Case Study

Lytes Carey Manor

Managing a mixed farming estate for the rare 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: Daisy Headley

Shrill carder bee on Red bartsia

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.

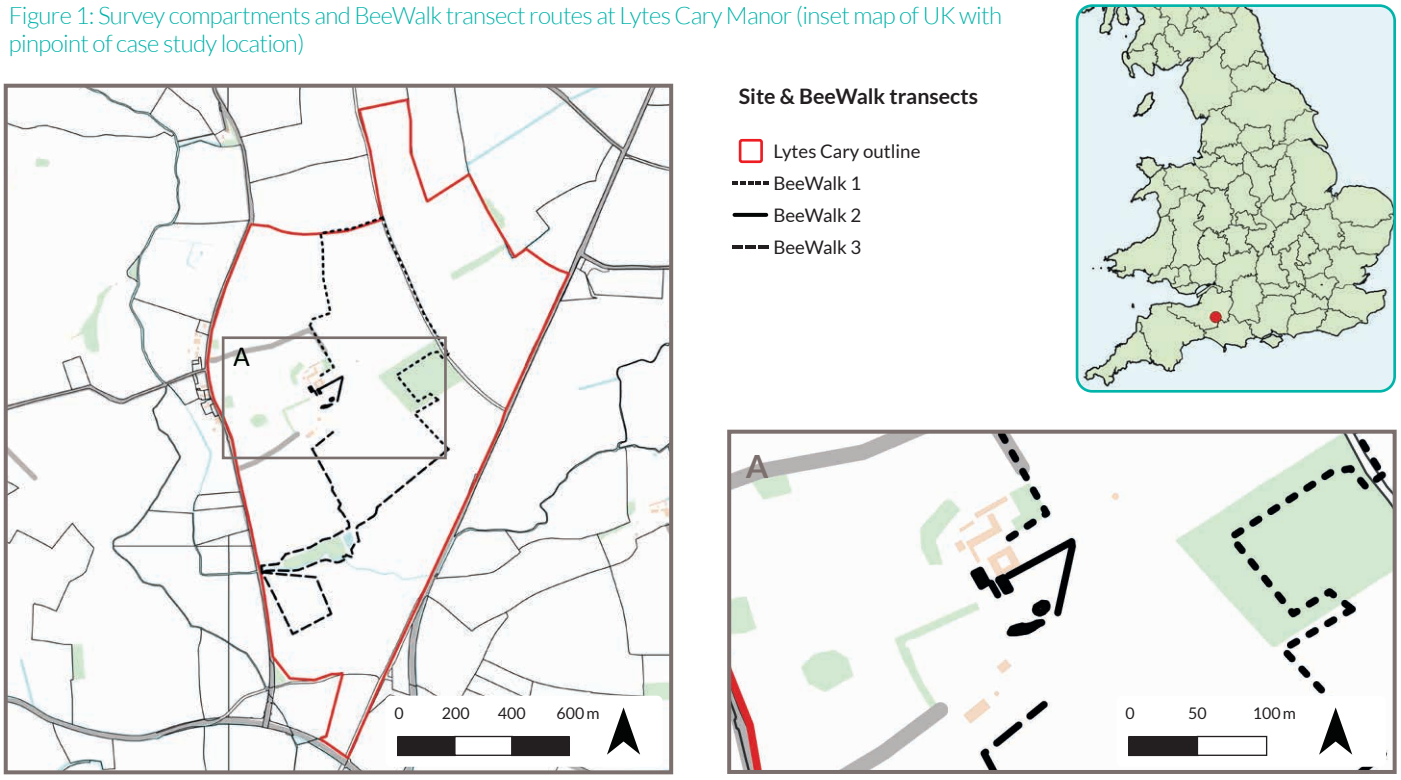
Species rich hay meadow at Lytes Cary Manor

Site introduction

Lytes Cary Manor, owned by the National Trust, is a 146 ha mixed farming estate containing arable rotation, meadows, grazing pasture, woodland, parkland, formal gardens and allotments. It is managed by a team of rangers, gardeners, a grazier and a tenant farmer. The estate is open to the public receiving around 72,000 visitors each year. The site has many pressures being a productive farm, providing for wildlife and meeting public demands.

In 2012, a Shrill carder bee was recorded on site and verified by the Bumblebee Conservation Trust. Volunteers have been monitoring the population and it has since become known as a key site for the species in Somerset; however, numbers have declined in recent years. To address this, the Shrill carder bee has been embedded into the site management plan as a priority species and an action plan created. Both place focus on providing a continuity of forage throughout the Shrill carder bee flight period and nesting habitat in close proximity.

Figure 1: Survey compartments and BeeWalk transect routes at Lytes Cary Manor (inset map of UK with pinpoint of case study location)



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Methodology

Three compartments were selected for monitoring in 2018 and 2019. At Lytes Cary Manor, this included a hay meadow, arable field margins, and brownfield area. In each compartment, vegetation surveys were conducted in mid (June) and late summer (Late Aug/ Sept) to monitor bumblebee forage plant availability and abundance throughout the season. All bumblebees encountered were identified and their forage plant recorded.

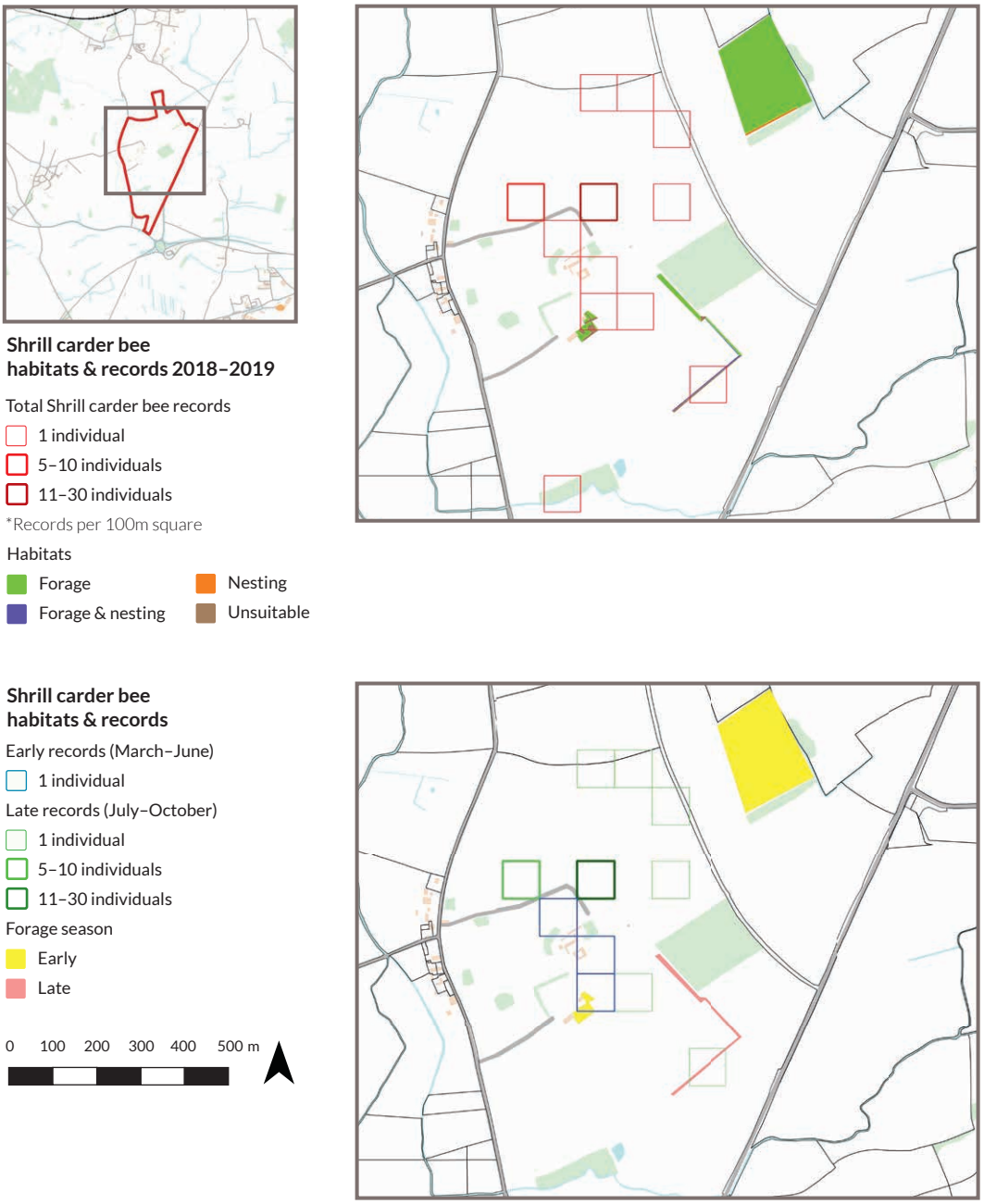
Bumblebees were also recorded using BeeWalk (Figure 1). BeeWalk is the Bumblebee Conservation Trust's national bumblebee monitoring scheme. Bumblebees are counted monthly along a set route, between March and October, using a standardised survey methodology.

Habitat management for the Shrill carder bee

Since 2011 Lytes Cary Manor has been in a Higher Tier Countryside Stewardship agreement with management focusing on the improvement of arable margins for pollinators and arable plants, restoring species poor grasslands and hedgerow management. The management of the specific compartments is as follows:

- Arable field Margin – Following intensive cultivation in the 1990s, Agri-Environment schemes have enabled the increase in arable margin size and management to encourage floristic diversity. Floral margins are cut for hay in early August (up to 50%), and cuttings removed to ensure soil fertility is not increased and floral diversity maintained. A further 25% of the margin is cut in late September. To provide Shrill carder bee nesting habitat close to foraging resources, the National Trust has altered their cutting regime. On rotation, some margins will not receive a September cut meaning vegetation closest to the hedgerow can grow to form tussocky grassland.
- Brownfield – In an area surrounding old farm buildings a patch of comfrey and bramble has subsequently grown. This patch provides an important early and late source of forage for the Shrill carder bee. This is further extended by cutting the comfrey after its initial flowering to encourage a second flourish. At the end of the season the comfrey is cut down and bramble trimmed to stop it from becoming dominant.
- Hay meadow – A species rich hay meadow was created on ex-arable land over ten years ago. The meadow is cut late in August, providing a source of pollen and nectar throughout the flight period. Hoary ragwort has begun to establish over the field in recent years and flowering diversity has reduced. This is in part, due to a lack of grazing and as such the National Trust are installing fencing to allow early-spring sheep grazing. Sheep will eat the rosettes of the ragwort whilst simultaneously creating new opportunities for wildflowers through the creation of bare ground. Continuous late hay cuts year on year can encourage grass growth and a reduction in floral diversity. It is therefore advised to vary cutting times annually e.g. to reduce grass dominance cut early, leaving an uncut strip/patch to ensure there is forage for the Shrill carder bee.

Figure 2: Summary of early and late season Shrill carder bee records at Lytes Cary Manor (2018–2019), with key areas of forage and nesting habitat in survey compartments highlighted



Results

Eleven bumblebee species were recorded during BeeWalks, all are considered widespread and common except for the Shrill carder bee. Worryingly, BeeWalk surveys recorded only a single Shrill carder bee both in 2018 and 2019. Ad-hoc surveying however, recorded individuals across the site. Interestingly many of these sightings were not within the case study survey compartments, despite an availability of forage. This could be as a result of mismatch of timing of resources with meadow areas flowering before the main Shrill carder bee flight period, and these areas having gone to seed by the time of the late summer survey. The area with the greatest amount of records was a field margin due to an abundance of Red bartsia and in 2018, following a hot summer, on the allotments on plants such as lavender. Overall flowering abundance varied greatly, with significantly more early flowering than late summer flower availability (Figure 2) which may be a limiting factor for Shrill carder bee.

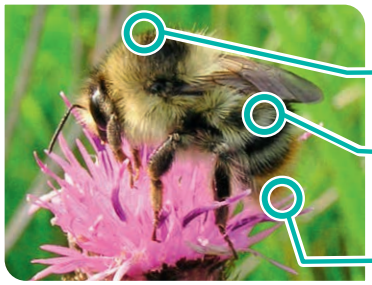
Looking ahead

Working jointly with the Bumblebee Conservation Trust and volunteers, the National Trust have developed a focussed action plan to address the concerns around declining numbers of Shrill carder bee at Lytes Cary Manor. The action plan will focus on enhancing forage availability and ensuring continuity of forage throughout the Shrill carder bee flight season (e.g. through planting and alteration of cutting times), as well as providing suitable, undisturbed nesting habitat in close proximity to foraging sources. To monitor the impact of habitat management changes, volunteers will continue monitoring the population using both BeeWalk and adhoc surveying.

Red bartisa (*Odontites vernus*), a key species found within the margins at Lytes Cary Manor. Often associated with disturbed grounds it grows well along tracks and paths. At Lytes Cary the Shrill carder bee is found almost exclusively on this species after late July.

Bramble and other plants like Comfrey and Honeysuckle are present around farm buildings and provide valuable forage sources for pollinators without using productive land.

Have you seen **this** bumblebee?



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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