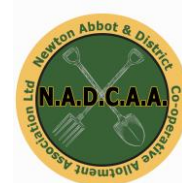




# People and Pollinators in the Bradley Valley

The Bradley Bug Recovery Network - Year 1 Report (2022 / 23)



## Foreword

*Bradley Bug Recovery Network is a fantastic example of a grass-roots project that is really making a difference. Our insects are in serious trouble, having declined dramatically in recent decades. If this continues the effects will be catastrophic, for insects are vital: they pollinate, recycle all manner of organic material, help to keep the soil healthy, control crop pests, and are food for most birds, bats, lizards, amphibians and fish. Love them or loathe them, we all need insects. So this initiative to monitor insects, improve their habitats, and engage local people in appreciating and caring for nature is wonderful. I only wish this was happening everywhere. Long may our insects thrive!*

Professor Dave Goulson,  
School of Life Sciences,  
University of Sussex.

31st March 2023

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## Section 1

# Introduction and Background

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## Introduction

The global decline in pollinating insects is one of the biggest tangible threats to our wider ecosystem, and to human society, that we face today. With mounting evidence that there has been a severe reduction in pollinating insects across the world and across the U.K., primarily due to the loss of habitat, intensification of agriculture and the use of pesticides, this is a challenge that we need to meet, and fast.

The Bradley Bug Recovery Network aims to demonstrate that it's possible for a local neighbourhood to work together in order to restore pollinating insect levels on their own doorstep by:

1. Assessing the level of the problem with expert support.
2. Working with landowners, stakeholders and residents to restore pollinator habitat.
3. Encouraging and enabling local residents and landowners to go pesticide-free.
4. Measuring the impact of habitat and behavioural changes on pollinator levels.
5. Reviewing achievements and replicating the approach in other communities.

This report sets out the background to the project, the research methodology, the results of the Year 1 Pilot and our conclusions and suggested next steps.

## Background

Across the world today an extreme loss of species and habitat is occurring which, if allowed to continue, would become more severe than the mass extinction event of 75 million years ago, when the dinosaurs, together with 75% of all plant and animal species on Earth were wiped out. Scientists are calling the "biological annihilation" (Ceballas et al. 2017) that is happening now, the "Sixth Mass Extinction", and together with climate change, it represents the single biggest threat to the survival of the Earth's ecosystems as we know them – and to the survival of our own species.

One of the key indicators of this loss of species around the world, and in the UK, is the unprecedented decline of our insect populations. There is plenty of anecdotal evidence of this decline from older people who remember car windscreens covered with insects after long car journeys and regularly encountering clouds of flying insects as children whilst out playing.

Numerous scientific studies from places around the world like North America, Japan, Puerto Rico and Germany all show alarming population declines of between 75% - 98% over a 20 year period from the late 1980's to the 2010's (Goulson et al. 2019). To have lost such a high percentage of species populations over such a short timescale is shocking and points to the dangerous level of impact that humans are having on insect populations.

In the U.K. there are similar levels of insect decline. Looking at recent data from the annual Butterfly Monitoring Scheme, it is clear that over the last 40 years almost all the of U.K.'s butterfly populations have decreased by between 45% - 91% (Williams 2021). Bee populations have not fared any better, with evidence showing that there has been a decline in populations across the

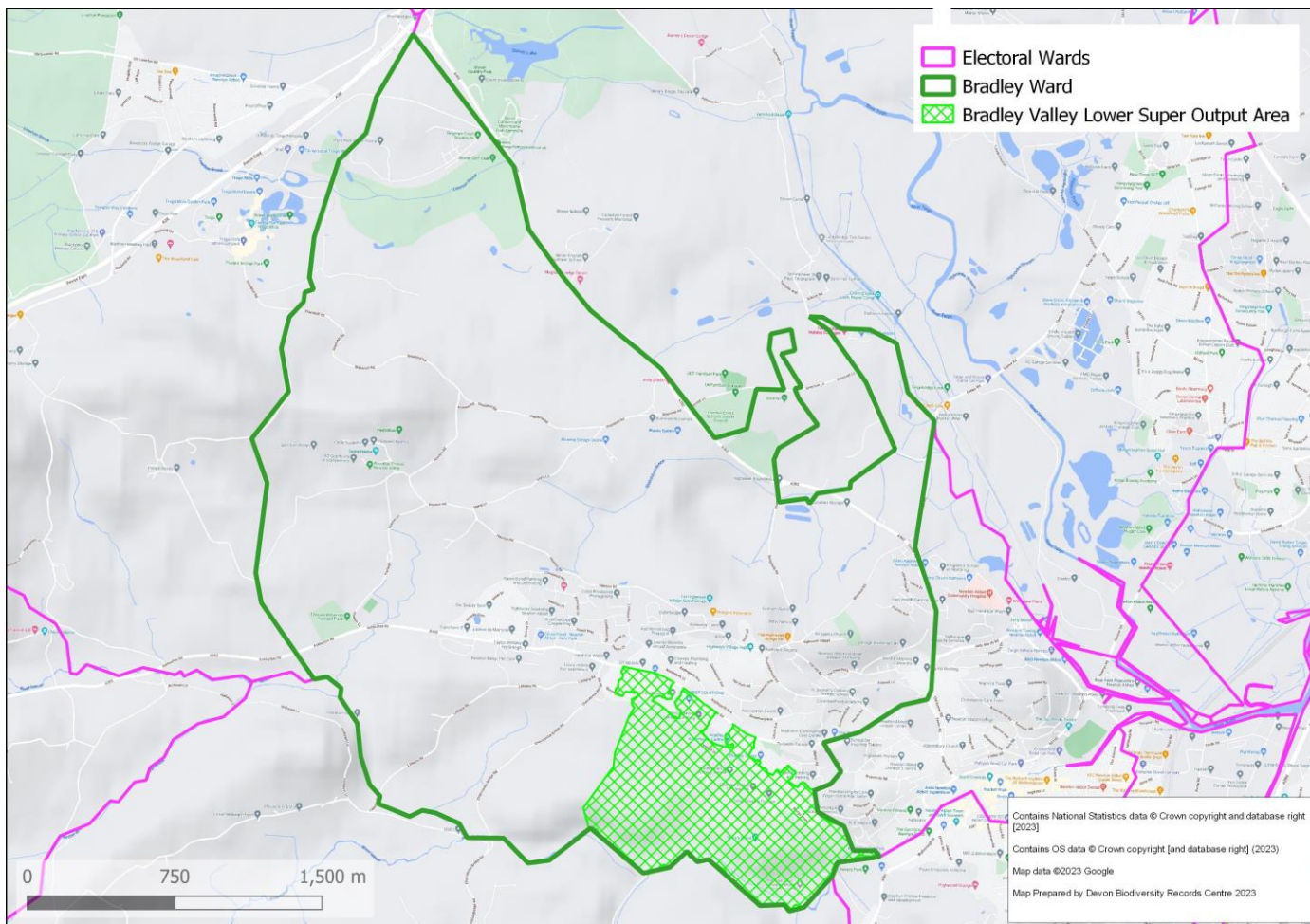
U.K. between 1980 and 2013, with an average of 11 bee species lost per km<sup>2</sup> and a loss of upland bee species of 55% (Powney 2019).

If allowed to continue, this severe decline in our insect populations, particularly pollinating insects, will have a devastating impact on our ability to produce food (87% of plants are pollinated directly by insects and 35% of all human food crops) and provision of a vital food source to millions of other species on land and in the water (Powney 2019). Insects are such a fundamental part of our wider food web that their loss imperils the cohesion of the entire structure of the wider ecosystem.

*What is our response to this information, on a personal level as adults, parents and grandparents, as members of a community and a local ecosystem?*

Green Futures Newton Abbot is a local community organisation, established in May 2020 and based in the town of Newton Abbot, South Devon. We are dedicated to enabling people to live in greater balance with their local environment and improving their levels of wellbeing. We identified that the decline in pollinators was not just a serious environmental problem in itself, but also an indicator of the wider environmental degradation that we are seeing across our local and global ecosystems, and therefore potentially an issue that would have links to a wider range of environmental, social and economic issues affecting our local community.

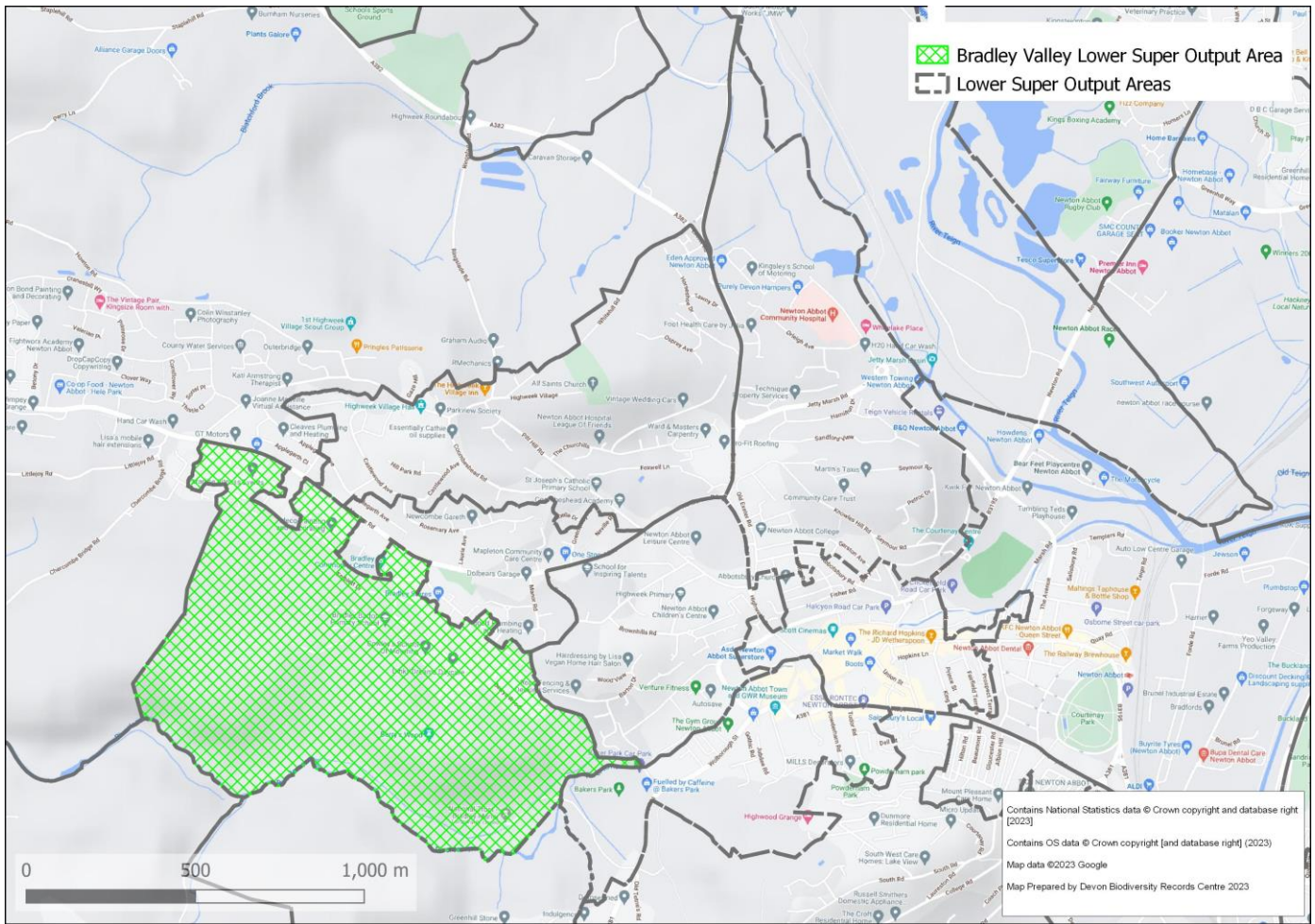
We felt strongly that it was important initially to develop a very localised approach for the Bradley Bug Recovery Network, partly because Year 1 was a pilot, but also because we believe strongly in working at a grassroots level in our community, with individual householders as well as local groups, organisations and businesses.



**Figure 1.** Bradley Ward Electoral Map

Bradley, the area where Green Futures is based, is located to the west of Newton Abbot, and has a mixed urban and rural landscape. Bordering the river Lemon in the South and including the residential areas of Bradley Valley, Highweek, and the new housing estates around Hele Park, Bradley Ward has a population of around 7000 people and covers a geographical area of approximately 8.8 km<sup>2</sup> (Office of National Statistics 2020).

In order to pilot our approach to engage local people in monitoring pollinator levels, species diversity and restoring pollinator habitat, we decided to focus on the smaller, more urban area of Bradley Valley, which has a population of around 1400 people in 630 households (Office of National Statistics LSOA E0102029 2020). The area also coincides with the boundaries of a Lower Super Output Area, which is one of over 30,000 such areas across the UK which are used to collate a wide range of statistics relating to lifestyle and standards of living.



**Figure 2.** Bradley Valley Lower Super Output Area (LSOA) in context of other local LSOAs

The area also contained a number of key monitoring sites on land owned and managed by some of our project partner organisations including:

- Newton Abbot Town Council
- Newton Abbot and District Co-operative Allotment Association
- The National Trust
- Bradley Barton Primary School
- Teignbridge District Council
- Devon County Council

Over previous years we had developed really strong, supportive and positive partnerships with all these organisations through a number of practical conservation and land-management projects, so we felt that we had a great foundation on which to build a multi-agency partnership initiative.

We also recognised that we needed to have the guidance and practical involvement of professional ecologists in order to ensure that pollinator species were successfully identified, monitoring processes were carried out in an effective way and land restoration work was appropriate to the local flora that was already present. Thankfully the first consultants we contacted were the Devon Biodiversity Records Centre and their professional, friendly and responsive approach has been absolutely fundamental to getting the Bradley Bug Recovery Network established.

Alongside professional ecological involvement, we also needed to ensure that we could effectively publicise our initiatives with the local community. The Mid Devon Advertiser has been solidly behind the "Bug Project" from the start and we have built up an excellent editorial relationship which means that we can get a really positive message out to local people alongside our website, leaflets and social media.

With all these elements in place, we then applied for grant funding from the Devon Environment Foundation, because we wanted to do our best to keep all elements of the pilot stage as local as possible, and because DEF seemed to have a really positive and innovative approach to nature conservation and regeneration work. We were successful in receiving a grant in March 2022, which covered all of our projected costs for whole 18 month duration of the pilot stage of the initiative, and DEF have been absolutely fantastic not only as a grant provider, but also as a source of encouragement and support.

We also want to acknowledge the key involvement and support of Newton Abbot Town Council. Right from the very start of Green Futures, local Councillors, the Town Clerk, the Assistant Town Clerk and all other members of staff have been fully supportive of what we are trying to achieve. The Town Council's Financial Assistance Grant for Local Organisations has been absolutely fundamental for Green Futures operations. It was the first grant funding that we received as a group and on an annual basis it provides the means for us to keep our basic operations functioning. Local councillors' guidance and input has been central to the development of the Bradley Bug Recovery Network and the role of the Town Council as a whole is integral to the development of this work as we move forward.

Our sincere thanks also go to Teignbridge District Councillor Mike Hocking, Devon County Councillor Phil Bullivant and Newton Abbot Mayor, Carol Bunday. We also want to thank the staff of Teignbridge District Council's Green Spaces Team, the South West regional team at SUEZ Recycling and Recovery, the National Trust's Ranger Team for the English Riviera area, the Headteacher, Staff and Children of Bradley Barton Primary School and the volunteer advisors at Orchard Link.

Finally we want to say a particular thank you to Simon Heath whose amazing support throughout the project has been absolutely key, and particularly for his superb graphic design skills in all of our publicity, to India Barklett-Judge whose inspiring artwork has graced all of our flyers and to our core volunteers Melinda, Karen, Sam, Robert, Paul, Maddy, Lucy and Sam H., and to our invaluable local naturalist Phil Sansum. None of this would have been possible without all of you!

## Section 2

# Our Approach and Methods

Our approach consisted of two main exploratory pathways:

- Data collection and analysis
- Engagement, education and encouragement

We are absolutely committed to developing a robust empirical dataset for pollinator species and their levels of abundance across our project area. This baseline will enable the project to assess over time how successful it is being in reversing the effects of the anthropogenic pollinator declines experienced over the last 50 years or more (Goulson 2019).

Alongside the formal and technical data collection work, we are also deeply committed to engaging and involving local people of all ages in the practical work of restoring and conserving pollinator levels. This is fundamentally a regenerative community development process, where our “non-human neighbours” are included and valued.

## Data Collection and Analysis

We identified 4 different primary monitoring sites across the Bradley Barton area where we aimed to gather ecological evidence, including the use of ‘citizen science’ activities, to accumulate data on the pollinators using these sites. The 4 sites, shown in Fig. 3 below are:

1. Bradley Field Allotments
2. Kiln Orchard Open Space
3. Bradley Barton Primary School
4. Bradley Manor Meadow



Figure 3. Primary Pollinator Monitoring Sites Across the Bradley Valley Area



## **Botanical and Habitat Surveys**

A **UKHAB<sup>1</sup> Level 4 Walkover Survey** of each site was undertaken during May and June (UKHAB 2022) and vascular plants presence data were collected. Species names followed (Stace 2019). Where semi-natural vegetation communities were encountered covering significant portions of a site, species abundance was broadly assessed on the DAFOR (Dominant, Abundant, Frequent, Occasional and Rare) scale.

In conjunction with the UKHAB survey (essentially a botanically based habitat assessment) we trialled the ***Invertebrate Habitat Potential assessment protocol*** (Dobson & Fairclough 2021). This is a tested protocol which has recently been published. It provides an effective counterpart to a conventional habitat survey by addressing the key elements of a habitat parcel that determine its resource value for invertebrate life (in all life stages and behaviours, not just nectar sources for feeding adults).

This approach was intended to help us to describe a broad baseline of the current pollinator habitat potential on each of the primary monitoring sites, guided by a published protocol, and help the comparison between the sites to serve as a starting point for recognising strengths and weaknesses that might drive positive management interventions. Critically, it was relatively simple to carry out and does not depend on the labour-intensive acquisition of species data.

Eleven habitat elements or features are assessed from a walkover survey on a five-point scale (1 = negligible to 5 = exceptional):

- **Decaying Wood** - In all its forms; from decaying wood on/in large trees to woodland floor debris
- **Rotational Management** - Planned or serendipitous; and whether for nature conservation or other purposes
- **Nectar Resources** – Visual assessment pending a more detailed analysis
- **Wet Substrates** - Marginal, marshy, muddy and seasonally inundated habitats, as well as flushes
- **Open Water Habitats** – Open water element of rivers, lakes, ponds, streams and ditches
- **Structural Patchwork** - Habitat mosaics, including open mosaic habitats on previously developed land
- **Still Air (Sunny)** - Suntraps and still-air microclimates in open situations (not windbreaks)
- **StillAir (Humid)** - Humid still-air microclimates In sheltered and shaded situations
- **Connectivity** - Landscape-scale connectivity between the site and external habitats
- **Ecoclines** - A graded transition between two or more broad habitats
- **Bare Earth** - Unshaded bare or sparsely vegetated well-drained substrate, regardless of soil type

## **Flower Insect Timed Counts**

In tandem with the Baseline Habitat and Invertebrate Potential Assessments (above) we began a volunteer programme of direct pollinator observation using the FIT count (Flower Insect Timed

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<sup>1</sup> UKHab is a hierarchical classification applicable across the UK that integrates Broad Habitat, Priority Habitat and Annex 1 Habitats into a single unified system.

Count) methodology of the UK Pollinator Monitoring Scheme (PoMS), developed by the Centre for Hydrology and Ecology.

We chose this approach for a number of overlapping reasons

- In order to raise awareness of pollinators in Bradley we felt it was important to employ survey methodologies that involved direct observation of, and engagement with, the organisms themselves. Although entomological survey is traditionally the preserve of experienced naturalists or professional entomologists, the FIT count is an activity that can be undertaken by a broad range of volunteers and, critically, does not require any previous entomological expertise.
- In addition to generating baseline information on pollinators and nectar sources in our project area the results would also feed into a robust scientific project of national scope which involved hundreds of different groups and individuals across the UK, and would therefore start to provide meaningful data in a national context, together with a 'sense of contribution' for volunteer surveyors from the outset.
- The FIT count methodology gives an ideal framework for the Bradley Bug Network to support the development of valuable biodiversity skills within the community insofar as it nurtures an interest in insect behaviour and diversity.
- There was some evidence, reported by POMS volunteers elsewhere (Birdsong Charity Consulting 2022), that the physical and sensory experience of carrying out FIT counts may have benefits for health and wellbeing.



**FIT Count Training in Bradley Field Allotments (May 2022)**



Identifying Insects on the Bradley Manor Estate (May 2022) and Bradley Field Allotments (Sept 2022)

This method of data collection uses a standardised 10 minute timed count, in which pollinating insects that visit a 50cm squared area of a single species of flower are counted and assigned to one of a number of broad categories :

- **Beetles**
- **Bumblebees**
- **Butterflies + Moths**
- **Honeybees**
- **Hoverflies**
- **Other flies**
- **Other insects**
- **Small insects**
- **Solitary bees**

In addition to counting the numbers of particular insects in each group, we were also aiming to identify species wherever possible, through personal knowledge and the use of books, apps and the internet.

We aimed to carry out consistent FIT counts on all 4 monitoring sites over the summer months from May – August 2022. In addition to the 4 primary monitoring areas, we also engaged with a number of local residents who carried out FIT counts in their home gardens across the Bradley Valley residential area.

### **Moth Surveys**

A prominent pollination role has been attributed to nocturnal moths (e.g. Macgregor et al. 2014) and recent research suggests these insects provide a significant function in maintaining wild plant pollination in agricultural landscapes (Walton et al. 2020).

Moths are a highly biodiverse insect group and their distribution and diversity in the UK is relatively well known, which makes them a convenient subject for monitoring. Records of their

diversity and abundance at a given location can give a proxy indication of the integrity of other less readily recorded invertebrate communities, which means moths are an effective bio-indicator. Although the correlation between moth diversity and abundance and other pollinator assemblages is complex (Gerlach et al. 2013), it is known that many moth species have experienced rapid population declines since the 1960s and there has been a 33% decline in total abundance from 1968 to 2017 in Britain (Fox et al., 2021).

We wanted to start exploring what kind of biodiversity we had in terms of moths within our project area, so we carried out 3 moth sampling evenings at two different locations on the Bradley Field allotments between August and November 2022. Moths were captured in a non-lethal low wattage (40W actinic light) trap and species identified using standard field guides (Waring and Townsend 2009, Sterling *et al.* 2012) on site. Species and numbers were recorded.

### **Community Pesticide Audit**

There is now overwhelming evidence that pesticides of all kinds – insecticides, herbicides and fungicides, have serious negative impacts on the health of wild pollinating insects, as well as hived honeybees (Goulson 2019, Sponsler et al 2019). Even newer pesticides, that are used in lower concentrations than older chemicals, have a significant detrimental impact to pollinating insect populations (Shulz et al 2021). We therefore wanted to find out to what degree pesticides were being used across our monitoring area.

Our approach was two-fold:

1. Engage with local householders through a community event called a “Pesticide Amnesty” to find out whether people were using pesticides in their gardens.
2. Engage with other key landowners such as Newton Abbot Town Council, Teignbridge District Council and Devon County Council the National Trust to find out whether they were still using pesticides.

The results of both of these approaches were recorded through in-person or telephone interviews with householders and organisation staff members.

### **Habitat Restoration and Enhancement**

Our priority in this first year of the project was to find out as much as we could about the different habitat areas and species of pollinator that were present. We were keen, wherever possible to begin taking steps to restore and enhance any habitat areas in order to encourage greater populations of pollinators and greater levels of pollinator diversity.

In order to achieve this we adopted two approaches:

1. Manage an existing habitat in a way that enables the naturally occurring wildflower species to flourish.
2. Sow wildflower seed to introduce native Devon wildflower species.

Any engagement in changing the floral diversity of an area of land would only be carried out in partnership with the land owner and any organisations who were responsible for the land area. The outcome of this step by step approach resulted in a number of different restorative activities at:

- Kiln Orchard Open Space
- Bradley Barton Primary School
- Bradley Manor Estate

These will be discussed in more detail in the Results section of the report.

# Engagement, Education and Involvement

## Local Groups and Organisations

The ability for Green Futures to operate in each of our 4 primary monitoring sites was dependent upon developing proactive, positive and mutually beneficial partnerships with the different landowners and the groups and organisations that are based there:

- **Bradley Field Allotments** – Newton Abbot and District Co-operative Allotment Association + Newton Abbot Town Council
- **Kiln Orchard Open Space** – Teignbridge District Council
- **Bradley Barton Primary School** – The Headteacher and Outdoor Learning Staff
- **Bradley Manor Meadow** – The National Trust Rangers for the English Riviera Area

We also needed to engage with local organisations around community involvement and technical support:

- **Community Involvement and Publicity** – Town, District and County Councillors, Officers, Mid-Devon Advertiser + Bradley Barton Community Centre
- **Logistics and Technical Support** – SUEZ Recycling and Recovery UK + Peakes GB

In all cases the representatives of these different organisations were immediately supportive of the project and interested to be personally involved with the different monitoring and habitat regeneration activities on the ground. These early positive connections were absolutely fundamental to the development and evolution of the project over 2022.

## Local Residents and the Wider Community

Our approach for engaging with local residents was four-fold:

1. Introducing the project to members of the key community groups and organisations associated with the 4 key pollinator monitoring sites and hoping that they would network out into the surrounding community.
2. Making direct contact with local people through events and activities that we set-up in the project area.
3. Raising awareness with posters and flyers in local shop windows (see Fig 4.)
4. Publicising the project in the local newspaper and on social media platforms.

Within all our engagement with local people we tried to emphasise the following narratives:

- There is a decline in pollinators and this is bad for humans and bad for the rest of the ecosystem.
- We are a group of local people trying to achieve a better quality of environment for our local community.
- When we talk about community we're talking about the human community together with all the plants, invertebrates, animals and micro-organisms that make up the wider ecosystem of the area.

The relative success of these different approaches to community engagement will be discussed in the Results section of the report.

The Bradley Bug Recovery Network 

Be a

# Bradley Bug Champion

**Help Welcome Pollinators Back to Our Neighbourhood**

Over the last 50 years there has been a big decline in pollinating insects globally and across the U.K.

Pollinating insects keep our ecosystem healthy by helping plants to reproduce.

They are essential for us too because they help crops develop to produce food.

It is estimated that pollinators are responsible for 35% of global food production.



**3 species of bumble bees lost**



**Butterfly numbers down 45-90%**



**Together We Can Make a Difference**

We want to show what a difference we can all make when we work together across our local neighbourhood, helping to boost pollinator levels in our gardens, our open spaces, our local school, our allotments and parks.

Get involved and become a Bradley Bug Champion.

Email us at 

**[bradleybugs@greenfutures-newtonabbot.co.uk](mailto:bradleybugs@greenfutures-newtonabbot.co.uk)**

or find us on Instagram **@bradleybugs**  
and Facebook at **Green Futures Newton Abbot**










All data shown comes from peer - reviewed sources.

Figure 4 – The Bradley Bug Recovery Network Poster and Flyer

### Networking Regionally and Nationally

Networking with regional and national groups and organisations was also a really key element to our approach. Through the planning and implementation phases of the project we had contact with the following groups and organisations:

- The UK Centre for Ecology and Hydrology
- The Pesticide Action Network
- Bristol Natural History Consortium

# Results

## Botanical and Habitat Surveys

### UKHAB Level 4 Walk Over Survey

#### Land Types for the Project Area

The sites occupy a zone of transition from the urban to its rural hinterland. Their interface with high-quality semi-natural habitats (the SSSI designated Lemon Valley Woods) is significant for building resilient ecological networks across the local Bradley Valley community. For a full list of all flora identified at each site, see Appendix 1.

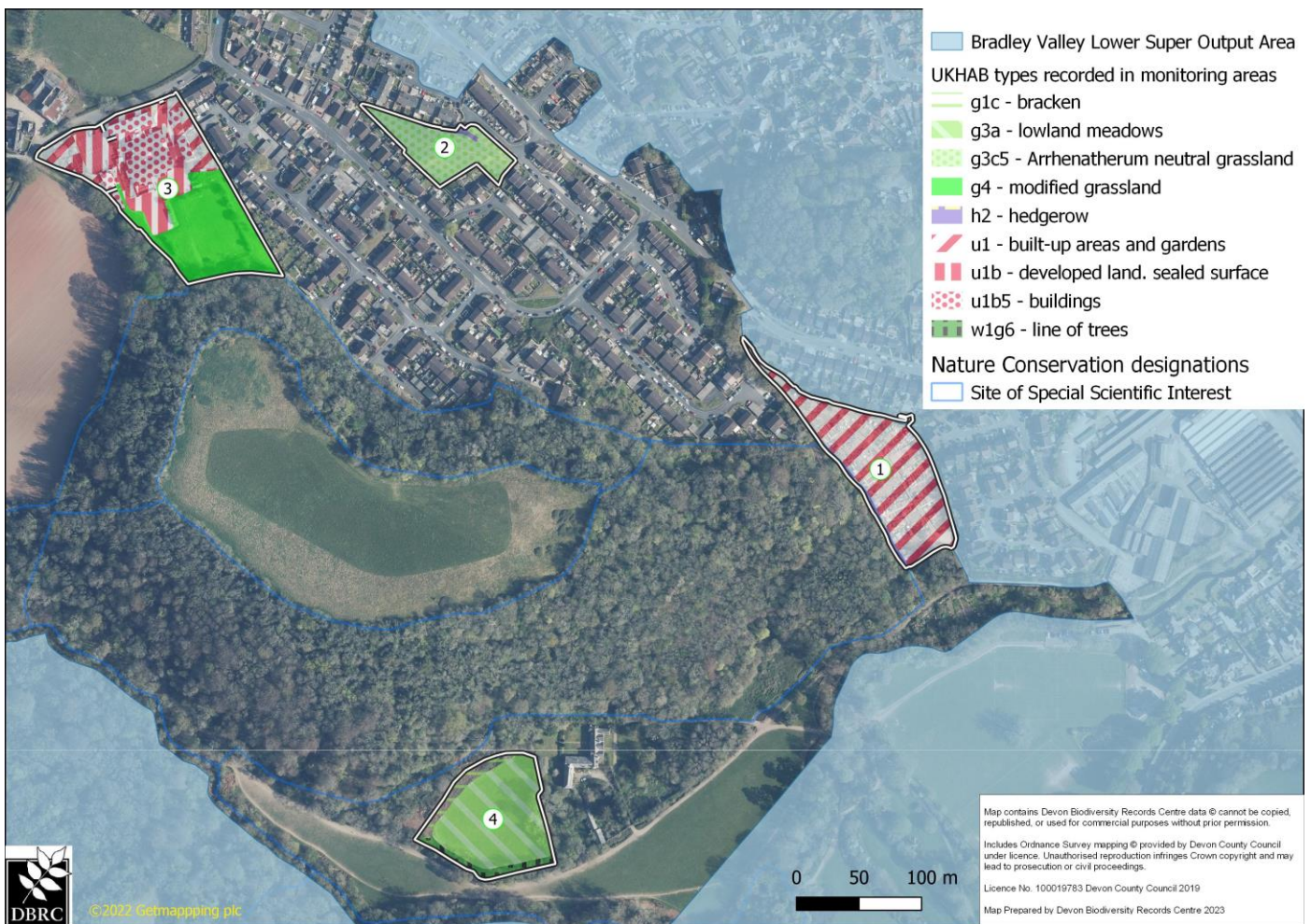


Figure 5. Mapping the habitats of the 4 monitoring sites in context of the surrounding landscape. 1. Bradley Field Allotments, 2. Kilm Orchard Open Space, 3. Bradley Barton Primary School, 4. Bradley Manor Meadow.

#### Bradley Field Allotments

##### UKHAB: u 1 built up areas and gardens

The allotments represent an eclectic and intricate mosaic of vegetation and other surfaces covering 0.87ha on the urban fringe of Newton Abbot. The variety of plants growing here, both native and horticultural, is likely to provide a reliable foraging territory for a wide range of pollinator species. However, several of the plots also offer habitat resources for pollinating insects

other than nectar – e.g. shelter, moisture, basking areas or breeding habitat in the form of deadwood or standing water.

The site occupies former pastureland overlying fluvial alluvium of the River Lemon valley. It is abutted to the west and south by semi-natural woodland and to the east and north by urban land. Conventional habitat survey is not designed for recording this kind of land cover and, in UKHAB terms, it is classified simply as 'garden'. The botanical survey did however record more than 90 species of vascular plant growing wild or uncultivated within the allotment boundary (including hedgerows). The nature of the multiple plot management means that no one species attains dominance but that there are many species present at low cover. Cultivated and planted ornamental species were not systematically recorded but may approach or exceed the number of wild species.



Bradley Field Allotments, June 2022.

The Invertebrate Habitat Potential assessment indicates at least moderate value across a wide range of habitat resources, with sheltered areas, habitat piles (of deadwood), various small informal ponds and still air pockets being significant features of the site. Principal nectar sources include various *Rubus* species, other s

mall soft fruit bushes, apple trees and assorted potherbs (e.g. Rosemary, Thyme, Lavender etc), Comfrey (*Symphytum* spp.) and among native, or 'weed' species, Dandelions (*Taraxacum* agg.) and Hedge Bindweed (*Calystegia sepium*)



## Kiln Orchard Open Space

### UKHAB: g3c5 *Arrhenatherum* neutral grassland

Kiln Orchard is a 0.35ha pocket of amenity grassland embedded in a residential area. The composition of the vegetation is generally species-poor but the site has features such as nettle patches, a relic hedge with native woody species and bare areas with concentrations of ruderal nectar plants that contribute to its value within the local network of pollinator habitat resources.



Kiln Orchard, June 2022.

The grassland at Kiln Orchard is not part of an orchard! It is the remnant of a field ('Lower French Park'), formerly part of Bradley Barton Farm, which we know to have been in arable cultivation in the 19th century (and probably 20th). The surviving piece of grassland overlies a small knoll caused by an intrusion of igneous bedrock in the Gurrington Slates that underlie the wider expanse of former farmland (now developed) and much of Bradley and Highweek.

After the development of Bradley Barton as a residential area, the management of this area as a greenspace amenity has led to the development of a stable neutral grassland community. The character of the sward is in keeping with an ungrazed and nutrient enriched site and currently dominated by bulky, competitive grass species (mainly Cock's Foot and False Oat-grass). It conforms to the British plant community MG1 (Rodwell 1992). Stinging Nettle and Perennial Rye-grass are frequent. Dicotyledonous herbs (wildflowers) are at best locally frequent, the most prominent being Cat's-ear, Meadow Buttercup, Ribwort Plantain and White Clover.

Although flowering nectariferous plants are sparse in terms of their overall contribution to the biomass (See Fig 6), there are a good range of native herbs scattered within the site, particularly in marginal areas, suggesting some ecological continuity with the former field margin flora. Notable species include Goat's-beard, Common Mallow, Small-flowered Buttercup, Cut-leaved

Crane's-bill and Wild Onion. A small remnant of the original hedge can be seen along parts of the northern edge of the site and on the steepest part of the slope there is a tiny patch of rosaceous scrub which supports a few shade bearing species.

### **Bradley Barton Primary School**

#### **UKHAB: g4 modified grassland (mixed with various buildings, developed land, gardens and sealed surfaces)**

The school site covers approximately 1.4ha of which about 50% currently has a vegetated soil surface with the remainder occupied by buildings and sealed surfaces. The bulk of the area is a modified grassland fairly typical of the sward in areas managed for amenity by frequent mowing. Some relatively small areas are used as gardens. These were not surveyed in detail but may contribute significantly to the site's pollinator habitat resource and were factored into the IHP assessment (see Fig 6).



**Bradley Barton School playing field edge – June 2022**

The sward is generally short, uniform and species-poor. The current management limits nectar sources in the grassed parts of the site to a few common mow tolerant species, but there are localised areas with greater potential where a few common grassland species such as Cat's-ear, Creeping Buttercup, Dandelion, Germander Speedwell and White Clover are frequent. As with Kiln Orchard, above, prior to the development of the Bradley residential area the school site was farmland overlying the Gurrington Slates formation which will have been under arable rotation historically (they were in fact part of the same large 15a field). Significant portions have also been

landscaped and reprofiled, e.g. to provide a level sports pitch, as part of the school's development.

The main grassland area borders native semi-natural woodland and some local residential gardens but the boundary from short grassland to woodland is abrupt with minimal transitional habitat. This represents a potentially interesting nexus of invertebrate habitat resources but the lack of transitional vegetation at the edges and structural diversity within the grassland currently limits its value to pollinators.



**Bradley Barton School Carpark Border 1 year after wildflower sowing June 2022**

The richest area floristically is a narrow strip bordering the car-park (above) where a legacy of native species such as Corky-fruited Water-dropwort and Bulbous Buttercup has been recently enriched by the establishment of other native wildflower species (e.g. Yellow Rattle, Bird's-foot Trefoil) from seed through partnership work between Green Futures and the school's staff.

## **Bradley Manor Meadow**

### **UKHAB: g3a lowland meadow**

Bradley Manor Meadow is a 0.75 ha area of herb rich grassland clearly showing the high value semi-natural transition to ancient woodland with scrub, deadwood and areas of sheltered still air. A characteristic feature of the spring meadow is the abundance of the old grassland indicator, Pignut.



**Bradley Manor Meadow, May 2022**

The meadow occupies a low terrace on the valley floor of the River Lemon adjacent to the ancient manor house of Bradley. Historically this was known as 'The Lawn' and was pastured. It is currently managed by the National Trust as a meadow on an annual cut. This is semi-natural grassland which conforms to the UK Priority Habitat classification of 'Lowland Meadow' and the National Vegetation Classification community MG5 (*Cynosurus cristatus* - *Centaurea nigra* grassland), although without more detailed sampling it is unclear whether the composition has an affinity to one of the described sub-communities (Rodwell 1992, Cooper 1998). The sward at the time of survey was distinctive for the abundance of Pignut, *Conopodium majus*, a species indicative of ancient grassland and woodland but is relatively species rich, and includes a number of important bee forage plants such as Common Bird's-foot-trefoil (both adults and larvae of

*Zygaena* spp. were recorded incidentally suggesting a breeding colony of burnet moths) and Red Clover.

The meadow has good nectar resources and good ecological connectivity, both in terms of proximity to other habitat parcels and in the quality of transitional habitats. Other pollinator resources such as decaying wood and still air are moderately well represented (see Fig. 6).

### **Invertebrate Habitat Potential Assessment for Key Monitoring Sites**

The Invertebrate Habitat Potential tool gives an overview of all 4 key monitoring sites. The assessment was carried out over a number of days in June and July 2022.

			<i>Bradley Field allotments</i>	<i>Kiln Orchard</i>	<i>Bradley Manor Meadow</i>	<i>Bradley Barton School</i>
<i>Invertebrate Habitat Potential: habitat elements assessed</i>	HE1	<b>Decaying Wood</b>	D	E	C	D
	HE2	<b>Rotational Management</b>	C	E	D	E
	HE3	<b>Nectar Resources</b>	C	D	B	D
	HE4	<b>Wet Substrates</b>	E	E	D	E
	HE5	<b>Open Water Habitats</b>	D	E	C	D
	HE6	<b>Structural Patchwork</b>	C	D	D	E
	HE7	<b>Still Air (S)</b>	C	D	C	D
	HE8	<b>Still Air(H)</b>	C	E	C	D
	HE9	<b>Connectivity</b>	B	E	B	B
	HE10	<b>Ecoclides</b>	D	E	C	D
	HE11	<b>Bare Earth</b>	C	D	D	D

**Figure 6. Summarised Invertebrate Habitat Potential assessment (see text) for the 4 primary monitoring sites. Negligible/Absent (E); Minor (D); Moderate (C); Major (B); Exceptional (A)**

The results suggest that currently Bradley Field Allotments and Bradley Manor Meadow have the most conducive habitats for invertebrates. Kiln Orchard appears to be the least hospitable, with Bradley Barton Primary School having marginally more resources through its proximity to the nearby woodland and having a thriving vegetable garden in the Outdoor Learning area.

One of the key attributes we compared between the four sites was Nectar Resources. Bradley Field Allotments had many cultivated flowering plants providing nectar. These include both edible produce species (e.g. legumes, Brassicas, root crops of the carrot family etc) and ornamentals (e.g. Cosmos, Dahlia). Perennial flowering plants (e.g. as cultivated fruit trees and bushes and wild hedgerow plants like honeysuckle and hedge bindweed) are also present but at lower density than in a semi-natural system like the Bradley Manor Meadow because much of the land is tilled. In the meadow the diverse assemblage of native wildflowers (including mature entomophilous trees and shrubs, like Small-leaved Lime, Blackthorn and Hawthorn on the edge of the meadow), with overlapping flowering periods coupled with the low intensity cutting regime is likely to provide a more significant and continuous nectar resource for pollinators over the whole summer season than the relatively short flowering duration annual crops covering much of the allotment areas.

When looking at habitat which is advantageous to pollinators, nectar resources are only one part of a much larger patchwork of elements required to sustain their life cycles. We can see from the results that both the Bradley Field Allotments and the Bradley Manor Meadow have a relatively high level of habitat resources which are advantageous for pollinators. Kiln Orchard and Bradley Barton Primary School currently have a relatively lower level of habitat resources across the range of types, so this means there is more need in these locations to actively intervene to improve the habitat quality for pollinators.

## **Flower Insect Timed Counts**

### **Comparison of Counts**

Over the course of the summer, from May to August 2022 a group of 12 volunteers carried out a total of 48 FIT counts across the 4 key monitoring sites of Bradley Field Allotments, Kiln Orchard, Bradley Barton Primary School and Bradley Manor Meadow, and in a number of local residents gardens (see Fig 7 below).

Within the FIT counts, broad species groups were identified. The average numbers of pollinators recorded per count were consistent with the national results published on the POMS website (between 6 to 15 insects per 10 minute count depending on the chosen nectar species). Nationally it was reported in July 2022 that the number of bees seen averages just over 3 per count. In our samples the overall average was 3.5 bees per count.

Although the number of counts undertaken in this pilot year were insufficient to allow a quantitatively meaningful comparison of pollinator abundance and diversity between the sites, the value of the Bradley Field allotments, where the majority of 2022 counts were undertaken, as a foraging site for bumblebees and honeybees is strongly indicated by the counts to date.

Looking at our basic data for all of the FIT counts it is clear that the method was successful in enabling both professionals and lay people to begin assessing the number of pollinators and species type in a given monitoring area and gives us a sound monitoring framework to develop over the coming years.

## FIT Count Results for Bradley Valley Area - Summer 2022

		All Insects	Beetles	Bumblebees	Butterflies	Honeybees	Hoverflies	Other flies	Other insects	Small insects	Solitary bees	Wasps	Nbr Counts
<b>Bradley Barton Primary</b>	Total	57	23	2	0	4	3	15	1	8	1	0	5
	Avg	11.4	4.6	0.4	0	0.8	0.6	3	0.2	1.6	0.2	0	
<b>Bradley Field Allotments</b>	Total	199	5	52	4	49	26	21	7	18	15	2	24
	Avg	8.29	0.2	2.16	0.166	2.04	1.08	0.875	0.29	0.75	0.625	0.08	
<b>Bradley Manor Meadow</b>	Total	41	6	13	0	12	0	5	1	1	2	1	8
	Avg	5.12	0.75	1.6	0	1.5	0	0.625	0.125	0.125	0.25	0.125	
<b>Kiln Orchard</b>	Total	75	38	1	10	1	4	14	0	2	2	3	8
	Avg	9.3	4.75	0.125	1.25	0.125	0.5	1.75	0	0.25	0.25	0.375	
<b>Residents Gardens</b>	Total	34	0	1	3	15	3	8	0	2	1	1	3
	Avg	11.33	0.00	0.33	1.00	5.00	1.00	2.67	0.00	0.67	0.33	0.33	

**Figure 7. Flower Insect Timed Counts for Bradley Valley Monitoring Sites, Summer 2022**

The FIT count results can be seen as an initial snapshot of what is happening with pollinators on each of the 4 key sites and in the wider community. We can compare the results from each site in terms of numbers and species groups, but we need to remember that these comparisons are not statistically significant. The raw data shows the presence of most of the key pollinator groups across all sites.

It is possible to make some qualitative remarks drawing from simple presence and absence within the results generated so far on the relative importance of the 4 sites for pollinator groups. For instance, Bumblebees were recorded in about 60% of all the counts undertaken. At Bradley Field Allotments they were encountered in 83% of counts whereas at Bradley Manor Meadow they were only present in 50% of counts, 40% at the school, and 13% at Kiln Orchard. Although recorded less frequently overall, the distribution of honey bee and solitary bee records among the sites follows a similar pattern. Further counts will be needed to corroborate this pattern but it is consistent with the types of nectar and habitat resource present on these sites currently (Kirk and Howes 2012.). Attractive allotment plants included:

- Comfrey
- Lavender
- Broad beans
- French beans

As expected, the site with the least diverse floral habitat – Kiln Orchard, has the lowest score for these pollinator types. Even though there is a relatively high diversity of flowering plant species on the site, the dominance of the grass species, Cock's-foot and False Oat-grass, over most of the area meant that there were very few nectar bearing plants in flower at any one time as a proportion of the vegetation. The only flowers available across the whole site for pollinators over the summer were small numbers of cow parsley, hogweed, ragwort and buttercup plants, with some buddleja around the margins. Notably however these few 'good nectar plants' did attract

good numbers of insects. The overall average pollinator numbers (Figure 12) were skewed by large numbers of beetles on hogweed flowers (again highlighting the need to conduct a larger number of counts so that extremes affect the averages less). These common white-flowered umbellifers are important nectar plants, particularly for flies and 75% of the counts at Kiln Orchard recorded flies (including hoverflies).

In a case study of pollinator provisioning in urban agriculture in Brighton and Hove, Nicholls *et al.* (2020) instructed growers to carry out twice monthly insect surveys on their holdings throughout the growing season. At the beginning of the Bradley Bug Network project we estimated that a broadly similar level of effort would be required to develop a robust evidence base from which to design and plan our interventions; a minimum of one FIT count per week per site on average. Bearing in mind that each FIT count only assesses a single nectar source species this may be insufficient for sites with diverse assemblages of wild nectar plants but should be adequate for simpler systems where the significant nectar resource at any point in time is limited to one or a small number of species.

### **Daytime Pollinator Species Identified**

Looking at the pollinator species themselves, studies show that although honey bees may visit more flowering plants per day than other species, this does not always equate to the efficacy of pollination for particular plant species. There is now growing evidence which shows that particular species of bee i.e. bumble bees, solitary bees or honey bees seem to be more efficient at pollinating certain plant species and wild bees in general can often be more effective pollinators than honey bees (Keatley-Garvey 2021 and Patterson 2018).

There is also now well documented evidence that pollinating effectiveness does not just depend on frequency of visits to flowers, but also on the ability of a particular pollinator to carry and re-distribute the pollen between flowers (Zych *et al.* 2013).

The fact that on all sites the results show a spread of different pollinator groups across the habitat area is encouraging, because it shows that there is a foundation of mixed pollinator species on all sites. Looking at the study as a whole, there are some noticeable differences between the appearance of particular species groups across all of the counts (Fig. 9)

<b>% Species Across All Counts</b>		
	<b>Present</b>	<b>Not Seen</b>
<b>Bumblebees</b>	58%	42%
<b>Other Flies</b>	46%	54%
<b>Solitary Bees</b>	42%	58%
<b>Hoverflies</b>	40%	60%
<b>Honeybees</b>	35%	65%
<b>Small Insects</b>	31%	69%
<b>Butterflies</b>	27%	73%
<b>Beetles</b>	25%	75%
<b>Wasps</b>	17%	83%
<b>Other Insects</b>	15%	85%

**Figure 9. Appearance of Species Groups Across All Counts as a Percentage of Total Count**

Bumblebees appear to be the most ubiquitous, appearing in 58% of all counts whilst, perhaps surprisingly, Honeybees are less prominent than Other Flies, Solitary Bees and Hoverflies. The low incidence of butterflies and moths in the counts (recorded in only 16% of Bradley Field Allotment counts, 38% of Kiln Orchard counts and absent in counts on the other two sites) is notable and,

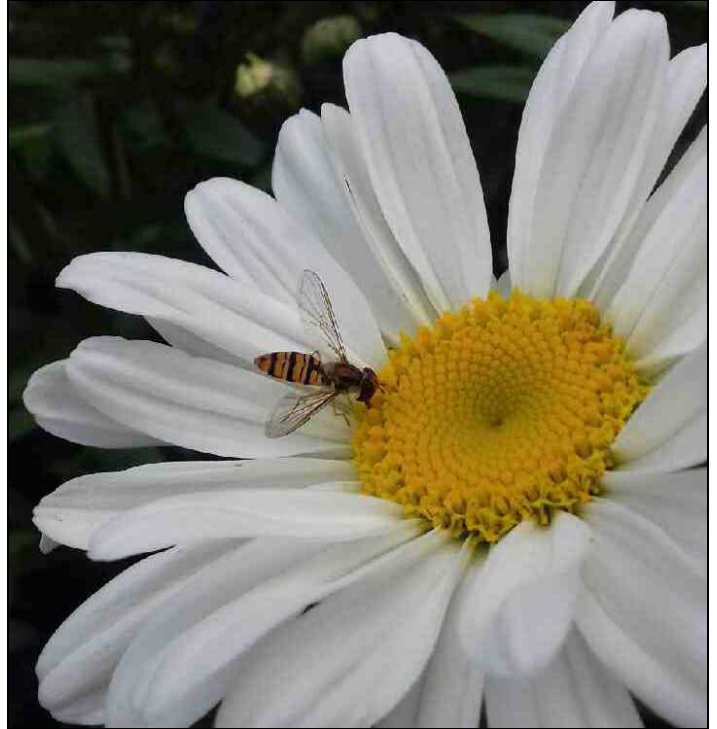


as with other patterns observed in the pilot year, it will be interesting to see if this is replicated when a full series of counts have been undertaken on all the sites for the whole of the growing season.

As most volunteers were counting pollinators for the first time, there was a greater emphasis on the identifying species group required by the FIT count process, rather than being able to identify the individual species. However, below are some of the pollinators that we were able to record to species level.



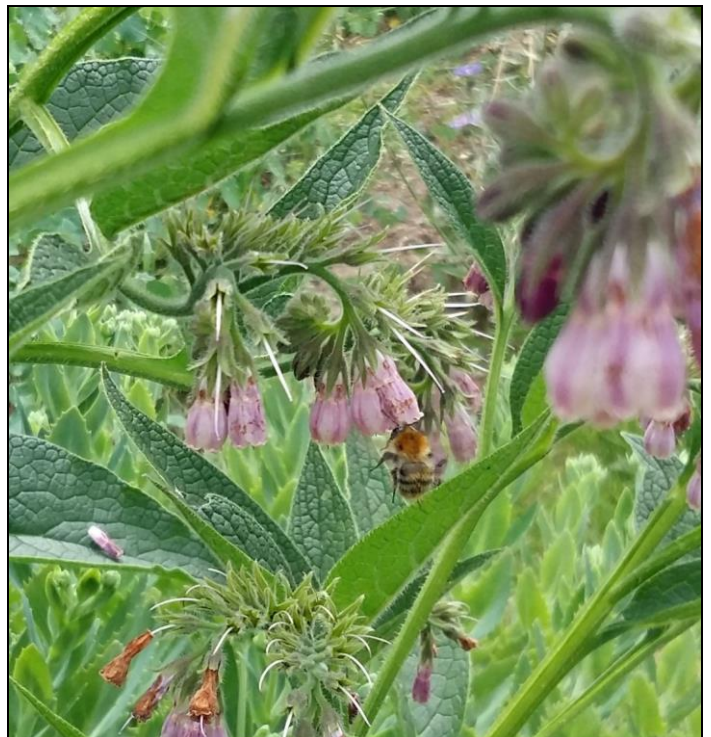
Honey Bee – *Apis mellifera*



Marmalade Hoverfly – *Episyrphus balteatus*



Patchwork Leaf-cutter Bee - *Megachile centuncularis*



Common Carder Bumblebee – *Bombus pascuorum*



Swollen-Thighed Beetle - *Oedemera nobilis*



Potato Capsid – *Closterotomus norwegicus*



Ichneumon wasp – *Ichneumon sarcitorius*



Common Blue butterfly – *Polyommatus icarus*

A full record of all the individual daytime pollinator species that were recorded during FIT counts or other survey work in the Bradley Valley project area can be seen in Appendix 2.

### **Wellbeing Benefits from Carrying Out FIT Counts**

Most volunteers reported that the process of carrying out the 10 minute long FIT Count generated a sense of being more “present” and more relaxed. The key element of the FIT Count is observing the same group of flowers for 10 minutes and this was likened by some people to being similar to meditation.

### **Moth Surveys**

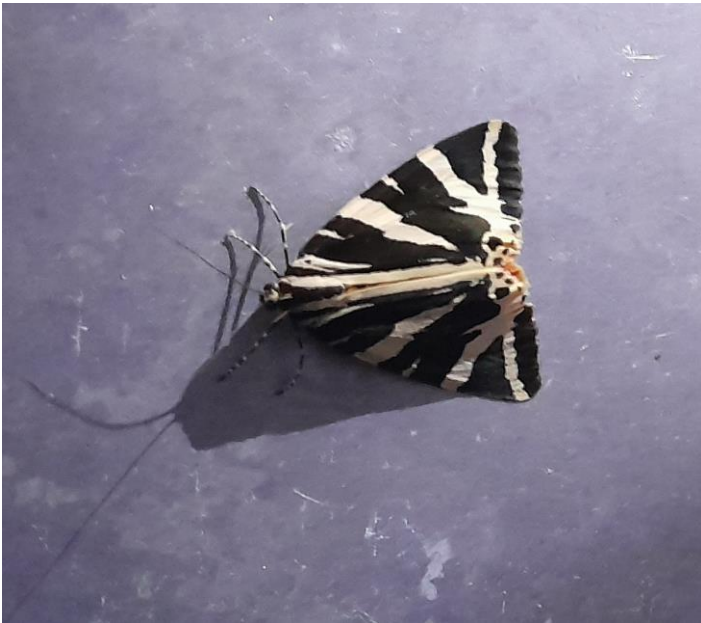
The moth trapping evenings produced records for 56 species of moth. The species on the wing in any place change throughout the year as the lifecycle of each moth differs in timing. Multiple surveys spaced throughout the year and sampling in different microhabitats are needed to produce a full record of the moth fauna. These initial records provide a sample of the whole assemblage likely to be using the Bradley Field Allotment, where the surveys were carried out. The majority of the species recorded were common moths, generalist species of woodland and grassland habitats (including gardens).

In 2007 many common or formerly common moth species were added to the UK Biodiversity Action Plan (BAP) list for research purposes because long term national monitoring evidence for rapid declines had emerged (Parsons & Davis 2007). Five of these species were recorded in our surveys on the Bradley Field Allotments site: Mullein Wave (*Scopula marginepunctata*), Small

Phoenix (*Ecliptopera silaceata*), Dusky Thorn (*Ennomos fuscantaria*), Rustic (*Hoplodrina blanda*) and Small Square-spot (*Diarsia rubi*). The Dusky Thorn, for example, is one of the thirty species of larger moths with the highest (statistically significant) rates of decrease in abundance measured over an average 10-year period (with a 47% decline in abundance over 10 years; Fox et al. 2021). The Nationally Scarce species, Madder Pearl (*Mecyna asinalis*) was also recorded and its foodplant, Wild Madder (*Rubia peregrina*) is present around the fringes of the allotments.

The moth trapping events had a second benefit in providing an opportunity for local volunteers and potential volunteers to encounter and observe a range of unfamiliar yet common insects. Such experiences can inspire people to engage further with other pollinator focused activities.

Some of the moths we identified are shown below.



Jersey Tiger – *Euplagia quadripunctaria*



Brimstone Moth - *Opisthograptis luteolata*



Small Phoenix - *Ecliptopera silaceata*



Dusky Thorn - *Ennomos fuscantaria*

A full record of recorded moths can be found in Appendix 3.

## Community Pesticide Audit


### Preparation for the Pilot Pesticide Amnesty

Engagement with local residents was carried out through an approach which had been piloted in other parts of the U.K. called a "Pesticide Amnesty". We identified a local neighbourhood area on the Bradley Valley housing estate, consisting of 3 streets containing a total of 62 properties. With the generous support of our local County Councillor, Phil Bullivant, we were able to obtain the resources that we needed to run neighbourhood "Amnesty" events.

One week before the planned event we posted a promotional flyer (see Fig 10) to half of the houses we were planning to visit in order to test whether pre-information had an effect on the quality and depth of engagement on the doorstep.

The Bradley Bug Recovery Network

# PESTICIDE AMNESTY



Pesticides are toxic chemicals which have many side effects on our local and global environment including:

- Reducing soil health
- Contaminating local water sources
- Harming animals, birds and fish
- Weakening or killing pollinating insects

Bradley Pesticide Amnesty gives you the chance to go pesticide-free in your garden and home to help protect pollinators and the wider ecosystem.

For more information please email [info@greenfutures-newtonabbot.co.uk](mailto:info@greenfutures-newtonabbot.co.uk) or visit our website [www.greenfutures-newtonabbot.co.uk](http://www.greenfutures-newtonabbot.co.uk)

Logos at the bottom: Green Futures Newton Abbot, Devon Environment Foundation, Devon County Council, Newton Abbot Town Council, NADCAA, SUEZ, Teignbridge.gov.uk

Figure 10 – The Bradley Pesticide Amnesty Flyer

We also approached the company responsible for managing Devon County's household recycling – Suez Recycling and Recovery UK, for guidance and assistance with managing any pesticides that we collected from households. One outcome of this connection was that we were going to need a secure storage environment where we could place any pesticide containers that we collected, prior to being disposed of safely. We therefore approached Newton Abbot Town Council for help and were kindly offered the use of some space within their maintenance depot. We were also put in touch with the company that Suez uses to dispose of pesticides – Peakes GB. Peakes were also very supportive and offered to provide us with secure storage containers that we could place at the Town Council's maintenance depot. Suez also generously agreed to pay for the disposal with Peakes of any pesticide containers that we collected.

Alongside the practical development of how this process was going to operate logistically, we needed to ensure that whatever we were engaged in was legal, since we were going to be dealing with a hazardous waste. The Environment Agency was approached for advice, and this was quite a complex process. One of the key components in the transfer of any hazardous material to a company for disposal is the "Hazardous Waste Regulations 2005 – Consignment Note" (see Appendix 4). Once we had been able to look at the information that was required to fill this in correctly, it became clear that this would require a high level of knowledge of the chemical components of any pesticide products that we might be handling and it would be much safer from a legal perspective at this stage in our learning process to leave this stage of the transfer pathway to a professional company – Peakes GB.

We therefore agreed with the Environment Agency and Peakes GB that we could transport any household pesticides that we collected to the Town Council's maintenance depot without needing to fill in a Consignment Note, and this would be done by Peakes GB at the time of their collection of the pesticide containers.

### **Delivery of the Pilot Pesticide Amnesty 29<sup>th</sup> October 2022**

The Pesticide Amnesty event was based around a gazebo that we set up on a piece of community open-space land within our project neighbourhood. We had a good turn out of volunteers so we were able to have two groups of two people knocking on doors, while 3 other people stayed with the gazebo to talk to interested local people who walked past.

In the days leading up to the event, we decided that we would not collect any household pesticides on the day, because at that stage we had not completely sorted out our disposal pathway to Peakes GB and we didn't want to put Green Futures in the position of not adequately fulfilling the requirements of the Environment Agency for handling hazardous waste.

We had also created a Green Futures identity card, with the support and involvement of our local Town Councillor, which included his mobile number, so that any residents who queried who we were could verify this immediately. We also decided that we would not knock on any doors with "No Cold Calling" signs. Even though we clearly weren't selling anything, we felt that it was important to respect householders requests.

Of the 62 houses that we had identified to engage with, we ended up engaging with 34. Most of these interactions were positive – there was very little sense of rejection from anyone around our direct approach. The main finding from these interactions was that most people (88%) didn't seem to be using pesticides in their gardens, which is a really positive result in the context of potential impact on pollinators (see Fig. 11 below).

GENERAL ENGAGEMENT		
No. of Properties in range:	62	
No. of Engagements	34	55 %
No. Of No Cold Callers:	13	21 %
No. of No-one Home:	17	27 %
No. of Positive:	27	79 %
No. of Negative:	4	12 %
No. of Neutral:	3	9 %
No. Currently using pesticides:	4	12 %
No. wanting removal	1	3 %

LEAFLETING									
No. of Households visited	51	No Contact		Positive		Neutral		Negative	
Leafleted	36	13	36 %	18	50 %	3	8 %	2	6 %
Not Leafleted (Excludes NCC)	13	4	31 %	7	54 %	0	0 %	2	15 %

Figure 11- Outcome of Engaging with Local Residents in the Bradley Valley Estate Around Garden Pesticide Use

Of the four households that were using pesticides in their gardens, one wanted removal and was willing to explore non-pesticide based approaches to gardening. We had also prepared packets of wildflower seeds for people to sow in their gardens and a small number of residents (6, 18%) took the seed.

Possibly one of the most significant outcomes of this initiative was discovering a relatively large degree of disinterest in the issue of pesticides and pollinators and a definite resistance to being involved in any kind of community initiative. Of the 34 households visited, 28 (82%) did not want to be involved in any kind of future work. Within the context of the degree to which our pollinator habitat and our wider environment is still deteriorating, this figure is concerning.

On a positive note, of the 6 (18%) residents who did express an interest in further involvement there was a suggestion of holding a cream tea at the local community centre to raise awareness and a suggestion of a piece of un-used land that Green Futures could make more pollinator-friendly. It also appeared that pre-leafleting resulted in a reduced level of negative response to the initiative.

We also had a meeting with Newton Abbot Town Council about whether they were still using pesticides as a weed management tool locally and discovered that they stopped using them in 2020 and converted to a hot foam-based weed management system. This is a really positive step!

## Habitat Restoration and Enhancement

### Kiln Orchard Open Space

This 0.35 ha of land is owned and maintained by Teignbridge District Council. Through working closely with their Green Spaces team we were able to agree that Green Futures could take on the management of roughly half of the site to try and increase the nectar resource for pollinators. Based on the floral survey of DBRC's ecologist we knew that there were lots of wildflower plants on site that had been dominated by the thick sward of grass over time. Our plan was therefore to:

1. Begin managing the land as a wildflower meadow – with one cut a year in July / August, with the mowings being taken away for hay or mulch.
2. Sowing the area with yellow rattle (*Rhinanthus minor*) – a parasitic flowering plant that feeds on the roots of grasses thereby reducing the nutrient quality of the surrounding soil which encourages other wildflowers.

TDC's Green Spaces team agreed to have the area cut at an agreed date, so we could go on with a group of volunteers to rake up the mowings ready for sowing.



**Green Futures volunteers from Bradley Barton raking up mowed grass ready for Rattle sowing**

We then sowed the yellow rattle seed, sourced from Goren Farm in East Devon over the whole area and designed a sign to interpret the project for local residents.



**Newton Abbot Mayor and Green Futures Volunteers with the new Kiln Orchard Meadow Sign**

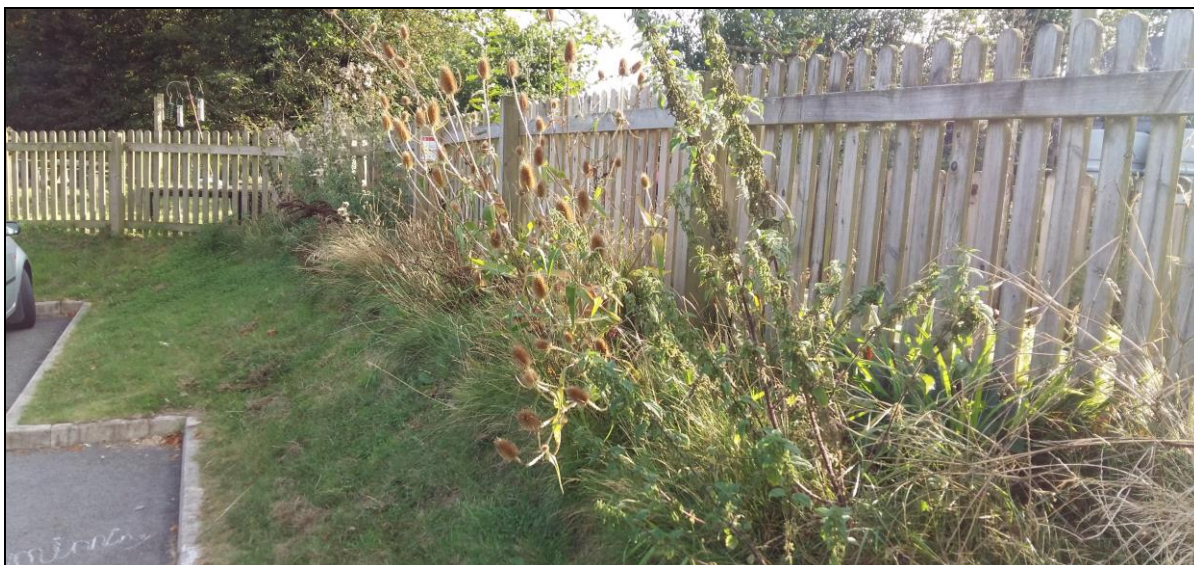
In addition to beginning the restoration of the land to its previous state as a semi-natural wildflower meadow, we were also given permission by TDC's Green Spaces team to plant a group of 6 native Devon apple trees in a corner of the site. Apple trees are a really positive addition to a low diversity site due to their blossom, which provides an early source of nectar to many pollinators, and obviously their fruit benefits us humans as well.



Launching the Bradley Barton Community Orchard with Clr Mike Hocking and local GF volunteers.

### **Bradley Barton Primary School**

In September 2021 we identified a relatively species poor area of land around the car park at the school. With the help of teachers and children we sowed a mixture of native and locally-produced wildflower seeds, sourced from Goren Farm.



Bradley Barton School Carpark border before wildflower seed sowing, Autumn 2021





**Children from Bradley Barton Primary School sowing wildflower seed with Green Futures volunteers.**

In the early summer of 2022 we could see a marked difference in the diversity of wildflowers now growing around the carpark.



**An abundance of wildflower in the Bradley Barton Primary School car park border**

In October 2022 we carried out another seed sowing event with teachers and children to hopefully further enhance the diversity of wildflowers there.

## **Bradley Manor Estate**

Working in partnership with National Trust Rangers and volunteers, in December 2022 we sowed approximately 150m<sup>2</sup> of rough grass parkland and semi-natural meadow with yellow rattle, sourced from Goren Farm and from the rattle we had introduced at Bradley Barton Primary School.



**Green Futures volunteers and NT Rangers strimming grass sward prior to rattle sowing.**



**NT Volunteer sowing yellow rattle in parkland on Bradley Manor Estate**

Hopefully in June 2023 we will begin to see the wonderful orchid-like flowers of the yellow rattle on the Estate attracting pollinators, and later in the season – July / August we will be able to hear their seeds “rattling” in their seed heads, ready to be harvested.



**Yellow rattle (*Rhinanthus minor*) flowering in the wild**

## **Engagement, Education and Involvement**

In total we estimate that we engaged with around 200 people directly. This includes professionals from partner organisations, volunteers, local residents and informal contacts with members of the general public on site. Its difficult to assess how many people we engaged with through indirect means such as press coverage, social media and flyers and posters, but a moderate estimate would be around another 500.

More significant than the numbers of people with whom we engaged was the quality of the particular kinds of engagement that the project achieved with people from different sectors of the community and this is explored below.

### **Local Organisations and Groups**

#### **Newton Abbot and District Co-operative Allotment Association (NADCAA)**

Central to what we achieved in 2022 was the ability to have a logistical base from which to operate and this was on the Bradley Field Allotments. NADCAA were consistently supportive and helpful throughout the project. The local Field Manager, backed up by the Secretary, Chair and administration volunteers, enabled us to:

- Run 2 FIT count training sessions
- Offer 3 Moth evenings
- Helped publicise the initiative to Field members

A number of allotment plot holders participated in the FIT count training sessions and 2 have become consistently involved in pollinator monitoring and habitat restoration work in other parts of the wider project area. The Secretary of NADCAA said *"We were keen to help and support the*

*Bug Project and found the Green Futures volunteers were enthusiastic to sow the seeds for future long term engagement within the study area and hopefully to other parts of Newton Abbot”.*

### **Newton Abbot Town Council (NATC)**

Local Town Councillors and council staff have played an essential role in enabling us to develop the Bug Recovery Network. We had firm backing from local Councillors Mike Hocking, Carol Bunday and Phil Bullivant, who live within the project area. They consistently helped us to promote the project in the local community and were always available to come to a project site for training events and press publicity. The Town Clerk and Assistant Clerk have also been consistently supportive of the project as a whole and generously made the Town Council's maintenance depot available for the temporary storage of pesticides. We have also begun to talk about how we can work together to manage Town Council-owned land to encourage more pollinators.

This combination of positive and reciprocally supportive relationships with Councillors and staff at the Town Council means that the project has gained a visible profile with the wider Council as a whole and is beginning to be seen within the context of a healthy local democracy.

### **Bradley Barton Primary School**

Bradley Barton Primary School was one of the first local organisations that we started working with around pollinator restoration, a year before the start of the Bug Recovery Network, in the summer of 2021. Within the busy demands of delivering their national curriculum responsibilities the Headteacher and Outdoor Learning staff have been incredibly supportive of what we are trying to achieve locally and really keen to involve the children in practical project initiatives. Having the opportunity to work with teachers and pupils in an outdoor educational setting has been really informative for the project as a whole.

### **The National Trust**

The Bradley Manor Estate is a really unique area of wild, semi-wild habitat close to the town centre of Newton Abbot. We had developed a great relationship with the Head Ranger and his staff team prior to developing the Bug Recovery Network and this really helped on an operational level when it came to monitoring pollinators and running training events. The Bradley Manor Meadow, as we have seen from our Invertebrate Habitat Potential assessment, is one of the most ideal sites in our local area for flourishing pollinators. Being able to work alongside the Rangers on this site and in other areas of the estate has been a real benefit, partly due to their extensive knowledge of wildlife and habitat management, but also their professional and experienced approach around finding the balance between people's needs and the needs of wildlife.

### **Teignbridge District Council (TDC)**

Much of the public land across our project area is owned and managed by Teignbridge District Council and one of our core monitoring areas, with great potential for pollinator-friendly habitat restoration – Kiln Orchard. TDC's Green Spaces Manager and their Green Spaces Project Officer have been really enthusiastic and supportive right from the start of the project, and giving us the opportunity to begin managing Kiln Orchard as a semi-natural meadow again is potentially a really significant step for the project as a whole, and hopefully for local pollinators too! They have also been really generous with their practical support – providing us with signs (based on our design) and bringing in their maintenance contractor, Idverde to install them on site. This sort of practical help on the ground is invaluable, not just because it reduces our project delivery costs, but because it demonstrates the level at which TDC is invested in the partnership and the project as a whole – which is motivating for us all.

### **Devon County Council (DCC)**

Devon County Council has a number of roles in our local area which have significance for the Bug Recovery Network. Managing the maintenance of road verges and managing the household

recycling centres are two key examples. Our local County Councillor, Phil Bullivant has been consistently supportive of what we're aiming to achieve - providing Locality funding for the pilot Pesticide Amnesty and helping with ideas for how we can develop the Bradley Bug Recovery Network, including networking more closely with the local Beekeepers Association and a local allotment association which is not part of NADCAA.

### **Suez Recycling and Recovery UK**

As a large, multi-national business, SUEZ have shown a really keen interest in the Bug Recovery Network. After initial contact with the P.A. to their Chief Operations Manager we were able to begin exploring how a Pesticide Amnesty could work with the regional management team for Devon and Cornwall. Over the last year we have had several meetings to look at how a neighbourhood and town-wide pesticide amnesty could work and their Senior Site Manager came to our pilot pesticide amnesty event in October 2022, which gave us an opportunity for us to talk about how we could develop this work in the future.

### **Mid-Devon Advertiser**

Fundamental to the success of any community initiative is the level of publicity that you are able to generate. The Mid-Devon Advertiser have been hugely supportive over the whole course of the project, giving us constant encouragement and kindly editing and then publishing our regular press releases to appear in the paper which has a reach of around 10,000 people. We have also had a face-to-face meeting to take a more strategic look at the role of the “narrative” that we are aiming to generate around the pollinator and habitat restoration work.

## **Local Residents and the Wider Community**

### **Events and Activities**

Involving and engaging local residents is a key objective of the project as a whole because local people are part of their local environment and if we, as a society, are serious about looking after our wider ecosystem, this has to be embedded into our everyday lives and our local neighbourhoods.

As stated in the Method section of the report we attempted to engage with local residents through local groups and organisations, direct contact through events and doorstep conversations and publicity in local shops and media.

In total we engaged directly with 61 people through formal events and activities between May 2022 – February 2023. The breakdown of numbers at each event are detailed in Figure 12 below.

<b>Event / Activity</b>	<b>Local Residents</b>	<b>Wider Community</b>	<b>Total</b>	<b>Longer term engagement</b>
FIT Count Training at Bradley Field Allotments	9	6	15	10
Bradley Bug Canvassing	8	0	8	3
Moth Evenings at Bradley Field Allotments	6	5	11	5
Habitat Restoration at Kiln Orchard, BB Primary School + Bradley Manor Estate	5	0	5	5
Seed Sowing at Bradley Barton Primary School	30	0	30	2
Bradley Pesticide Amnesty	38	0	38	2

**Figure 12 - Numbers of Local Residents and people in the Wider Community Engaged in Bug Recovery Events**

The Total figure for each event includes some of the same people, so the actual figure for Local Residents engaged with is 85 and the number of Local Residents who have become involved in the project over the longer term is 8.

## Publicity

We had 9 key routes for publicising the initiative to the local and wider community:

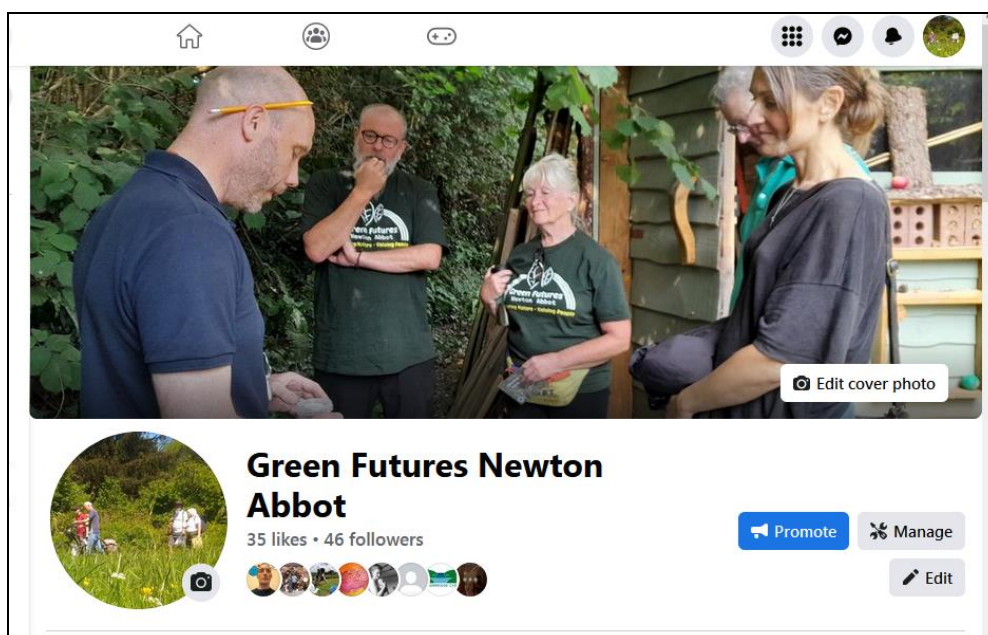
1. Word of mouth
2. Flyers delivered directly to peoples houses
3. Doorstep engagement with local residents
4. Posters in shop windows
5. Emailed invitations through local organisation's platform
6. Press articles in the Mid Devon Advertiser
7. Social media platforms
8. Physical signage at the Kiln Orchard site.
9. Green Futures website.

It is difficult to assess the effectiveness of each of these approaches to publicity in a formal manner, but there is plenty of anecdotal evidence that we can use to gain a sense of the effectiveness of each approach.

All of the 8 local residents who have become involved in, and committed to, the development of the project over the longer term have come through direct face to face contact either on the doorstep or through GF project workers meeting them in other settings. The most effective ways we have found of turning publicity into participation in events and activities has been either a face to face invitation or a direct email through a local organisation's membership.

Flyers, posters and social media activity has definitely generated a greater level of awareness of what the Bug Recovery Network is trying to achieve – we estimate that these routes have engaged with at least 2-300 people, but so far none of these routes has resulted in any new local residents or members of the wider community becoming involved with the project over the long term.

Social media has been good for enabling us to receive feedback from people in other parts of Newton Abbot and further a field across Teignbridge.



Our Facebook page now has 46 followers and we regularly receive likes and comments on our posts. Instagram did not work for us at all. We had hoped that this would relate well to younger people, but we did not get any traction after 6 months presence, so we did not continue on this platform. We have also had some interest from people in the wider community through our website.

## Green Futures Community Projects



### Bradley Bug Recovery Network

There is growing evidence that nationally and globally insect populations are falling, with particular concern around pollinating insects like bees and butterflies. To get a clearer sense of what species of pollinators we have in our local area, and in what levels of abundance, we want to enable local people to get involved. With the help of professional ecologists from the Devon Biodiversity Records Centre, we will start measuring and recording in order to generate the necessary baseline data across the Bradley area of Newton Abbot.

The project will use the information collected from these locations to assess what action we need to take to encourage more insects, particularly pollinators, into our local area. We will also feed our results into the UK Pollinator Monitoring Scheme, run by the Pollinator Monitoring and Research Partnership. We are currently working with Bradley Barton Primary School to help encourage more insects to their environment...

To get involved or find out more click on the butterfly



## Welcome to Green Futures Newton Abbot

### Restoring Nature, Valuing People

We are a community organisation based in Newton Abbot, that is dedicated to working with local people to improve our levels of wellbeing, grow our green economy and take care of our natural environment.

We're developing a range of projects and services for people from all parts of our community, so do please have a look around our website and let us know if you'd like any more info.

Lets improve our lives and our planet together!

As you explore our site you will notice that each page, has its own look and feel to it, and yet all are connected. This reflects the work of our staff, volunteers and the outdoor environment itself, creating an online ecosystem that replicates the importance of connectivity we share with the land that we work with and on.

A key focus at the moment is developing the [Bradley Bug Recovery Network](#)

This is a broad-based, citizen science initiative to engage with local residents in the Bradley Barton and Bradley Valley neighbourhoods in Newton Abbot. We will 'bee' measuring insect numbers to give us a baseline reading from which we can chart our success in restoring populations and increase biodiversity.



Between May 2022 and December 2023 we were able to have 4 articles printed in the Mid Devon Advertiser. In addition to raising awareness of the project, they also serve to archive some of our achievements in a chronological way, which is a great way to document what we have achieved.



## It's a bug's life for some

GREEN Futures Newton Abbot is launching an initiative to tackle the significant decline in pollinating insects, and they're asking locals to get involved.

A spokesman for the community environmental group explained: 'Pollinators keep our ecosystems healthy by helping plants to reproduce. They are essential for us too because they help crops develop to produce food. It is estimated that pollinators are responsible for 35 per cent of global food production. But their numbers have been plummeting over the last few decades. Remember when you used to go for a drive and have a windscreen covered with insects? This no longer happens.'

They continued: 'The good news is that we can all help pollinators to regain healthy population levels again.'

The Bradley Bug Recovery Network is a pilot project, funded by the Devon Environment Foundation, focusing on the specific neighbourhood of Bradley Valley in Newton Abbot. Together with Bradley Barton Primary School, the Newton Abbot and District Co-operative Allotment Association, the National Trust, Newton Abbot Town Council, Teignbridge District Council, local householders and the Devon Biodiversity Records Centre. They are currently monitoring pollinator levels in order to establish a baseline of population numbers.

The group will then work with their partners and residents, sowing wildflower seeds to boost the area's nectar resources. Next summer they'll see if numbers have increased.

Bradley Barton Primary School headteacher, Julie Barton said: 'Sowing wildflowers around our school car park has brightened up the area and helped give our pupils a better understanding of pollinators need wildflowers. It is a really positive example of what we can all do to help restore pollinator levels in our local area.'

The spokesman added: 'Getting local people involved is the key to the success of the project. We are aiming to support as many Bradley Valley residents as possible over the summer to spend 10 minutes a week in their gardens counting the pollinators that land on particular flowers. This will give us a larger and more accurate measurement of pollinator numbers in the area. Anyone can get involved, just contact us on [bradleybugs@greenfutures-newtonabbot.co.uk](mailto:bradleybugs@greenfutures-newtonabbot.co.uk) or look us up on Instagram @bradleybugs. Together we can help our pollinator pals to get back on their feet again so we can all benefit!



● Bradley Pesticide Amnesty Project Partners standing from right to left - Sam Hibbert, Green Futures Chairperson, Newton Abbot Town Councillors Mike Hocking and Carol Bunday, SUEZ Senior Site Manager, Tom Clarke, Devon County Councillor, Phil Bullivant, Green Futures Volunteers and kneeling Green Futures Co-ordinator, Andrew Rothery.

# Ridding the poison in your garden

ENVIRONMENTAL group Green Futures held a 'pesticide awareness day' last Saturday.

The event was a pilot project which will now be rolled out as part of a wider programme in the new year. And once the required paperwork has been approved by the Environment Agency, the group hopes to stage a series of pesticide 'amnesties' where residents will be able to hand in their unwanted pesticides, safe in the knowledge they will be safely disposed.

The event, held at Bradley Barton in Newton Abbot, was held thanks to support from Devon County Council, Newton Abbot Town Council, SUEZ Recycling and Recovery UK, the Devon Environment Foundation and Teignbridge District Council. AS well as raising awareness to grow handed out packets of wildflower seeds, courtesy of the Bradley Bug Recovery Network. The network is a partnership project, co-ordinated by Green Futures, to show what a local community can do to make a difference and reverse this concerning decline in pollinators.

Green Futures spokesman Andrew Rothery said: 'Pesticides are a wide range of chemicals that are designed to kill plants, insects and other forms of life that could reduce the productivity of agricultural crops or garden plants that we want to see flourish. We also

use some pesticides to kill weeds that may be growing where we don't want them to.

'Despite assurances that pesticides are "specific" chemicals that break down relatively quickly in the environment, they are found in our water supply, in our soil and even within our own body.' Since the 1950's there has been grow-



ing evidence that pesticides cause damage to a wide range of organisms that live in the wild and more recently it has been confirmed that pesticide usage has been one of the factors behind the observed decline in pollinating insects within the U.K. and across the rest of the world over the last 40 years.'

Green Futures chairperson, Sam Hibbert said: 'Our aim is to engage directly with local people in their own community. If we can find out what people think about pesticides and support them to introduce chemical-free gardening, we can create a cleaner and greener environment that supports more pollinators and a health-

ier future for our children and grandchildren!'

The Bradley Pesticide Amnesty was generously funded by County Councillor for Newton Abbot North, Phil Bullivant, who said: 'It makes sense to do all we can to encourage pollinators. If we can go pesticide-free in our gardens, we can help bees and other insects to flourish and that means better food production and a more resilient ecosystem.'

Having made a positive start in Bradley Barton, the aim is to run a pesticide amnesty for the whole of the Bradley Ward area, including Highweek and Hele Park, where people will be able to bring in any unused pesticides that are in the back of the garden shed.

SUEZ Senior Site Manager, Tom Clarke came down to see the progress at Bradley and confirmed their support for the initiative: 'At SUEZ we're passionate about protecting our natural environment, and improving biodiversity is an important part of this. We're pleased to support Green Futures in this project by ensuring that all products that are handed in will be disposed of safely.'

Newton Abbot Town Councillor Mike Hocking said: 'This initial research into the attitudes of local people towards pesticide use clearly shows that there is a growing move to go pesticide-free

and those who are still using chemicals to control insects and weeds are open to exploring other options. We now want to expand this work to reach all the other residents across the Bradley area.'

● For more information about Green Futures do check out their website [www.greenfutures-newtonabbot.co.uk](http://www.greenfutures-newtonabbot.co.uk) or email [info@greenfutures-newtonabbot.co.uk](mailto:info@greenfutures-newtonabbot.co.uk)



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**NEWS**

# Mowed, raked and ready at Kiln Orchard

GREEN Futures Newton Abbot has formed a partnership with Teignbridge District Council to manage part of an open space area on the Bradley Barton housing estate in Newton Abbot, called Kiln Orchard.

Local Green Futures volunteers will restore the area to become a wildflower meadow as part of its Bradley Bug Recovery Network to help boost pollinator populations in the area.

Ecologist Phil Samsun, from Devon Biodiversity Records Centre, has carried out a floral survey of the site and found 52 species of native flowering plant.

He said: 'The survey shows a link back to the typical lowland Devon grassland which the rest of the area might have been like in the 1960s before the houses were built. There are plenty of wildflowers in here, we just need to manage it to benefit them.'

The key inhibitor of wildflowers is thick long grass.

In order to give the native wildflowers a chance, the grass must be cut and the mowings taken away, because this reduces the

nutrients for future growth. Wildflower plants survive best in a low nutrient environment. Another key management tool is the introduction of the wildflower Yellow Rattle. Rattle feeds on the roots of grasses and so helps to reduce their dominance, making space for more wildflowers to flourish.



Volunteers from Green Futures are pictured, inset, raking off the mowings at Kiln Orchard to prepare for sowing the ground with Yellow Rattle seed.

Now is the best time of year for wildflower sowing because the seeds need a winter in the ground before they germinate the spring. Newton Abbot mayor, Cllr Carol Bunday, came to give the volunteers her support encourage-

ment. She said: 'It's really great what they are doing. Our local wildlife needs all the help it can get and anything we can do to encourage more pollinators in Newton Abbot has got to be a good thing.'



● Mayor of Newton Abbot, Carol Bunday (second from right) gives her support and encouragement to Green Futures volunteers with co-ordinator, Andrew Rothery.

New signage for the area has kindly been provided by Teignbridge contractors Idverde, telling local people what's happening and encouraging them to get involved.

Andrew Rothery, Green Futures co-ordinator said: 'Today is a big step in the journey to restore this area

back to the wildflower meadow that it probably was over 50 years ago.'

'We want to thank Mark Payne, Teignbridge Green Spaces Manager for his support for this project, Devon Environment Foundation for enabling the ecological surveying to happen and all of our local Bradley volunteers who are putting their time in to help pollinators.'

Green Futures is a community organisation based in Newton Abbot, dedicated to working with local people to improve people's levels of wellbeing, grow the green economy



and take care of the natural environment.

They are developing a range of projects and services for people from all parts of the community. For more information go to [www.greenfutures-newtonabbot.co.uk](http://www.greenfutures-newtonabbot.co.uk).

**NEWS**

# Residents plant their own apple orchard

BRADLEY Barton residents launched their own Community Orchard last week.

They planted six native Devon varieties of apple tree at open space land aptly named Kiln Orchard Meadow in Newton Abbot.

Andrew Rothery of Green Futures explained: 'Apples and orchards have been an integral part of Devon life for centuries, with local varieties of apple evolving to suit specific micro-climates and ecosystems. Apples are obviously a really tasty and healthy food resource for everyone, but apple trees also provide nectar resources for pollinating insects and homes for many other species of invertebrates and birds.'

'With the support of Green Futures Newton Abbot, Teignbridge District Council, Newton Abbot Town Council, Devon Environment Foundation, Orchard Link, and the Devon Community Foundation, the Bradley Barton Community Orchard aims to plant apple trees across the local area on open space land that currently has limited biodiversity.'

Tim Walker, from Orchard Link said: 'We're really keen to promote new orchards in built up areas near to where people live, because more

people of all ages will benefit, not just from the delicious local apples, but also from learning more about their local ecosystem and becoming more involved.'

The six varieties of tree that were planted were - Paington Marigold, Pig's Snout, Peter Lock, Luccombe's Pine, Tidcombe Seedling and a Plympton Pippin.

'It's a great start,' said local Councillor Mike Hocking. 'These apples are going to be available for local people to harvest and children particularly are going to benefit from being able to learn about where apples come from and the life-cycle that goes on throughout the year.'

Paul Hearn, a Green Futures Volunteer said: 'It's great to feel part of something creative and positive in our local community. It gives us a place to go when we go out for a walk where we've had an input and made a difference.'



● Green Futures chairperson Sam Hibbert, Cllr Mike Hocking, centre, and Andrew Rothery, right, with Bradley Barton orchard volunteers.

Teignbridge Council's Green Spaces team are behind the initiative. 'It's wonderful to see local people taking the initiative,' said Green Spaces manager, Mark Payne.

'We are really keen to encourage greater biodiversity on Teignbridge Council's land whenever we

can, so we're only too happy to be working here with Green Futures volunteers.'

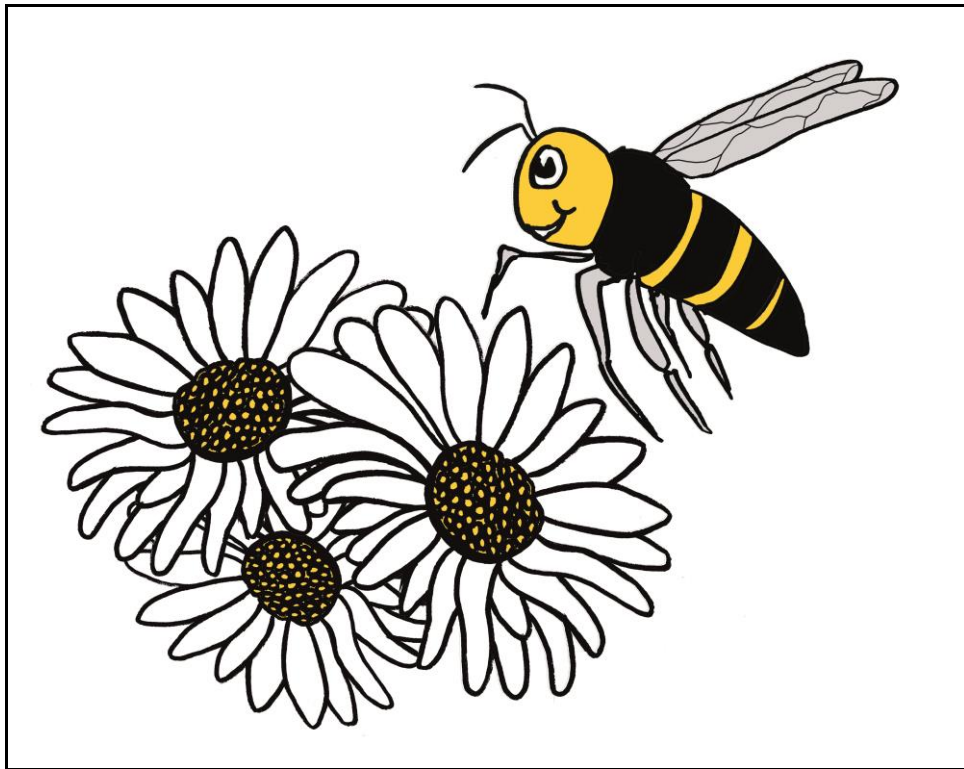
For more information about the Bradley Barton Community Orchard, go to [www.greenfutures-newtonabbot.co.uk](http://www.greenfutures-newtonabbot.co.uk) or check out the Green Futures Newton Abbot Facebook page.

Articles published in the Mid Devon Advertiser promoting the Bradley Bug Recovery Network

## Bradley the Bee

In order to create more continuity in the narrative we were generating with local people around our work with pollinators, we created an pollinator "mascot" that we named "Bradley the Bee". Bradley the Bee began life as a rough sketch in a project meeting, but soon we realised that it

could be useful to put a friendlier non-human face on all our publicity related to the Bug Recovery Network.



Bradley the Bee with flowers ( © Daweway Publications 2022)

Bradley the Bee now appears on all of our flyers and on related areas of our website and social media platforms.

### **Feedback from the Bradley Bug Champions**

We asked our core volunteers for their feedback on the project so far based on the following 3 questions :

#### **1. What do you feel were the 3 most positive aspects of the project?**

*"Involving the community, making them aware of the decline in pollinators, which will affect the food we grow."* – Melinda

*"Gaining and sharing important knowledge in the hope people will make steps to help nature."* – Melinda

*"Realising how our planting might benefit insects"* – Paul

*"Understanding the scope of insect varieties in our garden"* - Maddy

*"You managed to get people from the allotment to take part."* – Karen

*"The string that was provided to help gauge the area we had to survey."* – Karen

*"Holding the two moth evenings"* – Karen

*"Promoting simple methods of bug monitoring that over time can help build reliable data"* – Steve

*"Engaging with organisations and individuals in the target area to build knowledge and skills through making small positive changes that grow in significance over time"* - Steve

*"The adaptation of meadow areas to encourage pollinators"* – Sam

*"Creating a more diverse environment to enjoy" - Sam*

*"Encouraging people to reduce the use of pesticides" – Sam*

## **2. What could be changed or improved in 2023?**

*"Get other allotment plots to take part and properties around the allotment areas" – Karen*

*"Make the [FIT Count] form easier for children by using images of pollinators" – Karen*

*"More could be made of the outcomes of the project – the significance of the [FIT] count" - Paul*

## **3. Any other thoughts or feedback?**

*"Shame that only a small number of people from the allotments got involved." - Karen*

*"The get together at Christmas was very enjoyable" – Karen*

*"Very much enjoyed the simple timed task – being in the garden with the meditative aspect of the count" - Maddy*

## **Networking Regionally and Nationally**

- **The UK Centre for Ecology and Hydrology (UKCEH)**

The UK Centre for Ecology and Hydrology is the instigator and the host of the UK Pollinator Monitoring Scheme (UK POMS), around which our pollinator monitoring approach was based. The team at UKCEH have been really supportive and we had several exchanges of email and telephone conversations about how POMS would work best within the context of the Bradley Bug Recovery Network.

The Green Futures Co-ordinator was also invited to participate in a focus group that UKCEH held in November 2022 about how POMS had worked in practice. We were the only NGO present amongst a range of scientists and data experts. This was a really useful opportunity to talk about the importance of non-scientific "lay-person" input to academic research, which was welcomed by the focalisers of the event.

- **The Pesticide Action Network (PAN)**

We had some very useful contacts with PAN around the development of our pilot Pesticide Amnesty. The Bradley Bug Recovery Network is now part of their Pesticide Free Towns campaign and we have the opportunity to network with a wide range of community groups and organisations who are involved in this UK-wide project.

PAN is very much a campaigning organisation and we have had a number of conversations about the difference between this approach and the organic, partnership-building approach that Green Futures favours for its work in local communities.

- **The Bristol Natural History Consortium (BNHC)**

We had a very useful zoom meeting with project workers at BNHC around their experiences of running the UK's first pesticide amnesty. This informed our approach with our pilot Amnesty.

## Section 4

# Conclusions and Next Steps

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### Habitat Suitability for Pollinators

The Bradley Valley area as a whole has a diverse habitat composition which supports all the main species groups of pollinators at varying levels.

1. It is clear that the project area as a whole has a significant portion of semi-natural habitat (ancient woodland) and semi-natural grassland, together with a patchwork of diverse habitat resources within residential areas, which support all of the main species groups of pollinator. With regard to enabling an increase in pollinating insect populations over time, this is a promising foundation to work with.
2. Within the 4 key monitoring sites it is clear that Bradley Manor Meadow and Bradley Field Allotments currently have habitat elements that are best suited to supporting pollinators.
3. Kiln Orchard and Bradley Barton Primary School currently have a lower abundance of habitat elements that are suitable for pollinators, but there is ample opportunity for us to take practical action to ameliorate this, which we have now started ( see Next Steps below).
4. As a result of the botanical and IHP assessments carried out in 2022 baseline information on the principal nectar sources present on these sites is now available. This information gives us a more structured framework for future pollinator counts, ensuring attention is directed to key habitat resources and enabling a more meaningful comparison between sites.

### **Next Steps**

The IHP site assessment gives a framework for proposing and planning actions to enhance pollinator habitat on the four sites and thereby increase ecological resilience in the area and community as a whole.

1. Kiln Orchard wildflower meadow restoration has begun this year with sowing of yellow rattle and introducing a wildflower meadow mowing cycle in partnership with TDC. Additional plant biodiversity has also been introduced with the planting of a native Devon apple orchard. The site will be surveyed again in 2023 to identify how nectar resources are developing.
2. Bradley Barton Primary School carpark border has been sown again this year with a mix of native Devon wildflower species. Yellow rattle was harvested for use on other sites. Green Futures (GF) will work with the school to explore restoring more of the school site in 2023.
3. Bradley Manor Estate has been sown with yellow rattle and the progress of this will be monitored in 2023 along with the levels of floral biodiversity in the Manor Meadow.
4. GF will explore the potential to enhance pollinator habitat within the Bradley Field Allotments with the Field Manager and the NADCAA management committee. One opportunity could be to encourage semi-natural, wildflower-rich, grassland to develop on un-used patches of land on the allotment fringes.
5. GF will explore the potential to enhance pollinator habitat on the patchwork of community open space land within the Bradley Valley residential area, in partnership with TDC, NATC and DCC.
6. We will also begin working with local farmers to enhance pollinator habitat around field margins.

7. We also need to learn more about what habitat supports the larval stage of our key pollinators.

## **Pollinator Species and Populations**

We have now established a “citizen science-based” monitoring framework which enables local people to keep track of the diversity and abundance of the pollinator species living in their neighbourhood and begin to build up a more detailed knowledge-base that feeds into regional and national recording.

1. Due to the small sample size of our FIT count data, it is difficult to make any conclusions of statistical significance, but it is clear that there was a noticeable difference in the numbers and diversity of pollinator populations between the grass dominated habitat of Kiln Orchard Open Space and the more florally diverse Bradley Field Allotments and Bradley Manor Meadow.

2. Bumblebees appear to be the most ubiquitous the FIT Count defined pollinator species group across all sites. Flies (Hoverflies and Other flies combined) however occur in a slightly higher proportion of the FIT counts carried out.

3. Bradley Field Allotments appears to be a key foraging site for bumblebees and honeybees.

4. Prior to 2022 there were 44 species of Lepidoptera (butterflies and moths) with localised records in the project area (data held by DBRC by permission of Devon Moth Group and Butterfly Conservation). The moth surveys undertaken in the Bradley Bug Network pilot year coupled with incidental records of Lepidoptera from FIT counts (above) increase this total to 95 species.

5. The Dusky Thorn moth, a species which is experiencing one of the most serious rates of decline across the UK, was found at Bradley Field Allotments.

6. The Madder Pearl moth, a species that is on the Nationally Scarce list, was recorded at the Bradley Field Allotments, along with its food source Wild Madder.

7. The results have clearly validated the efficacy of the approach to monitoring pollinator levels of diversity and abundance, and has produced the information needed to plan a volunteer-led monitoring programme across the project area in future years.

### **Next Steps**

1. We need to increase our monitoring frequency to a minimum of 60 counts per site over the whole season in order to generate data that has a robust statistical significance and assess whether other sites, with their differing nectar resource profiles, are more or less important for different pollinator groups. This is essentially an increase in volunteer capacity to at least 20 people doing a minimum of 12 counts each. We will also aim to create site-specific volunteer Monitoring Teams, so that people can build up a deeper knowledge base for a particular site, hopefully involving residents who live near to the site.

2. Our recommendations following the pilot year are for a flexible approach where future volunteer effort is coordinated to ensure that all sites are monitored at least twice per month and that all the significant nectar sources in evidence at each visit are assessed. For some sites this will necessitate multiple counts per visit with some of the same flower species being counted multiple times through the season. The overall number of counts should be determined by the available nectar resource and not by observer preference for site, flower or insect type. This is important as the natural human tendency towards selecting large or colourful flowers and/or

those with large and colourful pollinators (bees and butterflies) obviously in attendance will undermine inter-site comparisons.

3. We need to improve our ability to identify insect species. This will require a range of training resources which include identification books, apps and individual feedback from experienced naturalists /entomologists . But most of all developing a regular practice of going out to monitor and survey our local environment.

4. We need to improve our understanding of the relative importance of specific species for pollination across the area. This could take the form of a more focused and intense piece of surveying and monitoring carried out by professional ecologists / entomologists.

5. The relevance of moths to our area's pollination needs to be explored in much greater depth. We will therefore aim to carry out more night-time moth trapping events on all 4 key monitoring sites over 2023 in order to mirror our work with daytime pollinators and look at how moth's pollination roles are being studied elsewhere.

6. While the focus on our 4 key monitoring sites is important, we also need to dramatically increase the capacity for local residents to carry out pollinator monitoring in their own gardens. We will therefore look to develop the role of our Bradley Bug Champions through different routes of community engagement such as shop advertising, creating Bug Noticeboards across the residential area and in-person coaching and support over 2023 and beyond.

7. Local farmers potentially have a key role to play in the study of pollinator levels in the Bradley Valley area and taking restorative land management steps to improve pollinator abundance. GF will therefore engage with local farmers to explore how we can work together in 2023 to bring them into the Bug Recovery Network.

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## **Reducing Pesticide Use in the Bradley Valley Area**

Pesticides are still being used to manage garden environments in the Bradley Valley area, but many people are now aware of the damaging impact they have on pollinating insects.

1. There is a huge disparity between the financial costs and administration involved in purchasing household pesticides and their safe disposal. Anyone can go to a shop and buy a container of pesticide with no paper trail to the Environment Agency and minimal cost. If someone wants to dispose of a container of pesticide, it is a much more expensive and complex process. It seems that this situation favours the pesticide manufacturers, while communities, taxpayers and the ecosystem has ultimately have to pay for the "clean-up" costs.

2. The pilot Pesticide Amnesty was a novel approach to engaging with local people about the damage that pesticides do to pollinating insects. It has informed the wider project about the potential use of pesticides within residential gardens and about how best we can engage with local people to find alternatives to pesticides in their approaches to garden management and to involve them in becoming more "pollinator active".

3. There was a significant level of non-participation due to a range of factors, including being too busy and not wanting to engage in any community-based activity outside of immediate family and friends, so the results are not conclusive.

4. Of those people who did participate there seemed to be a relatively low percentage of pesticide usage, partly due to people not engaging in their gardens at all, as well as those who were making a conscious decision not to use pesticides.

5. Of those who were using pesticides, there seemed to be a willingness to reduce or stop and seek alternative approaches to garden management.
6. GF has developed a proactive partnership with NATC, SUEZ Recycling and Recovery UK, DCC and TDC to progress the Pesticide Free Bradley initiative and will explore running an Amnesty with wider community reach in 2023.
7. We discovered that NATC decided to stop using pesticides in 2020 for weed control and now uses a foam based treatment. We are interested in combining this with an approach to land management that involves a lower management regime for plants, in order to allow them to flower to create more nectar resource.

### **Next Steps**

1. While the pilot Pesticide Amnesty was a useful exercise to explore how best to engage with local people around pollinator issues it is not an approach that we will scale up. We will therefore work with project partners to explore other approaches to engage with local people around reducing pesticide such as linking in to the household waste collection service managed by TDC.
2. We will explore working with NADCAA to develop a bespoke knowledge base for gardeners to adopt alternative weed and pest management approaches that don't involve pesticides.
3. We will network with other groups across the UK who are involved with tackling household pesticide use, such as Pesticide Free Balerno in Edinburgh.
4. We would like to engage with shops in the Newton Abbot area that sell household pesticides and explore whether they are willing to stop these product lines.
5. We will engage with TDC and DCC to see if they are still using pesticides as part of their municipal land management.

### **Engagement, Education and Involvement**

Many people now understand that pollinators are being adversely affected by our everyday lifestyles, but there is still a lack of motivation to do something about it.

1. Even though there has been a lot of mainstream media coverage of the decline in pollinators across the UK (particularly bees) and GF publicised the Bradley Bug Recovery Network through variety of routes, we found that the large majority of local people did not respond in any practical way to help with the Bug Recovery initiative. This is partly due to many people leading very busy lives, but we also feel that underlying this is a generalised lack of identification with our surrounding environment as an important part people's lives.
2. Those local people who did become involved practically with the project all had a positive experience and want to be involved again next year.
3. Everyone who has been involved learned something about new about pollinators that made them feel more engaged on a relational level.

4. There is a growing sense of community and connectedness amongst the group of local people who have become longer term volunteers.

5. Enabling people to engage directly with pollinators through the FIT counts or moth surveys is a key factor in encouraging a longer term involvement in the Bug Recovery initiative and could have wellbeing benefits such as reducing stress and improving cognitive function.

### **Next Steps**

1. We will explore the potential for creating several dedicated Bradley Bug Recovery Update sign boards around our local neighbourhood with local land owners. This will hopefully generate a stronger sense of the presence of this work in the local community.

2. We want to make a documentary film based on our experiences in 2022 and hope that this can be viewed locally in a special community presentation, as well as going up on platforms like Youtube.

3. Bradley Barton Primary School has a key position in our local neighbourhood, with many households in the Bradley Valley involved directly with the school. We would like to explore with the school how we can work together to make more use of the school's networking and publicity resources to engage more people in pollinator monitoring at home, as well as recruiting more project volunteers to be involved in the wider community.

4. We feel that there is potential to develop a piece of theatre perhaps around Bradley the Bee as a way of introducing children and families to the importance of pollinators.

5. Generating a greater physical sense that pollinators are part of our wider community is important. We want to explore the commissioning of a range of installation art pieces around our local neighbourhood including sculpture and visual arts on vacant wall space, to create a Bradley Bug Trail, which gives our pollinator relations a larger physical presence.

6. Demonstrating how restoring pollinators can help improve pesticide-free food production is important so we will explore working with NADCAA and local farmers to evidence this to the wider community.

7. Based on the quality of interactions we have had with local people through simply setting up the GF gazebos in a visible location, we are looking at the possibility of holding a Village Green Fair which would include stalls selling eco-products, locally-sourced food and pollinator-themed games and entertainment for local families and bee / bug walks.

8. We feel that there is more potential to interact with local people through social media and we will seek advice from a professional social media designer to improve our reach.

9. Exploring and publicising the potential personal wellbeing benefits that can be experienced through engaging in pollinator monitoring is an area of work that we definitely want to develop.

10. We will be launching this report at a local event called The Bradley Bug Summit where project partners, volunteers and the wider community will be able to meet to reflect on the first year's results and contribute to plans for taking the initiative forward.



People and Pollinators in the Bradley Valley was co-authored by:  
Andrew Rothery – Green Futures Newton Abbot  
Phil Sansum – Devon Biodiversity Records Centre

We would like to again thank all the volunteers, staff-members of partner organisations and local councillors who have all helped this important work to happen.

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**“In nature, nothing exists alone” – Rachel Carson, author of Silent Spring**

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# Appendices

## Appendix 1 - Full List of Flora Identified at Each Monitoring Site

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### Bradley Field Allotments

<b>Taxon</b>	<b>English</b>
<i>Ulmus glabra</i>	Wych Elm
<i>Corylus avellana</i>	Hazel
<i>Acer campestre</i>	Field Maple
<i>Cornus sanguinea</i>	Dogwood
<i>Euonymus europaeus</i>	Spindle
<i>Salix caprea</i>	Goat Willow
<i>Crataegus monogyna</i>	Hawthorn
<i>Sambucus nigra</i>	Elder
<i>Fraxinus excelsior</i>	Ash
<i>Symphoricarpos albus</i>	Snowberry
<i>Rubus fruticosus</i> agg.	Bramble
<i>Calystegia sepium</i>	Hedge Bindweed
<i>Hedera helix</i>	Common Ivy
<i>Geum urbanum</i>	Wood Avens
<i>Urtica dioica</i>	Common Nettle
<i>Polystichum setiferum</i>	Soft Shield-fern
<i>Hypericum androsaemum</i>	Tutsan
<i>Asplenium scolopendrium</i>	Hart's-tongue
<i>Geranium robertianum</i>	Herb-Robert
<i>Rumex obtusifolius</i>	Broad-leaved Dock
<i>Stachys sylvatica</i>	Hedge Woundwort
<i>Taraxacum</i> agg.	Dandelion
<i>Circaea lutetiana</i>	Enchanter's-nightshade
<i>Veronica chamaedrys</i>	Germander Speedwell
<i>Allium ursinum</i>	Ramsons
<i>Lamium galeobdolon</i>	Yellow Archangel
<i>Hyacinthoides non-scripta</i>	Bluebell
<i>Rumex sanguineus</i>	Wood Dock
<i>Carex pendula</i>	Pendulous Sedge
<i>Lapsana communis</i>	Nipplewort
<i>Epilobium parviflorum</i>	Hoary Willowherb
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Agrostis capillaris</i>	Common Bent
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Festuca rubra</i> agg.	Red Fescue
<i>Trifolium repens</i>	White Clover
<i>Poa annua</i>	Annual Meadow-grass
<i>Sonchus asper</i>	Prickly Sow-thistle
<i>Euphorbia peplus</i>	Petty Spurge
<i>Elymus repens</i>	Common Couch

<i>Vinca major</i>	Greater Periwinkle
<i>Bellis perennis</i>	Daisy
<i>Prunella vulgaris</i>	Selfheal
<i>Cardamine flexuosa</i>	Wavy Bitter-cress
<i>Potentilla anserina</i>	Silverweed
<i>Rumex crispus</i>	Curled Dock
<i>Veronica persica</i>	Common Field-speedwell
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Alopecurus pratensis</i>	Meadow Foxtail
<i>Cynosurus cristatus</i>	Crested Dog's-tail
<i>Geum urbanum</i>	Wood Avens
<i>Schedonorus giganteus</i>	Giant Fescue
<i>Alliaria petiolata</i>	Garlic Mustard
<i>Myosotis arvensis</i>	Field Forget-me-not
<i>Oxalis corniculata</i>	Yellow Oxalis
<i>Jacobaea vulgaris</i>	Common Ragwort
<i>Digitalis purpurea</i>	Foxglove
<i>Equisetum arvense</i>	Field Horsetail
<i>Galium aparine</i>	Cleavers
<i>Lamium purpureum</i>	Red Dead-nettle
<i>Polygonum aviculare</i>	Knotgrass
<i>Plantago major</i>	Greater Plantain
<i>Coronopus didymus</i>	Lesser Swine-cress
<i>Trifolium pratense</i>	Red Clover
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill
<i>Trifolium dubium</i>	Lesser Trefoil
<i>Vulpia bromoides</i>	Squirreltail Fescue
<i>Lysimachia arvensis</i>	Scarlet Pimpernel
<i>Valerianella carinata</i>	Keeled-fruited Cornsalad
<i>Heracleum sphondylium</i>	Hogweed
<i>Dactylis glomerata</i>	Cock's-foot
<i>Medicago lupulina</i>	Black Medick
<i>Chenopodium album</i>	Fat-hen
<i>Stellaria media</i>	Common Chickweed
<i>Bromus hordeaceus</i>	Soft Brome
<i>Epilobium montanum</i>	Broad-leaved Willowherb
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Misopates orontium</i>	Weasel's-snout
<i>Primula vulgaris</i>	Primrose
<i>Sagina procumbens</i>	Procumbent Pearlwort
<i>Linaria purpurea</i>	Purple Toadflax
<i>Vicia sativa</i>	Comonn Vetch
<i>Arum maculatum</i>	Lords-and-Ladies
<i>Convolvulus arvensis</i>	Field Bindweed
<i>Scrophularia auriculata</i>	Water Figwort
<i>Carex hirta</i>	Hairy Sedge
<i>Persicaria maculosa</i>	Redshank
<i>Ajuga reptans</i>	Bugle
<i>Vicia sepium</i>	(Bush Vetch)
<i>Buddleja davidii</i>	Butterfly-bush

Potentilla reptans	Creeping Cinquefoil
Dipsacus fullonum	Wild Teasel
Rubia perigrina	Wild Madder
Teucrium scorodonia	Wood Sage
Euphorbia amygdaloides	Wood Spurge

**Total No. of Flora Sp. = 96**

Notonecta maculata	Peppered Backswimmer
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### **Bradley Field Allotments: cultivated flowering plants observed for FIT counts May to August 2022**

Other (Butternut squash)

Other (Verbena Officialis)

Other (Salvia -Hot lips)

Other (Golden Marjoram)

Other (Greater Bindweed- Calystegia sepium)

Other (Nasturtium)

Lavender (English) - Lavandula angustifolia

Other (Cosmos)

Other (Raspberry)

Other (Leucanthemum)

Bramble (Blackberry) - Rubus fruticosus

Dandelion - Taraxacum officinale

Other (Forget-me-not (Myosotis sp.))

Other ('Tayberry' (Rubus hybrid))

Other (Allium schoenoprasum)

Other (Dogwood)

Other (Comfrey)

Other (Perennial Wallflower)

Other (Broad Bean)

### **Kiln Orchard Open Space**

<b>Taxon</b>	<b>English</b>
Hedera helix	Common Ivy
Corylus avellana	Hazel
Rosa canina agg.	Dog Rose
Ulmus sp.	Elm
Pteridium aquilinum	Bracken
Urtica dioica	Common Nettle
Galium aparine	Cleavers
Sonchus oleraceus	Smooth Sow-thistle
Geranium robertianum	Herb-Robert
Senecio jacobaea	Common Ragwort
Lapsana communis	Nipplewort
Buddleja davidii	Butterfly-bush
Arrhenatherum elatius	False Oat-grass
Dactylis glomerata	Cock's-foot

<i>Urtica dioica</i>	Common Nettle
<i>Rumex obtusifolius</i>	Broad-leaved Dock
<i>Bromus hordeaceus</i>	Soft Brome
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Convolvulus arvensis</i>	Field Bindweed
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Poa trivialis</i>	Rough Meadow-grass
<i>Rumex crispus</i>	Curled Dock
<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Sorbus aucuparia</i>	Rowan
<i>Ulmus sp.</i>	an elm
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill
<i>Poa annua</i>	Annual Meadow-grass
<i>Trifolium repens</i>	White Clover
<i>Crepis biennis</i>	Rough Hawk's-beard
<i>Ranunculus acris</i>	Meadow Buttercup
<i>Hypochaeris radicata</i>	Cat's-ear
<i>Trifolium pratense</i>	Red Clover
<i>Senecio jacobaea</i>	Common Ragwort
<i>Hypericum perforatum</i>	Perforate St John's-wort
<i>Achillea millefolium</i>	Yarrow
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Trifolium dubium</i>	Lesser Trefoil
<i>Cerastium fontanum</i>	Common Mouse-ear
<i>Ranunculus acris</i>	Meadow Buttercup
<i>Rumex acetosa</i>	Common Sorrel
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
<i>Ranunculus repens</i>	Creeping Buttercup
	Small-flowered
<i>Ranunculus parviflorus</i>	Buttercup
<i>Anisantha sterilis</i>	Barren Brome
<i>Sisymbrium officinale</i>	Hedge Mustard
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill
<i>Hordeum murinum</i>	Wall Barley
<i>Malva sylvestris</i>	Common Mallow
<i>Alopecurus pratensis</i>	Meadow Foxtail
<i>Allium vineale</i>	Wild Onion
<i>Hypochaeris radicata</i>	Cat's-ear
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Euonymus europaeus</i>	Spindle
<i>Rosa canina agg.</i>	Dog Rose
<i>Hedera helix</i>	Common Ivy
<i>Iris foetidissima</i>	Stinking Iris
<i>Heracleum sphondylium</i>	Hogweed
<i>Achillea millefolium</i>	Yarrow
<i>Buddleja davidii</i>	Butterfly-bush
<i>Tragopogon pratensis subsp. minor</i>	Goat's-beard
<i>Bellis perennis</i>	Daisy
<i>Alliaria petiolata</i>	Garlic Mustard

Capsella bursa-pastoris	Shepherd's-purse
Euphorbia peplus	Petty Spurge
Geranium molle	Dove's-foot Crane's-bill

**Total No. of Sp. Varieties = 66**

Eurydema oleracea	(Brassica Shieldbug)
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**Bradley Barton Primary School**

<b>Taxon</b>	<b>English</b>
Oenanthe pimpinelloides	Corky-fruited Water-dropwort
Rhinanthus minor	Yellow-rattle
Taraxacum agg.	Dandelion
Medicago arabica	Spotted Medick
Cynosurus cristatus	Crested Dog's-tail
Lolium perenne	Perennial Rye-grass
Alopecurus pratensis	Meadow Foxtail
Festuca rubra agg.	Red Fescue
Poa trivialis	Rough Meadow-grass
Agrostemma githago	Corncockle
Anthoxanthum odoratum	Sweet Vernal-grass
Hypochaeris radicata	Cat's-ear
Agrostis capillaris	Common Bent
Holcus lanatus	Yorkshire-fog
Rumex acetosa	Common Sorrel
Cerastium fontanum	Common Mouse-ear
Prunella vulgaris	Selfheal
Plantago lanceolata	Ribwort Plantain
Phleum pratense sens. lat.	Timothy
Medicago lupulina	Black Medick
Leucanthemum vulgare	Oxeye Daisy
Rubus fruticosus agg.	Bramble
Lotus corniculatus	Common Bird's-foot-trefoil
Veronica chamaedrys	Germander Speedwell
Dipsacus fullonum	Wild Teasel
Urtica dioica	Common Nettle
Crepis vesicaria	Beaked Hawk's-beard
Ranunculus repens	Creeping Buttercup
Achillea millefolium	Yarrow
Vicia sativa	Common Vetch
Geranium dissectum	Cut-leaved Crane's-bill
Viola arvensis	Field Pansy
Trifolium dubium	Lesser Trefoil
Rumex sanguineus	Wood Dock
Ranunculus bulbosus	Bulbous Buttercup
Stachys sylvatica	Hedge Woundwort
Trifolium repens	White Clover
Bellis perennis	Daisy
Galium aparine	Cleavers



<i>Potentilla reptans</i>	Creeping Cinquefoil
<i>Rumex obtusifolius</i>	Broad-leaved Dock
<i>Trifolium pratense</i>	Red Clover
<i>Bromus hordeaceus</i>	Soft Brome
<i>Ranunculus acris</i>	Meadow Buttercup
<i>Epilobium montanum</i>	Broad-leaved Willowherb
<i>Carex divulsa</i>	Grey Sedge
<i>Vicia cracca</i>	Tufted Vetch
<i>Chenopodium album</i>	Fat-hen
<i>Senecio jacobaea</i>	Common Ragwort
<i>Aesculus hippocastanum</i>	Horse-chestnut
<i>Tilia x europaea</i>	Lime
<i>Ligustrum vulgare</i>	Wild Privet
<i>Hedera helix</i>	Common Ivy
<i>Rosa canina</i> agg.	Dog Rose
<i>Ulmus</i> sp.	an elm
<i>Smyrniolus olusatrum</i>	Alexanders
<i>Fraxinus excelsior</i>	Ash
<i>Crataegus monogyna</i>	Hawthorn
<i>Corylus avellana</i>	Hazel
<i>Geum urbanum</i>	Wood Avens
<i>Glechoma hederacea</i>	Ground-ivy
<i>Sambucus nigra</i>	Elder
<i>Prunus laurocerasus</i>	Cherry Laurel
<i>Heracleum sphondylium</i>	Hogweed
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Betula pendula</i>	Silver Birch
<i>Rumex obtusifolius</i>	Broad-leaved Dock
<i>Acer campestre</i>	Field Maple
<i>Allium ursinum</i>	Ramsons
<i>Poa trivialis</i>	Rough Meadow-grass
<i>Acer pseudoplatanus</i>	Sycamore
<i>Iris foetidissima</i>	Stinking Iris
<i>Rosa canina</i> agg.	Dog Rose
<i>Geum urbanum</i>	Wood Avens
<i>Polystichum setiferum</i>	Soft Shield-fern
<i>Circaea lutetiana</i>	Enchanter's-nightshade
<i>Cornus sanguinea</i>	Dogwood
<i>Dryopteris filix-mas</i>	Male-fern
<i>Mercurialis perennis</i>	Dog's Mercury
<i>Scrophularia auriculata</i>	Water Figwort
<i>Lamiastrum galeobdolon</i>	Yellow Archangel
<i>Geranium robertianum</i>	Herb-Robert
<i>Lonicera periclymenum</i>	Honeysuckle
<i>Dactylis glomerata</i>	Cock's-foot
<i>Ilex aquifolium</i>	Holly
<i>Epilobium montanum</i>	Broad-leaved Willowherb
<i>Veronica filiformis</i>	Slender Speedwell

<i>Arctium minus</i>	Lesser Burdock
<i>Epilobium palustre</i>	Marsh Willowherb
<i>Euphorbia peplus</i>	Petty Spurge
<i>Sonchus asper</i>	Prickly Sow-thistle
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
<i>Agrostis capillaris</i>	Common Bent
<i>Persicaria maculosa</i>	Redshank
<i>Prunus avium</i>	Wild Cherry
<i>Tilia x europaea</i>	Lime
<i>Bellis perennis</i>	Daisy
<i>Cerastium fontanum</i>	Common Mouse-ear
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Trifolium repens</i>	White Clover
<i>Poa trivialis</i>	Rough Meadow-grass
<i>Plantago major</i>	Greater Plantain
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Veronica chamaedrys</i>	Germander Speedwell
<i>Rumex acetosa</i>	Common Sorrel
<i>Cardamine pratensis</i>	Cuckooflower
<i>Taraxacum agg.</i>	Dandelion
<i>Hypochaeris radicata</i>	Cat's-ear
<i>Alopecurus pratensis</i>	Meadow Foxtail
<i>Veronica persica</i>	Common Field-speedwell
<i>Senecio jacobaea</i>	Common Ragwort
<i>Centaurea nigra</i>	Common Knapweed
<i>Carex pendula</i>	Pendulous Sedge
<i>Lythrum salicaria</i>	Purple-loosestrife
<i>Iris pseudacorus</i>	Yellow Iris
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Carex acutiformis</i>	Lesser Pond-sedge
<i>Anthophila fabriciana</i>	Nettle-tap

**Total No. of Sp. Varieties = 121**

### **Bradley Manor Meadow**

<b>Taxon</b>	<b>English</b>
<i>Conopodium majus</i>	Pignut
<i>Ranunculus acris</i>	Meadow Buttercup
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Cirsium arvense</i>	Creeping Thistle
<i>Rumex acetosa</i>	Common Sorrel
<i>Trifolium pratense</i>	Red Clover
<i>Stellaria graminea</i>	Lesser Stitchwort
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil
<i>Taraxacum agg.</i>	Dandelion
<i>Centaurea nigra</i>	Common Knapweed
<i>Ajuga reptans</i>	Bugle
<i>Orchis mascula</i>	Early-purple Orchid

<i>Heracleum sphondylium</i>	Hogweed
<i>Veronica chamaedrys</i>	Germander Speedwell
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Oenanthe crocata</i>	Hemlock Water-dropwort
<i>Urtica dioica</i>	Common Nettle
<i>Dryopteris affinis</i> agg.	Scaly Male-fern
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill
<i>Hypochaeris radicata</i>	Cat's-ear
<i>Ficaria verna</i>	Lesser Celandine
<i>Achillea millefolium</i>	Yarrow
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Dactylis glomerata</i>	Cock's-foot
<i>Luzula campestris</i>	Field Wood-rush
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Bromus hordeaceus</i>	Soft Brome
<i>Festuca rubra</i> agg.	Red Fescue
<i>Cynosurus cristatus</i>	Crested Dog's-tail
<i>Pteridium aquilinum</i>	Bracken
<i>Eupatorium cannabinum</i>	Hemp-agrimony
<i>Scrophularia auriculata</i>	Water Figwort
<i>Veronica hederifolia</i>	Ivy-leaved Speedwell
<i>Poa trivialis</i>	Rough Meadow-grass
<i>Ranunculus bulbosus</i>	Bulbous Buttercup
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Corylus avellana</i>	Hazel
<i>Ulmus glabra</i>	Wych Elm
<i>Quercus robur</i>	Pedunculate Oak
<i>Prunus spinosa</i>	Blackthorn
<i>Crataegus monogyna</i>	Hawthorn
<i>Fagus sylvatica</i>	Beech
<i>Fraxinus excelsior</i>	Ash
<i>Tilia cordata</i>	Small-leaved Lime
<i>Rumex obtusifolius</i>	Broad-leaved Dock
<i>Rubus fruticosus</i> agg.	Bramble
<i>Vicia sepium</i>	Bush Vetch
<i>Lonicera periclymenum</i>	Honeysuckle
<i>Sambucus nigra</i>	Elder

**Total No. of Sp. Varieties =51**

<i>Pieris napi</i>	(Green-veined White)
<i>Epirrhoe alternata</i>	(Common Carpet)
<i>Petrophora chlorosata</i>	(Brown Silver-line)
<i>Zygaena filipendulae</i>	(Six-spot Burnet)
<i>Cantharis rustica</i>	(a soldier beetle)
<i>Dolycorius baccarum</i>	(Hairy Shieldbug)
<i>Coreus marginatus</i>	(Dock Bug)
<i>Scathophaga stercoraria</i>	(Yellow Dung Fly)
<i>Rhingia</i> sp.	(a hoverfly)
<i>Anthocharis cardamines</i>	(Orange-tip)

<i>Autographa gamma</i>	(Silver Y)
<i>Cionus tuberculosus</i>	(a weevil)
<i>Bombus pascuorum</i>	(Common carder bee)
<i>Celypha lacunana</i>	(a moth)
<i>Micropterix calthella</i>	(a moth)
<i>Micropterix aruncella</i>	(a moth)
<i>Rhagonycha nigriventris</i>	(a soldier beetle)
<i>Epiblema cirsiaria</i>	(a moth)

## Appendix 2 – Daytime Pollinator Species Identified During FIT Counts and in other Survey Work

<b>Pollinator Group + Species</b>			
<b>Common Name</b>	<b>Latin name</b>	<b>Location</b>	<b>Recorder</b>
<b>Beetles</b>			
False blister beetle	<i>Oedemera lurida</i>	BFA	PS
Swollen Thigh Beetle	<i>Oedemera nobilis</i>	BFA BMM	PS
Common Red Soldier Beetle	<i>Rhagonycha fulva</i>	BFA	KG
Common Flower Bug	<i>Anthocoris nemorum</i>	BFA	KG
Red Spider Mite		BFA	KG
A weevil	<i>Cionus tuberculosus</i>		PS
A soldier beetle	<i>Cantharis rustica</i>	BMM	PS
(Hairy Shieldbug)	<i>Dolycoriscus baccarum</i>	BMM	PS
(a soldier beetle)	<i>Rhagonycha nigri-ventris</i>	BMM	PS
Potato Capsid	<i>Closterotomus norwegicus</i>	BFA	KG
<b>Bumblebees</b>			
Buff-tailed Bumblebee		BFA	AR
(Common carder bee)	<i>Bombus pascuorum</i>	BMM	PS
<b>Butterflies + Daytime Moths</b>			
Meadow brown	<i>Maniola jurtina</i>	BFA	PS
(Green-veined White)	<i>Pieris napi</i>	BMM	PS
(Common Carpet)	<i>Epirrhoe alternata</i>	BMM	PS
(Six-spot Burnet)	<i>Zygaena filipendulae</i>	BMM	PS
(Orange-tip)	<i>Anthocharis cardamines</i>	BMM	PS
(Silver Y)	<i>Autographa gamma</i>	BMM	PS
(a moth)	<i>Celypha lacunana</i>	BMM	PS
(a moth)	<i>Micropterix calthella</i>	BMM	PS
(a moth)	<i>Micropterix aruncella</i>	BMM	PS
(a moth)	<i>Epiblema cirsiaria</i>	BMM	PS
Nettle-tap	<i>Anthophila fabriciana</i>	BMM	PS
<b>Honeybees</b>			
Western Honeybee	<i>Apis mellifera</i>	BFA BMM	KG
A hoverfly	<i>Rhingia</i> sp.	BMM	PS
<b>Hoverflies</b>			
Marmalade hoverfly	<i>Episyrphus balteatus</i>	BFA	KG
a hoverfly	<i>Sphaerophoria scripta</i>	BMM	PS
(a hoverfly)	<i>Rhingia</i> sp.		PS
<b>Other Flies</b>		<b>Hoverflies</b>	
(Yellow Dung Fly)	<i>Scathophaga stercoraria</i>	BMM	PS
Ferruginous Bee-grabber	<i>Sicus ferrugineus</i>	KO	PS
<b>Solitary Bees</b>			
Patchwork leafcutter bee		BMM	AR

Painted Nomad Bee	Nomada fucata	KO	PS
<b>Wasps</b>			
Ichneumonid Wasp		KO	AR

## Appendix 3 – Moth Survey Records

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Taxon	English	Date
<i>Gymnoscelis rufifasciata</i>	Double-striped Pug	18/08/2022
<i>Euplagia quadripunctaria</i>	Jersey Tiger	18/08/2022
<i>Camptogramma bilineata</i>	Yellow Shell	18/08/2022
<i>Acentria ephemerella</i>	Water Veneer	18/08/2022
<i>Ochropleura plecta</i>	Flame Shoulder	18/08/2022
<i>Noctua janthe</i>	Lesser Broad-bordered Yellow Underwing	18/08/2022
<i>Xanthorhoe designata</i>	Flame Carpet	18/08/2022
<i>Opisthograptis luteolata</i>	Brimstone Moth	18/08/2022
<i>Peribatodes rhomboidaria</i>	Willow Beauty	18/08/2022
<i>Pyrausta aurata</i>	Mint Moth	18/08/2022
<i>Hoplodrina blanda</i>	Rustic	18/08/2022
<i>Endrosis sarcitrella</i>	White-shouldered House-moth	18/08/2022
<i>Agriphila tristella</i>	Common Grass-veneer	18/08/2022
<i>Agriphila geniculea</i>	Elbow-striped Grass-veneer	18/08/2022
<i>Agriphila straminella</i>	Straw Grass-veneer	18/08/2022
<i>Acrobasis advenella</i>	Grey Knot-horn	18/08/2022
<i>Blastobasis adustella</i>	Dingy Dowd	18/08/2022
<i>Eudonia mercurella</i>	Small Grey	18/08/2022
<i>Cryphia muralis</i>	Marbled Green	18/08/2022
<i>Yponomeuta plumbella</i>	Black-tipped Ermine	18/08/2022
<i>Matilella fusca</i>	Brown Knot-horn	18/08/2022
<i>Ligdia adustata</i>	Scorched Carpet	18/08/2022
<i>Cyclophora annularia</i>	Mocha	18/08/2022
<i>Ennomos fuscantaria</i>	Dusky Thorn	18/08/2022
<i>Xestia xanthographa</i>	Square-spot Rustic	18/08/2022
<i>Epirrhoe alternata</i>	Common Carpet	18/08/2022
<i>Amphipyra pyramidea</i>	Copper Underwing	18/08/2022
<i>Noctua pronuba</i>	Large Yellow Underwing	18/08/2022
<i>Emmelina monodactyla</i>	Common Plume	18/08/2022
<i>Nomophila noctuella</i>	Rush Veneer	18/08/2022
<i>Parapoynx stratiotata</i>	Ringed China-mark	18/08/2022
<i>Lithosia quadra</i>	Four-spotted Footman	18/08/2022
<i>Acleris forsskaleana</i>	a moth	18/08/2022
<i>Acrossus rufipes</i>	Night-flying Dung Beetle	18/08/2022
<i>Ochropleura plecta</i>	Flame Shoulder	18/08/2022
<i>Rivula sericealis</i>	Straw Dot	18/08/2022
<i>Acleris laterana</i>	Dark-triangle Button	18/08/2022
<i>Epirrhoe alternata</i>	Common Carpet	18/08/2022
<i>Eilema lurideola</i>	Common Footman	18/08/2022
<i>Emmelina monodactyla</i>	Common Plume	18/08/2022
<i>Geotrupes spiniger</i>	Common Dumble Dor (beetle)	18/08/2022
<i>Pandemis corylana</i>	Chequered Fruit-tree Tortrix	30/08/2022
<i>Xestia c-nigrum</i>	Setaceous Hebrew Character	30/08/2022
<i>Noctua pronuba</i>	Large Yellow Underwing	30/08/2022
<i>Agriphila tristella</i>	a moth	30/08/2022
<i>Noctua pronuba</i>	Large Yellow Underwing	30/08/2022
<i>Ennomos fuscantaria</i>	Dusky Thorn	30/08/2022

Noctua janthe	Lesser Broad-bordered Yellow Underwing	30/08/2022
Agriphila geniculea	a moth	30/08/2022
Tachystola acroxantha	a moth	30/08/2022
Nomophila noctuella	Rush Veneer	30/08/2022
Scopula marginepunctata	Mullein Wave	30/08/2022
Ecliptopera silaceata	Small Phoenix	30/08/2022
Miltochrista miniata	Rosy Footman	30/08/2022
Ochropleura plecta	Flame Shoulder	30/08/2022
Camptogramma bilineata	Yellow Shell	30/08/2022
Mythimna pallens	Common Wainscot	30/08/2022
Caradrina clavipalpis	Pale Mottled Willow	30/08/2022
Xestia xanthographa	Square-spot Rustic	30/08/2022
Noctua fimbriata	Broad-bordered Yellow Underwing	30/08/2022
Hoplodrina blanda	Rustic	30/08/2022
Gymnoscelis rufifasciata	Double-striped Pug	30/08/2022
Cyclophora annularia	Mocha	30/08/2022
Mythimna l-album	L-album Wainscot	30/08/2022
Luperina testacea	Flounced Rustic	30/08/2022
Agrotis puta	Shuttle-shaped Dart	30/08/2022
Plutella xylostella	Diamond-back Moth	30/08/2022
Diarsia rubi	Small Square-spot	30/08/2022
Mecyna asinalis	Madder Pearl	30/08/2022
Opisthograptis luteolata	Brimstone Moth	30/08/2022
Pyrausta aurata	a moth	30/08/2022
<a href="#">Nicrophorus investigator</a>	<a href="#">Banded Sexton Beetle</a>	30/08/2022
<a href="#">Cercyon laminatus</a>	<a href="#">a water scavenger beetle</a>	30/08/2022
Agrotis segetum	Turnip Moth	04/11/2022
Operophtera brumata	Winter Moth	04/11/2022



# Appendix 4 – Hazardous Waste Regulations 2005 Consignment Note

Form HWCN01v112

## The Hazardous Waste Regulations 2005: Consignment Note



PART A Notification details						
1 Consignment note code: <input style="width: 100px;" type="text"/>		3 The waste will be taken to (name, address and postcode):				
2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):		4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):				
PART B Description of the waste						
1 The process giving rise to the waste(s) was:				2 SIC (2007) for the process giving rise to the waste: <input style="width: 100px;" type="text"/>		
3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)						
Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are:		Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)
			Component	Concentration (% or mg/kg)		
The information given below is to be completed for each EWC identified						
EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements	
PART C Carrier's certificate				PART D Consignor's certificate		
<p>(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. <input type="checkbox"/>)</p> <p>I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.</p> <p>Where this note comprises part of a multiple collection the round number and collection number are: <input style="width: 100px;" type="text"/></p> <p>1 Carrier name: On behalf of (name, address, postcode, telephone, e-mail, facsimile):</p> <p>2 Carrier registration no./reason for exemption:</p> <p>3 Vehicle registration no. (or mode of transport, if not road):</p> <p>Signature</p> <p>Date <input style="width: 100px;" type="text"/> Time <input style="width: 100px;" type="text"/></p>				<p>I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.</p> <p>I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.</p> <p>1 Consignor name: On behalf of (name, address, postcode, telephone, e-mail, facsimile):</p> <p>Signature</p> <p>Date <input style="width: 100px;" type="text"/> Time <input style="width: 100px;" type="text"/></p>		
PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)						
Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)			
1 I received this waste at the address given in A3 on: Date <input style="width: 100px;" type="text"/> Time <input style="width: 100px;" type="text"/>		2 Vehicle registration no. (or mode of transport if not road):		Name: On behalf of (name, address, postcode, telephone, e-mail, facsimile):		
3 Where waste is rejected please provide details:		Signature				
I certify that waste permit/exempt waste operation number: <input style="width: 100px;" type="text"/>		Date <input style="width: 100px;" type="text"/> Time <input style="width: 100px;" type="text"/>				
authorises the management of the waste described in B at the address given in A3.		Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are: <input style="width: 100px;" type="text"/>				

HWCN01v112

# The Hazardous Waste Regulations 2005: Consignment Note



**PRODUCER'S/HOLDER'S/CONSIGNOR'S COPY** (Delete as appropriate)

**PART A Notification details**

1 Consignment note code:  /

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):

3 The waste will be taken to (name, address and postcode):

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

**PART B Description of the waste** If continuation sheet used, tick here

1 The process giving rise to the waste(s): 2 SIC (2007) for the process giving rise to the waste:  /

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are:		Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
			Component	Concentration (% or mg/kg)			

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements

**PART C Carrier's certificate** **PART D Consignor's certificate**

**(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. )**

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises part of a multiple collection the round number and collection number are:  /

1 Carrier name:  
On behalf of (name, address, postcode, telephone, e-mail, facsimile):

2 Carrier registration no./reason for exemption:

3 Vehicle registration no. (or mode of transport, if not road):

Signature  Date  Time

I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.

1 Consignor name:  
On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Signature  Date  Time

**PART E Consignee's certificate** (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)

1 I received this waste at the address given in A3 on: Date  Time

2 Vehicle registration no. (or mode of transport if not road): Name:

3 Where waste is rejected please provide details: On behalf of (name, address, postcode, telephone, e-mail, facsimile):

I certify that waste permit/exempt waste operation number:

authorises the management of the waste described in B at the address given in A3.

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Signature  Date  Time

# The Hazardous Waste Regulations 2005: Consignment Note



**PART A Notification details**

1 Consignment note code:  /

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):

3 The waste will be taken to (name, address and postcode):

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

**PART B Description of the waste** If continuation sheet used, tick here

1 The process giving rise to the waste(s) was: \_\_\_\_\_ 2 SIC (2007) for the process giving rise to the waste:  /

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are:		Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
			Component	Concentration (% or mg/kg)			

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements

**PART C Carrier's certificate** **PART D Consignor's certificate**

**(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. )**

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises part of a multiple collection the round number and collection number are:  /

1 Carrier name:  
On behalf of (name, address, postcode, telephone, e-mail, facsimile):

2 Carrier registration no./reason for exemption:

3 Vehicle registration no. (or mode of transport, if not road):

Signature:  Date  Time

I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.

1 Consignor name:  
On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Signature:  Date  Time

**PART E Consignee's certificate** (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)

1 I received this waste at the address given in A3 on: Date  Time

2 Vehicle registration no. (or mode of transport if not road): \_\_\_\_\_ Name: \_\_\_\_\_  
On behalf of (name, address, postcode, telephone, e-mail, facsimile):

3 Where waste is rejected please provide details: \_\_\_\_\_

I certify that waste permit/exempt waste operation number:

authorises the management of the waste described in B at the address given in A3.

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Signature:  Date  Time