Case Study

Rainham Marshes

Managing a nature reserve for the Shrill carder bee

What is the Back from the Brink Shrill carder bee project?

The Shrill carder bee project is a partnership led by the Bumblebee Conservation Trust and Buglife working to secure the future of this species, as part of the wider Back from the Brink project.

Photo-credit: Rosie Earwaker.

Shrill carder bee queen on Fodder vetch at Rainham Marshes

The Shrill carder bee

The Shrill carder bee (*Bombus sylvarum*) is one of the UK's rarest bumblebees. Once widespread throughout southern England and Wales, its current distribution is now limited to five isolated populations. The Shrill carder bee is late emerging, with queens typically coming out of hibernation in April/May, and workers seen on the wing from mid-June. Males and new queens are produced from late August to September and the colony life cycle is completed by the end of September or early October. Nesting occurs in rough, often tussocky grassland either on or slightly below the surface of the ground. Old small mammal burrows may be used. New nests are constructed each year, and are occupied between April and October. Therefore, areas where nesting is suspected to take place should be left undisturbed during this period.

Habitat requirements

All bumblebees rely on flowers for food in the form of nectar and pollen, and a continuous supply of suitable forage throughout the colony lifecycle is needed for survival. Shrill carder bees have been described to have a narrow dietary breadth; however studies across various locations indicate a broader range of forage plants utilised. As such, it is probable that local preferences are displayed according to the flowering plant species available. Example forage plants include bird's-foot trefoils, Black horehound, Comfrey, knapweeds, Red bartsia, Red clover, vetches and White dead-nettle. Plants in the Pea family (Fabaceae) are particularly important.

To better inform future land management advice, the Back from the Brink Shrill carder bee project has monitored four case study sites over the two project areas; two in Somerset and two in the Thames Estuary. This allowed the project team to gain a better understanding of how the Shrill carder bee uses different habitats and how these can be managed to best provide for them.

Mosaic of forage and nesting habitat in Compartment 3 at Rainham Marshes

Site introduction

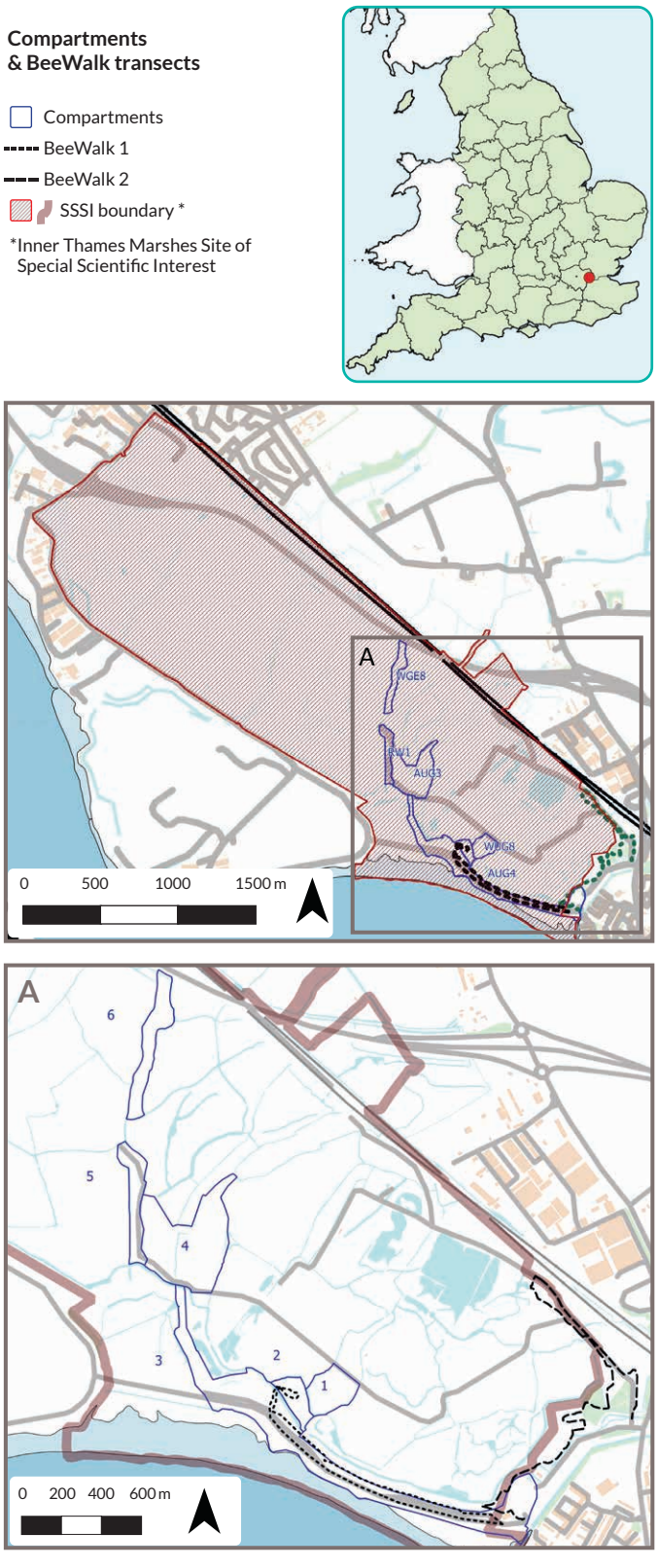
Rainham Marshes is an RSPB reserve adjacent to the River Thames in Essex. The main habitat is lowland wet grassland, with smaller areas of dry grassland, scrub, woodland, saltmarsh and reedbed. It is an important site for breeding waders and wintering waterfowl, with drier areas providing a home for a diverse range of bee and wasp species. There are a range of nature trails and bird hides around the reserve attracting 40,000 visitors each year.

The site covers a total of 411 hectares, most of which is designated as a Site of Special Scientific Interest (SSSI). It is part-owned and managed by RSPB, with some areas of the site currently in a Higher Level Stewardship (HLS) agreement from 2010 - 2020. All of the compartments shown on Figure 1 are in the EK3 HLS option for low input grassland management. Shrill carder bee has been recorded on the site since at least 2012 and it is one of the best sites to observe this bumblebee in the Thames Estuary.

Methodology

Six compartments were selected for monitoring in 2018 and 2019 with help from volunteers. In each compartment, walkover surveys were conducted in June and August of both years to record bumblebee species and forage availability. All plants in flower were recorded in each compartment and their relative abundance was scored using the DAFOR (Dominant, Abundant, Frequent, Occasional, Rare) scale. All bumblebees encountered were identified and their forage plant recorded.

Figure 1: Survey compartments and BeeWalk transect routes at Rainham Marshes, with the SSSI boundary illustrated (inset map of UK with pinpoint of case study location)



Bumblebees were also recorded using BeeWalk (see Figure 1). BeeWalk is the Bumblebee Conservation Trust's national bumblebee monitoring scheme. Bumblebees are counted monthly along a set route, between March and October, using a standardised survey methodology.

Habitat management for the Shrill carder bee

The EK3 HLS option requires the area to be cut or grazed once a year, but not between 1 April and 30 June. The management of the specific compartments is as follows:

- Compartments 1 and 2 – cut once a year from late September. These compartments provide good areas of longer, tussocky grassland where queen Shrill carder bees were observed to be nest searching in spring.
- Compartment 3 – most flower rich compartment, with both a south and north facing slope. It is cut once a year from late September at quite a high cutting level. Some areas are left uncut to provide longer, tussocky grassland as potential nesting habitat.
- Compartment 4 – grazed by cattle from April to December, which provides a shorter sward with opportunities for foraging.
- Compartments 5 and 6 – non-intervention areas, sometimes with light cattle grazing from September onwards. Nesting opportunities are provided along banks, with more flowers along the track edges.

Photo-credit: Bumblebee Conservation Trust

Shrill carder bee on Red clover

Figure 2: Summary of early and late season Shrill carder bee records at Rainham Marshes from 2018-2019, with key areas of forage and nesting habitat in survey compartments highlighted

Results

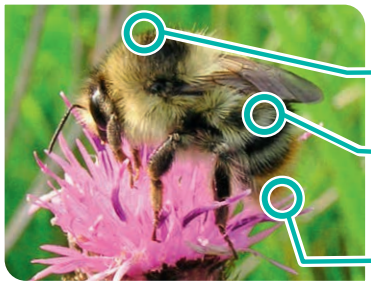
Nine species of bumblebee were recorded, with three of these being notable: Brown-banded carder bee, Red-shanked carder bee and Shrill carder bee. The Brown-banded carder bee and Shrill carder bee were the most commonly encountered bumblebee species on site, with Hawkweed oxtongue being the plant that workers were recorded foraging on most frequently. This was a fairly abundant plant across the site, which could help to explain this apparent preference. The Red-shanked carder bee record came from a single queen recorded foraging on Fodder vetch. Queens of the Shrill carder bee were found primarily on Fodder vetch as well, suggesting that this might be an important plant on site for scarce bumblebees. Early on in the season, 45 plant species were recorded in flower across the compartments compared with 47 species later in the season.

Looking ahead

Shrill carder bee and other rare bumblebees are thriving at Rainham Marshes, taking advantage of the large areas of Fodder vetch scattered across the grassland. A mixture of late cutting and grazing in some compartments, with other areas left uncut helps to provide both the forage, and the tussocky longer grass for nesting. Collection of arisings after cutting is preferable to help keep the sward open and free from excessive litter build-up. While it is recognised that this would be beneficial, it is very resource heavy to collect and remove these arisings, which presents a challenge at many sites where Shrill carder bee is found.

Volunteers surveying bumblebees and plants at Canvey Wick

Have you seen **this** bumblebee?



Black band between wings.

Black stripes on abdomen.

A mainly straw-coloured bee, with dull **reddish-orange** tail.

Back from the Brink

Back from the Brink is one of the most ambitious conservation projects ever undertaken. Its aim is to save 20 species from extinction and benefit over 200 more through 19 projects that span England; from the tip of Cornwall to Northumberland.

It's the first time ever that so many conservation organisations have come together with one focus in mind – to bring back from the brink of extinction some of England's most threatened species of animal, plant and fungi. The project is made possible thanks to the National Lottery Heritage Fund and the players of the National Lottery.

The Bumblebee Conservation Trust

The Bumblebee Conservation Trust was established in 2006 and is a science led organisation with projects across the UK. The Trust aims to inspire people to help provide the habitat these charismatic insects require across communities and the countryside to ensure that populations have a long term future in the UK.

Buglife

Buglife is the only organisation in Europe devoted to the conservation of all invertebrates. The organisation is actively working to save Britain's rarest little animals – everything from bees to beetles, worms to woodlice and jumping spiders to jellyfish. There are more than 40,000 invertebrate species in the UK, and many of these are under threat as never before. Buglife intends to inspire people across the country to discover and care for the small things that run the planet.

Find out more about Back from the Brink and our other projects at **naturebftb.co.uk**

buglife.org.uk
bumblebeeconservation.org

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Registered Office: Bumblebee Conservation Trust, Lakeside Centre, Lakeside Country Park, Wide Lane, Eastleigh, Hampshire SO50 5PE.