SPACE 4 NATURE

Impact Report 2022-26

Surrey Wildlife Trust

buglife

PAINSHILL

UNIVERSITY OF SURREY

POSTCODE LOTTERY

POSTCODE INNOVATION TRUST

PROJECT SUMMARY

This three-year-plus project, supported by a grant of £1.25 million made possible by players of People's Postcode Lottery, brought together the University of Surrey and Surrey Wildlife Trust in partnership with Buglife and the Painshill Park Trust.

The team enlisted the help of the public to inform their work in the growing field of Earth Observation – combining satellite technology and artificial intelligence – to monitor and improve wildlife habitats.

More than 1,000 surveys carried out by 300-plus volunteers across Surrey Wildlife Trust reserves and further afield have recorded typical species found across Surrey's precious chalk and acid grassland and heathland habitats.

DATA

The data collected is helping project partners in the world-leading Centre for Environment and Sustainability at University of Surrey develop new machine-learning-led mapping technology which combines with satellite imagery to identify similar habitats on a wider scale than previously possible. This is enabling them to be better managed for nature, and crucially, connected together.

This work is already reshaping conservation strategies and has the potential to be applied more broadly to help reverse the fragmentation of critical habitats, supporting a rich diversity of wildlife including vulnerable species such as the Nightjar, Sand Lizard, and the Adonis Blue butterfly.

CITIZEN SCIENCE

Engaging local people in species recording – known as Citizen Science – to create a more comprehensive bank of vital conservation data and to engage people more closely with nature has been a cornerstone of the project from the outset.

HABITAT MANAGEMENT

On an immediate practical level, the Space4Nature project has also supported the extension of project partner Buglife's B-lines network of nationwide pathways for pollinators, leading to the creation or improvement of more than 60 hectares of habitat in Surrey, including on the site owned and managed by project partner Painshill Park Trust.

Surrey Wildlife Trust has produced a YouTube animation, exploring the key themes of the project and suggesting ways to help wildlife.

View video >>

PREDICITIVE MODELLING TECHNOLOGY

The predictive modelling of chalk grassland and heathland, based on S4N's citizen science data, satellite imagery and machine learning has been submitted for publishing in the academic press by the University of Surrey, after which it will be made available as a mapping layer for conservation practitioners.

It is hoped that the model we have developed will enable those engaged in nature restoration nationally and internationally to map habitats and develop effective land management partnerships far more efficiently than has previously been possible.

Colleagues at University of Surrey are also modelling acid grasslands across Surrey using data collected in summer 2025 by our citizen science volunteers.

Work carried out in parallel by Surrey Wildlife Trust and Surrey Botanical Society on the Surrey Important Grassland Inventory is providing additional data to validate the S4N modelling.

View video >>

SWT and Buglife are already actively using the outputs of the modelling to identify potential locations for habitat restoration, but the methodology is intended to be reproducible for other Wildlife Trusts, environmental NGOs, local authorities and wider actors involved in local nature-recovery planning. The project has already shown wider operational relevance beyond Surrey through its transfer to peatland habitat mapping and condition assessment in Scotland.

Beyond map production, Space4Nature also demonstrated how citizen science can widen participation in conservation, create new volunteering opportunities, and generate practical evidence for decision-making. Together, these strands show how Earth Observation, citizen science and ecological expertise can move organisations beyond patchy and outdated habitat information towards more transparent, repeatable and locally useful evidence while at the same time facilitating learning and social exchange.

"Validation against independent datasets gave us added confidence that the chalk grassland and heathland predictions were robust and meaningful for conservation use."

Dr Ana Andries, Senior Lecturer in GIS & Remote Sensing - University of Surrey

FURTHER ACADEMIC RESEARCH

S4N funding has supported a PhD looking at practical conservation applications for paleoecology (the study of past ecosystems) conducted by Surrey Wildlife Trust's Research and Monitoring Manager Ben Siggery. Ben completed his PhD in April 2026.

Based on what he has learned thanks to PPL support, Ben Siggery is now further exploring applications of palaeoecological data to conservation projects, including potentially the reintroduction of Natterjack Toads – a formerly common but now very rare species – to sites in Surrey.

Further S4N research work is continuing through to the end of 2027 thanks to additional funding from the Garfield Weston trust. This is supporting PhD student Sahar Sharifi's work using "deep learning" AI techniques to map wetland and peri-urban habitats, thus enabling the S4N model to be deployed in the conservation of these vital habitats for wildlife.

View video >>

HABITAT DELIVERY – B-LINES

Project partner Buglife has delivered habitat creation or restoration works over 62 hectares across 22 sites, for 13 different landowners.

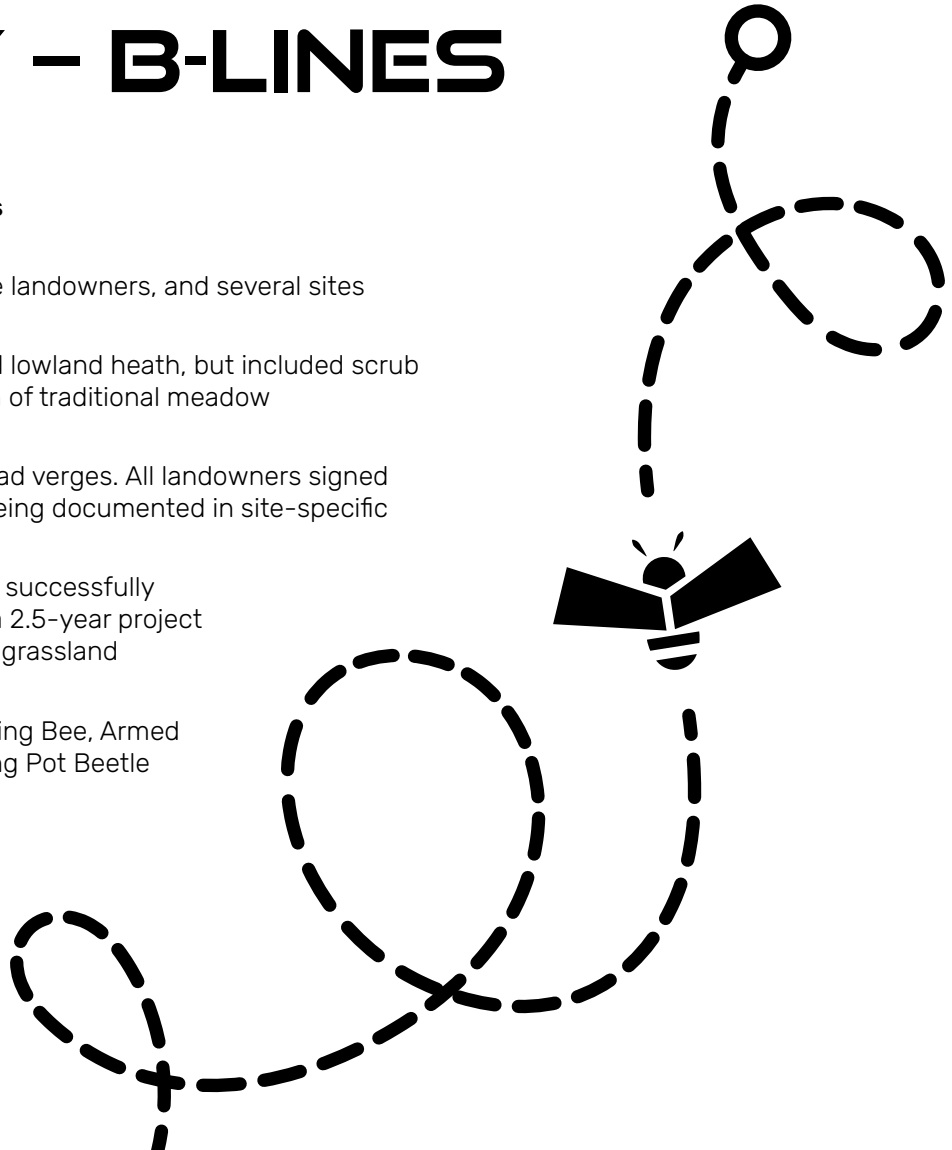
These include national and local government, charities, community groups, private landowners, and several sites owned or managed by Surrey Wildlife Trust.

The work focussed primarily on the restoration of species-rich chalk grassland and lowland heath, but included scrub clearance, wildflower seeding, hedgelaying, pond creation and the implementation of traditional meadow management regimes.

The sites included nature reserves, orchards, vineyards, schools, churches, and road verges. All landowners signed a 10-year agreement to continue to manage these sites for conservation. This is being documented in site-specific Habitat Management Plans, along with ongoing advice from Buglife.

To build on this legacy and create more B-Lines habitat across Surrey, Buglife has successfully secured a grant from the National Lottery Heritage Fund for “Surrey Chalk Lines”: a 2.5-year project commencing in spring 2026, and which aims to restore 30 hectares of flower-rich grassland including 15 hectares of chalk downland in the Surrey Hills National Landscape.

This project will also focus on seven threatened invertebrates: Large Scabious Mining Bee, Armed Nomad Bee, Red-tailed Mason Bee, Adonis Blue butterfly, Straw Belle moth, Shining Pot Beetle and Hazel Pot Beetle.



Marbled White, Jon Hawkins - Surrey Hills Photography

CITIZEN SCIENCE AND ENGAGEMENT

Space4Nature has been the most ambitious citizen science project undertaken by Surrey Wildlife Trust, with more than 1,000 individual surveys contributing a substantial body of data and greatly enhancing the capacity of our partners at University of Surrey to deliver a meaningful new tool for habitat mapping.

Traditional field surveys alone are expensive, time-consuming, difficult to repeat regularly, and often constrained by access to privately owned land. To address this, partners developed a collaborative approach that combined Earth Observation (EO) satellite data, ecological expertise, structured citizen science and machine learning (ML).

Using standardised surveys designed around UK Habitat Classification criteria, trained volunteers collected data from over 1000 quadrats capturing habitat data for chalk, acid and neutral grasslands, as well as heathland, between 2022 and 2025.

These field observations were combined with PlanetScope satellite imagery and a range of other data to produce fine-scale habitat maps. These maps have filled important gaps left by broader national datasets and by field surveys that are difficult to repeat at the county scale.

For users such as SWT and Buglife, this has meant better spatial evidence on habitat extent, fragmentation and likely restoration opportunities. The outputs have supported more rapid habitat inventory, better targeting of restoration and habitat creation, and clearer understanding of where ecological connectivity could be strengthened.

LOOKING FORWARD

To keep this momentum up as we seek to retain the skills and enthusiasm of the S4N volunteers, engage even more people in conservation and use data more intelligently on the road to the internationally-agreed UN target to manage 30 per cent of land and sea for nature by 2020 (30X30), the Trust has now developed a long-term Citizen Science strategy in consultation with volunteers and biological recorder groups.

PARTNERSHIP WORKING

Working in close partnership with Buglife, University of Surrey and Painshill Park Trust has enabled the development and use of new technical and land management skills and practices at all levels of Surrey Wildlife Trust. As we seek to rise to the challenges posed by the biodiversity and nature crises, we will increasingly use what we have learned from this project to build new alliances to deliver conservation on a landscape scale.

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WILDER SCHOOLS

INTRODUCING A NEW GENERATION TO CONSERVATION

Surrey Wildlife Trust's Wilder Schools programme works with schools to introduce pupils, teachers and families to simple steps they can take to conserve nature, with an initial emphasis on improving school grounds for wildlife.

Through Space4Nature, an increased focus has been placed on mapping and connecting habitats on a local level, mirroring the wider aims of the S4N project – and more than 60 schools have taken part in talks, visits and practical training sessions as part of this strand of the programme. Through sweep netting, bird watching, tree ID games and minibeast hunts they have looked at where nature thrives within school grounds and learnt about what actions they could take to enhance other areas. They have also used satellite images and aerial photographs to consider the schools' setting in the landscape and potential to link up with other habitats.

The students then developed and implemented plans for how the school grounds could be enhanced for nature – including the creation of meadows, ponds and connecting hedges, and the planting to date of over 1,000 tree whips, with advice and support from Surrey Wildlife Trust's Wilder Schools team.

The S4N team also encouraged families to take similar actions at home and record these on the Trust's Geographical Information System (GIS) using ArcSurvey123 so that the students can see them spatially. Families have logged well over 1,000 actions for nature, ranging from the installation of bird feeders and ponds to the planting of native plant species to benefit pollinators.

The S4N team also attended the 2024 Teen Tech festival event in Brighton, where they trained 72 teenagers to carry out habitat assessments on chalk grassland and heathland sites. It is hoped this that will open young minds to the possibility of careers in the fast-evolving conservation and land management sectors.

CASE STUDIES

INSPIRING VOLUNTEERS

A wider perspective on volunteering: Tessa Colman

Tessa Colman, aged 67, from north Surrey, has been a volunteer with Surrey Wildlife Trust at Nower Wood education centre and with the Trust's conservation grazing team as a cattle Lookers for some years, thanks to her lifelong passion for nature.

Tessa was excited about S4N from the outset, when Citizen Science Officer Dan Banks spoke in person to volunteers at Nower Wood at the beginning of the project in 2023. Specifically, she was motivated by S4N's focus on practising a joined-up, collaborative approach which benefits local areas but also looks at the bigger picture. Since then she has appreciated regular updates and newsletters from Dan about current and future areas of focus.

In 2023 she took part in the lowland heath plant data collection on Chobham common. In 2024 the focus was chalk grassland plant data collection, which she helped undertake at Sheepleas nature reserve in West Horsley. Tessa also helped survey Grayling butterflies on Chobham common.

For plant data collection, Tessa's task was to enter weather conditions then plant details and numbers within marked quadrats. For the Grayling butterflies it was a case of finding one specimen, then spending 10 minutes observing and logging other Grayling numbers, behaviour and conditions within a 10-metre diameter area, also using the S4N app.

Although Tessa was already generally familiar with heathland and grassland plants, she reports that she gained a lot of new knowledge about many different plant species and about Graylings. She also really enjoyed the opportunity to do useful work out-of-doors 'in some beautiful locations'.

Tessa says that the project has provided an insight into new areas of nature conservation outside of her previous 'comfort zone'. She says that she'll be looking out for more opportunities as and when they arise.

Forging connections & embracing technology: Peter Hewetson

Peter Hewetson, 60, from Dorking became aware of the Space4Nature project via the Surrey Wildlife Trust website. Upon contacting Citizen Science Officer Dan Banks, Peter began volunteering at Quarry Hangers nature reserve near Caterham in summer 2023, where he conducted plant surveys, recording indicator species which typify chalk grassland habitat.

As well as reporting that participating in Space4Nature helped him hone his plant identification skills, Peter says that using the S4N phone app and learning about involvement of satellite technology and AI in the project helped him boost his IT and tech skills in a practical context. Peter went on to volunteer as project officer for the Space4Nature project.

Peter was motived to become involved with S4N because he was excited by the opportunity the project represented to harness technology and citizen science to improve nature, leading to more land managed for conservation and less fragmentation of nature-friendly sites on the road to the international 30by30 target.

He says that thanks to the collaboration with the University of Surrey and Buglife, he was able to network with other volunteers and Surrey Wildlife Trust staff, both at volunteer briefing meetings and while out on site. This forged friendships and professional connections which endured after the conclusion of this project.

Peter's volunteering experience inspired him to pursue a more formal role in conservation and he now works as a permanent member of the Buglife team.

CONSERVATION IN ACTION


Chalk grassland, James Adler

Rosamund Meadows: trialling chemical-free scrub management

Rosamund Meadows, on the North Downs near Guildford, is a four-hectare mosaic of species-rich chalk grassland and scrubland.

Here the team successfully trialled a novel mechanical scrub clearance method using a bespoke excavator attachment to remove large woody scrub that had a history of being coppiced, and was too overgrown to be managed by volunteers or targeted grazing.

Many contractors and wildlife groups had previously suggested the scrub would have to be cut and treated with glyphosate, which was not an acceptable option due to the risk of harming invertebrates and other species on this fragile habitat.

Over two years S4N trialled the attachment to remove the scrub, including removing associated roots, reprofiling the site into a habitat mosaic of scrub of various ages with crucial areas of open species-rich chalk grassland.

Over the years we expect this to improve the ability of the Trust's conservation grazing cattle to access and effectively graze the area, thus boosting floral abundance and diversity within the sward and creating better habitat for invertebrates, reptiles and Skylarks. Orchids are already appearing in the areas cleared.

Disturbance to soil was minimal, but the limited areas of bare ground created will create nesting opportunities for solitary bees and wasps and basking areas for the butterflies onsite. Species of butterfly that will benefit from the overall improvements include the Small Blue, Grizzled skipper and Dingy Skipper.

In summary, good conservation outcomes were attained at competitive prices, without the added concerns of introducing chemicals that are harmful to wildlife and humans. Buglife has subsequently trialled this methodology with Guildford Borough Council on its sites at Tytings Meadows and The Mount, with further success. This will help the council deliver on its policy of reducing the use of harmful herbicides.


Yellow Rattle, Lee Schofield

Denbies Vineyard: improving habitat in a commercial setting

Denbies Vineyard, near Dorking, holds 2.4 hectares of species-rich chalk grassland.

Working with Denbies Vineyard, Buglife and Space4Nature hosted a workshop engaging landowners in the strategically important Mole Gap, home to some of Surrey's rarest invertebrates including Adonis Blue butterflies, Straw Belle moths and Shining Pot-beetles, to accelerate efforts to deliver B-Lines habitat.

We recognised an interest in sustainability within the Denbies Vineyard team due to the estate's certified Net Zero accreditation, and membership of the Sustainable Wines of Great Britain (SWGB), and history of working effectively with Jenny Desouttre. However, the Denbies team voiced some concerns over the potential impact of B-Lines habitat on production, the perceived appearance to visitors and ongoing management commitment. Our team was able to provide advice - for example around mowing 'harder' edges and paths through meadow restoration areas - to minimise these concerns.

Buglife also took steps to reintroduce Yellow Rattle, a hemiparasitic plant that obtains some of its nutrients by suppressing vigorous grass species, allowing wildflowers to compete and thrive. This shows how aligning goals and finding creative solutions can help deliver for pollinators – in this case including the Red-tailed Mason-bee and Small Blue, Adonis Blue, Grizzled Skipper and Dingy Skipper butterflies - in commercially-productive landscapes.

The Buglife team has subsequently carried this model of Yellow Rattle reintroduction and meadow management to several other landowners including the National Trust at Polesden Lacey as well as Albury Vineyard and Mickleham church.

Grassland. Vaughn Matthews

Painshill Park: creating nature-rich grassland

Painshill Park is an historic 18th century landscape garden created by Charles Hamilton to provide impressive vistas of woodlands, fields and lakes, with ornamental bridges and follies. The park is held within a charitable trust and is open to the public with some 250,000 visitors each year. The entire park provides about 64 hectares of landscape gardens; within this around 16 hectares is being restored as part Buglife's work, which comprises six individual neutral grassland areas individually identified in Figure 1.

In recent years most of the grassland sites were managed for public access, landscape aesthetics, commercial events and use as a filming location, and therefore were mown with a frequent 'cut and drop regime' throughout the year.

Following botanical surveys undertaken across the park in 2023 by Space4Nature partners it became apparent that there was a healthy seed bank on site, with over 250 flowering plant species recorded. Buglife promoted the natural regeneration of species-rich grassland through the re-introduction of traditional meadow management from autumn 2023. This prescribed abstaining from cutting the grass throughout the flowering season (March to July). Instead, an annual cut-and-collect regime was introduced for September-October.

This management is improving the species richness within the grassland, as removing cuttings is essential to help to lower nutrient levels. This favours wildflowers, which are able to become better established and numerous, providing a range of forage for a diversity of invertebrates, especially pollinators.

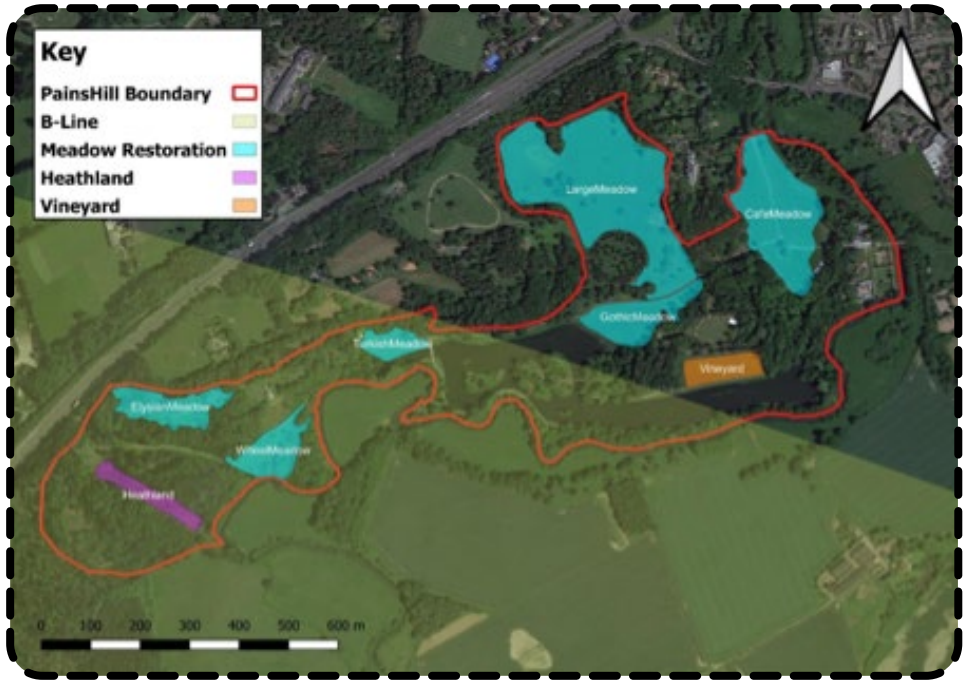

Figure 1: Painshill Park grassland restoration areas