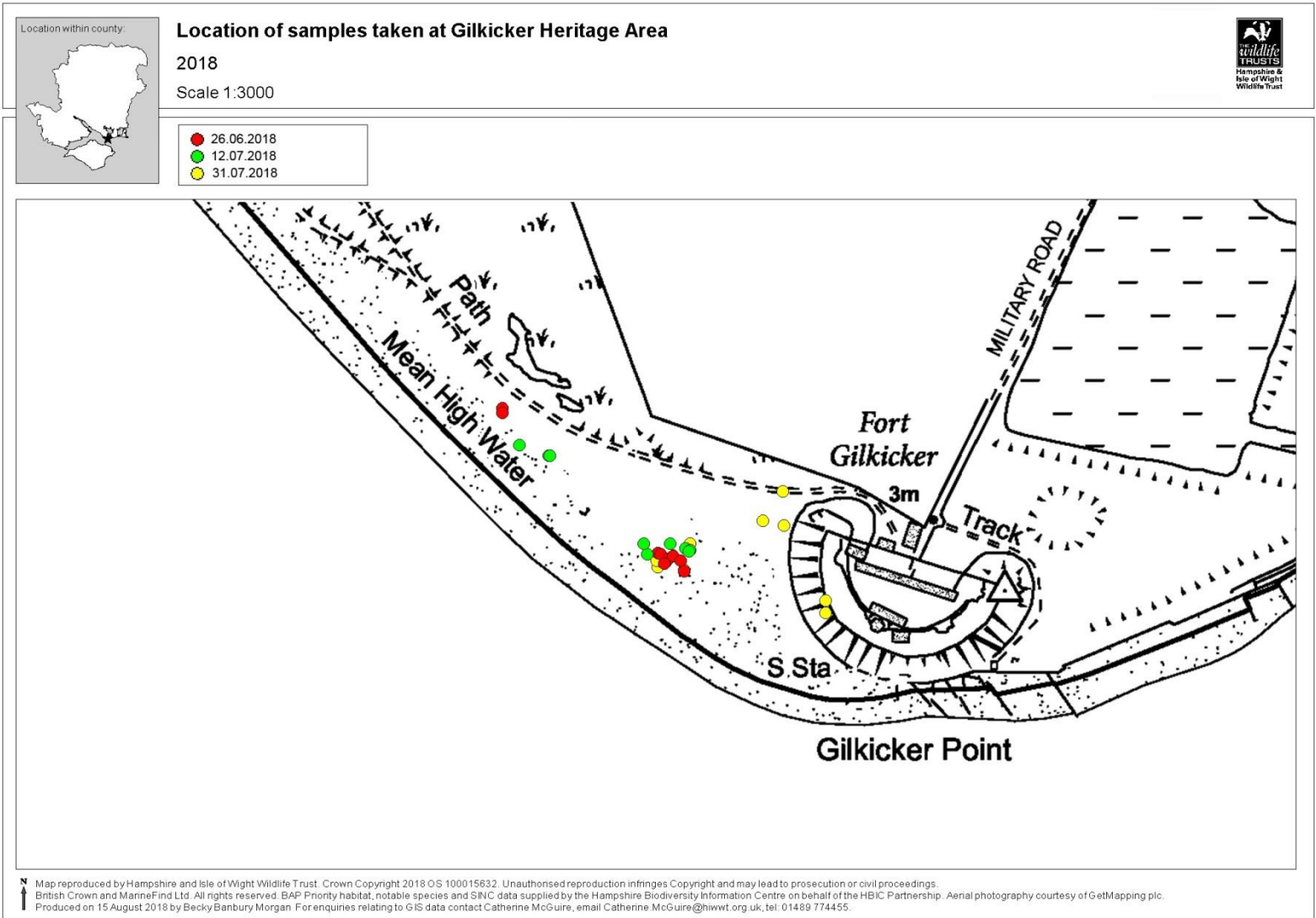
Map 2: Locations of samples taken at Browdown SSSI. Legend: Red = Survey 1; Green = Survey 2; Yellow = Survey 3



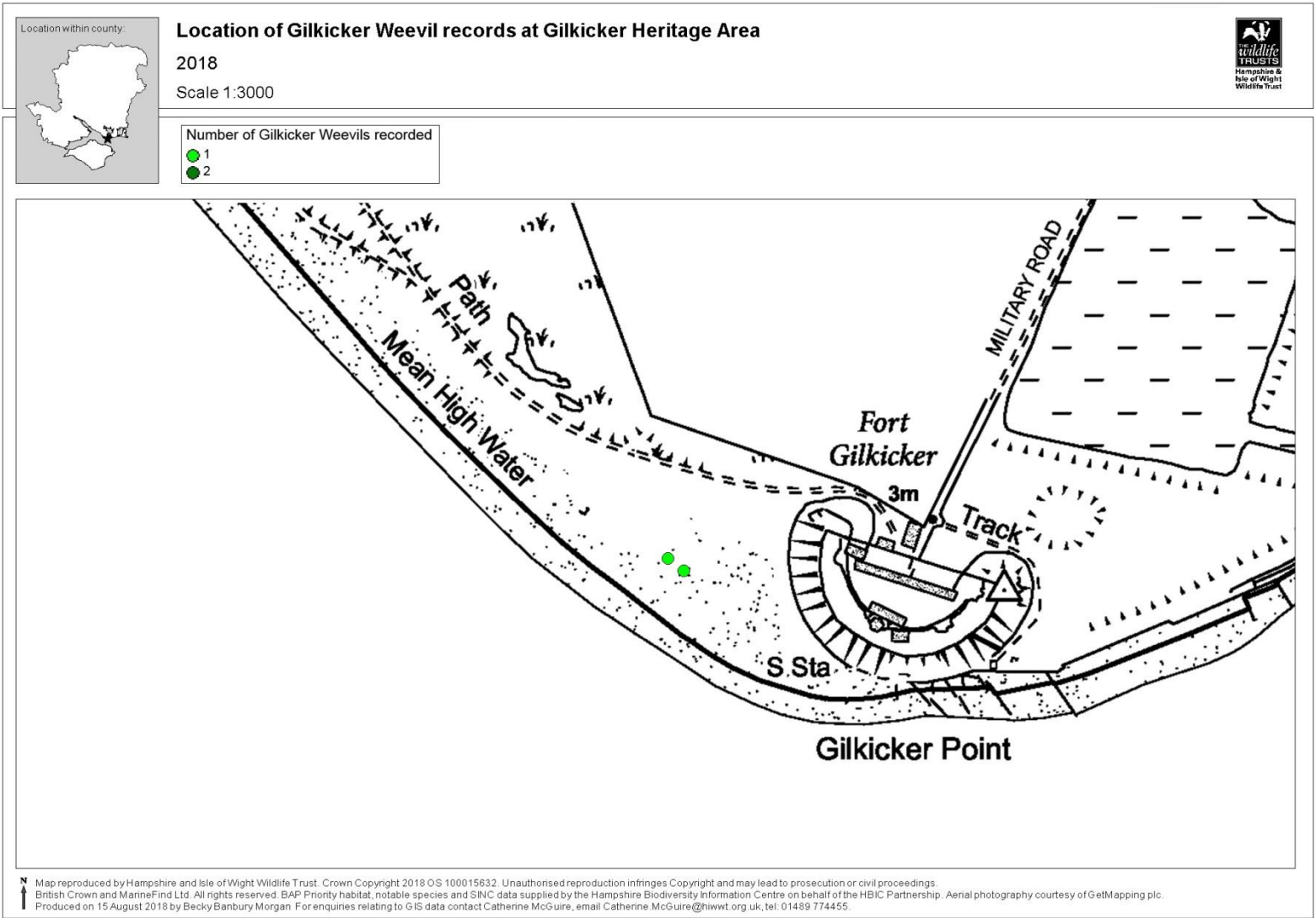
Map 3: Location of Gilkicker Weevils recorded at Browdown SSSI. Legend: Light green = 1 record; dark green = 2 records.



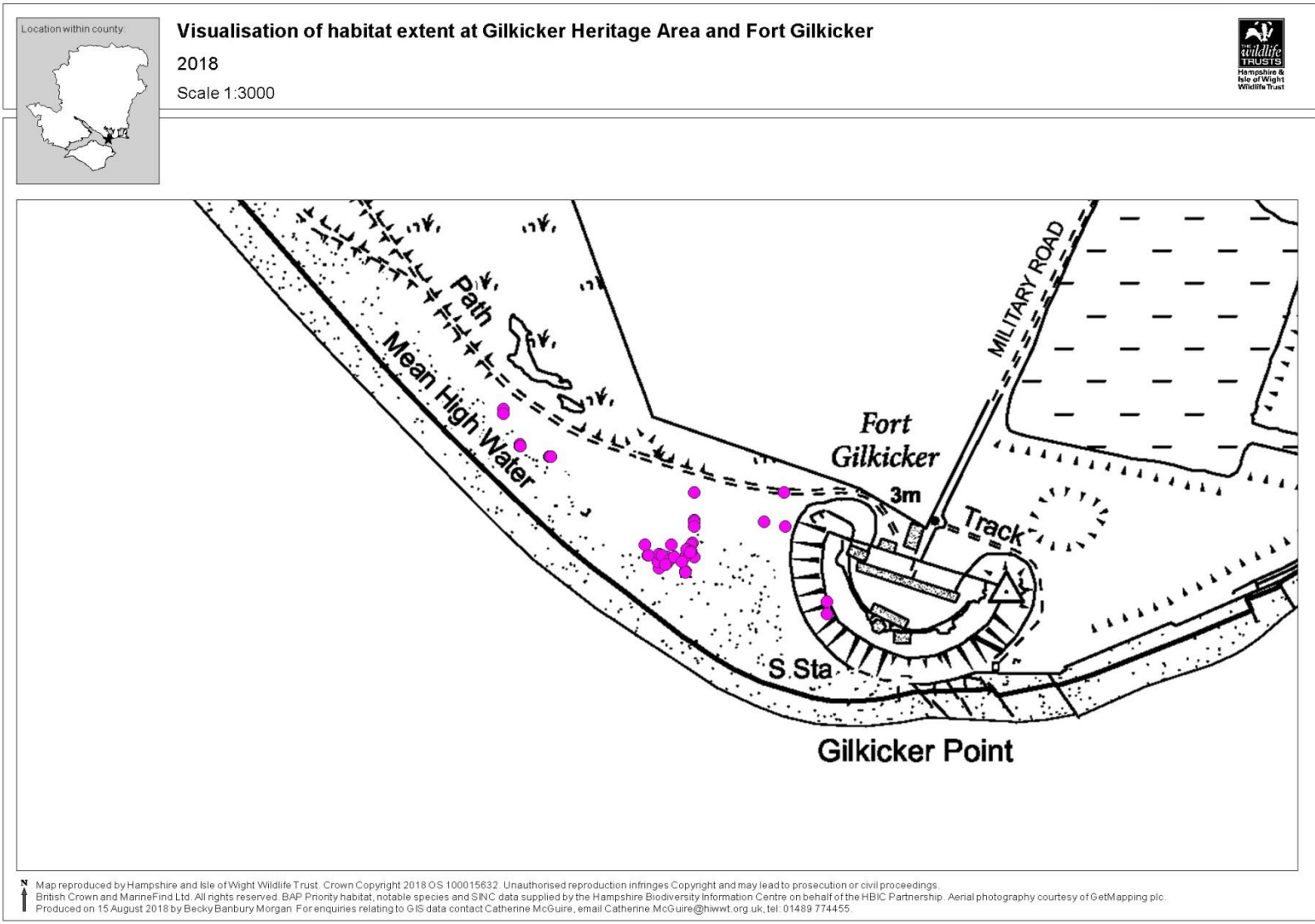
Map 4: Visualisation of habitat extent at Browdown SSSI. Each pink circle marks a patch of Common Bird's-foot-trefoil.



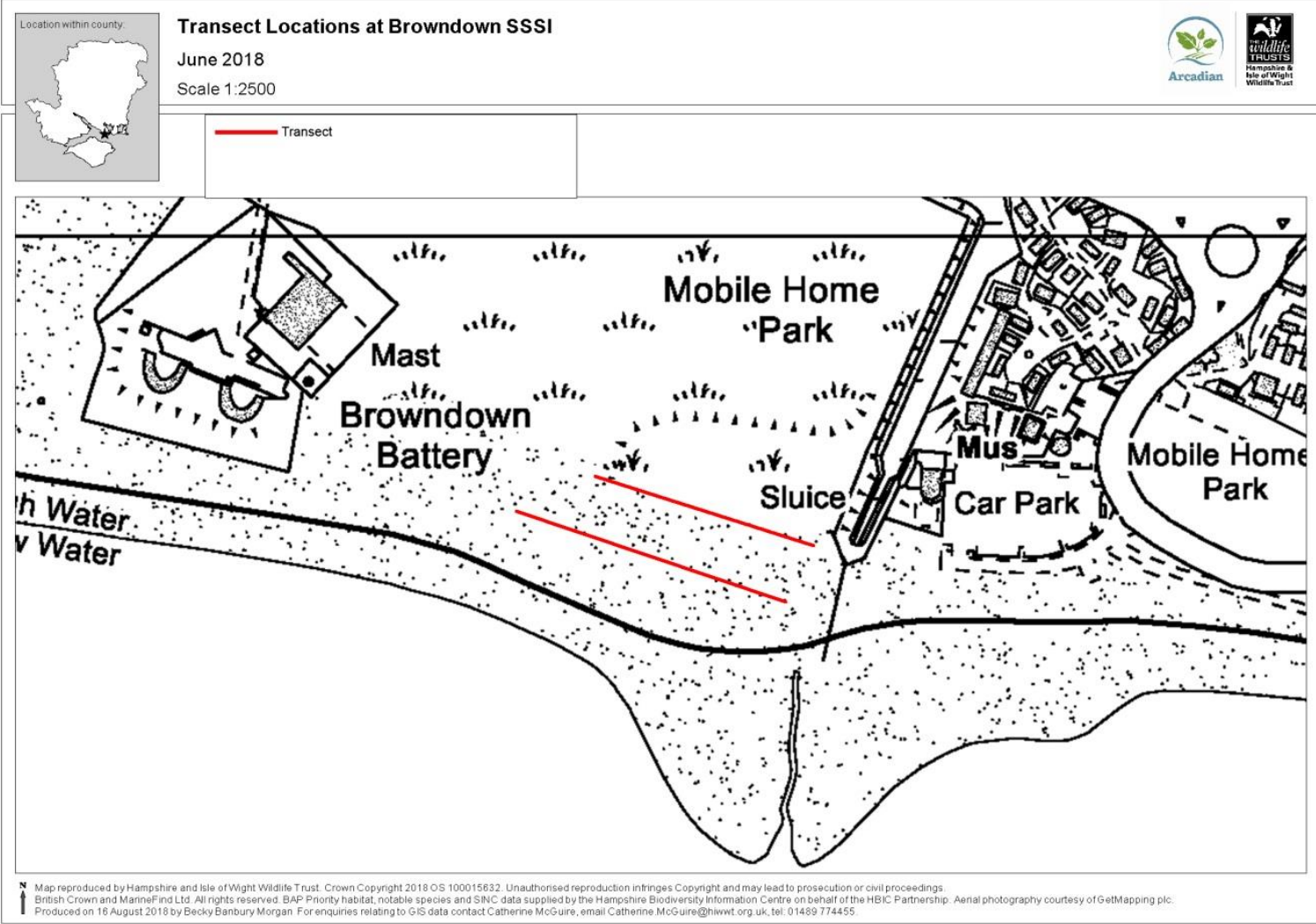
Map 5: Locations of samples taken at Gilkicker Heritage Area and Fort Gilkicker. Legend: Red = Survey 1; Green = Survey 2; Yellow = Survey 3



Map 6: Location of Gilkicker Weevils recorded at Gilkicker Heritage Area and Fort Gilkicker. Legend: Light green = 1 record; dark green = 2 records.



Map 7: Visualisation of habitat extent at Gilkicker Heritage Area and Fort Gilkicker. Each pink circle marks a patch of Common Bird's-foot-trefoil.



Map 8: Approximate locations of transects at Browdown SSSI

PHOTOGRAPHS



Image 1: Gilkicker Weevil, *Pachytychius haematocephalus*, illustrating the distinctive wine-coloured rostrum)
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