


Central Scotland B-Lines Report

April 2021

Camelon Public Park B-lines Meadow, Falkirk ©Claire Pumfrey

Saving the small things that run the planet

Summary

The Central Scotland B-Lines project has created a network for nature by increasing the area of flower-rich grasslands and improving habitat connectivity within East Dunbartonshire, South Lanarkshire, Falkirk and Edinburgh. Through this project, wildflower-rich habitat has been created, restored, enhanced, and better managed for pollinators along the John Muir Way and within the Clyde Valley.

Using the B-Lines framework and Buglife's guiding principles, this project is helping to restore local populations of bees, butterflies, and other pollinating insects, boosting the abundance of pollinators, and improving landscape permeability. The B-Lines network will also benefit a range of other wildlife from small mammals to birds. This project has focussed on enhancing habitat within an urban network to allow pollinators to move freely through the built landscape.

This project has directly created and restored 15.3 hectares of wildflower-rich habitat across 47 sites within the four Local Authorities. Habitats have been created and restored through changes in mowing regimes, sowing wildflower seed, plug and bulb planting, tree planting and the creation of bee banks.

This project has worked in partnership with biodiversity officers, park managers and others within each of the four Local Authority areas as well as Central Scotland Green Network Trust. We have worked with Councils, landowners, and local communities to create and enhance habitat and have provided advice on suitable land management practices and changes in management regimes to allow flower-rich habitats to regenerate and to be sustainably managed over the long term. This will contribute to NatureScot's priority of connecting people with nature.

This project has been funded by NatureScot through their Biodiversity Challenge Fund and the Central Scotland Green Network Fund (managed by the CSGNT - now the Green Action Trust).

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1. Introduction

The UK has lost over 97% of its wildflower-rich grasslands since the 1940s, along with other flower-rich habitats which are vital for our pollinating insects to thrive. This has led to fragmentation and isolation of remaining pollinator habitat, putting our pollinators and other wildlife at risk as they are unable to move safely through our landscape and respond to environmental pressures.

Buglife have worked in partnership with the Central Scotland Green Network Trust (CSGNT- now Green Action Trust), Edinburgh City Council, Falkirk Council, East Dunbartonshire Council, South Lanarkshire Council as well as other landowners and appropriate organisations to create, enhance and restore pollinator habitat through the Central Scotland B-Lines Project.

The Central Scotland B-Lines Project has created a network for nature by increasing the area of wildflower-rich grasslands and restoring habitat connectivity within East Dunbartonshire, South Lanarkshire, Falkirk and Edinburgh (Figure 1). Through this project, wildflower-rich habitat along the John Muir Way and in the Clyde Valley has been created, restored, enhanced and better managed for pollinators. This has also created healthier and more colourful spaces for local communities. This project was funded through NatureScot's Biodiversity Challenge Fund and the Central Scotland Green Network Fund (managed by CSGNT - now the Green Action Trust).

Figure 1. CSGN B-Lines and Central Scotland B-Lines Local Authority Areas

1.1 Pollinating insects

There are over 4,000 species of native bees, butterflies, hoverflies and other pollinating insects in the UK. The diversity of insect pollinators is important, as well as abundance. Insects are responsible for pollinating at least 70% of our crops and 90% of wild plants – and pollination is worth approximately £690 million to the UK economy each year.

Recent research highlights that the abundance of pollinators is in drastic decline and several species are now threatened with extinction in the UK. A major factor contributing to pollinator declines is the substantial reduction in the area and connectivity of wildflower-rich grassland. Habitat loss and subsequent habitat fragmentation prevents insect pollinators from moving and mixing across our landscape which can lead to isolation and local extinctions.

Different species of pollinating insect have different habitat requirements. For pollinators to thrive, it is important that a mosaic of habitats provide food, shelter, and nesting sites for all stages of the lifecycle. Some hoverfly species require water bodies to complete the larval stage of their lifecycles, they also use tree rot holes. The larvae stages of butterflies and moths require specific food plants; for example, the caterpillar of the Peacock butterfly (*Inachis io*) feeds on Common nettle (*Urtica dioica*). The adult butterfly will lay eggs on the leaves of the plant to ensure the caterpillars can feed. Some species of bumblebees and social wasps will nest in rough grassland, whilst many solitary mining bees will dig nest burrows in sparsely vegetated grassland and in south-facing banks. The main foraging period for pollinating insects is March to October, although some species can be active outside of this period. It is vital that there is a source of nectar and pollen during this time suitable for pollinating insects with varying feeding preferences.

The habitat created through this project is expected to benefit several species, in particular pollinating insects such as bees, wasps, butterflies, moths, and hoverflies. Other invertebrates associated with meadows or longer grass will also benefit, including grasshoppers, spiders, and leafhoppers, and subsequently their predators.

Although particular species of conservation concern were not targeted through this project, recent studies highlighting the decline of pollinators and invertebrates within and out-with protected areas, highlight the need for targeted action to benefit a range of species by providing a network of habitat that is severely lacking and in decline. Species of conservation concern that are likely to benefit through this project include the GB Red Data Book species the Northern mining bee (*Andrena ruficrus*) that is currently found at a handful of sites across Falkirk, as well as the Grayling butterfly (*Hipparchia semele*) a Scottish Biodiversity List Priority Species that is recorded at several sites across Edinburgh. New and enhanced areas created through this project and better-connected habitat will allow these rare species (as well as others) to move through and across the Local Authority areas.

1.2 B-Lines

B-Lines is Buglife's ground-breaking landscape-scale solution to the decline in pollinating insects. This is a bold and ambitious programme of working with partners to identify opportunities for the creation and restoration of a network of wildflower-rich habitats. B-Lines are designed to be delivered on the ground creating a network of wildflower insect superhighways, mapped, and delivered through partnerships.

In Scotland, B-Lines have been mapped across the whole country and include the CSGN area which was used to identify sites for this project.

B-Lines provided a framework for the project which aimed to:

- Restore and create permanent wildflower-rich grasslands (and other wildflower-rich habitats), increasing the overall area of habitat and helping conserve and enhance populations of a wide range of invertebrates.
- Reduce habitat fragmentation across our landscapes and improve habitat connectivity and species movement/dispersal across the UK.
- Contribute towards several ecosystem services, including pollination and water resource management.

This project followed the B-Line framework to provide best opportunities for pollinators to survive and thrive.

2. Habitat Creation and Enhancement

Through this project 15.3 hectares of habitat have been directly created, restored, and enhanced for pollinators across 47 sites within the four Local Authority areas. However, it is expected that the total area indirectly improved by the project is over 100ha - connecting 451.16 hectares of habitat across the four Local Authority Areas. This is a result of adding to the mosaic of habitats through linking different sites many of which have existing pollinator habitat.

Working in partnership with Local Authority partners and landowners, the project has raised awareness around the importance of providing and managing habitat for pollinators, and has discouraged the use of pesticides. Local Authority staff and landowners were offered the opportunity to gain new skills and knowledge around pollinating insects and their habitat requirements. Project partners were invited to a landowners' workshop focused on managing and creating habitat for pollinators. They have also been provided with pollinator information sheets and they have been directly involved in practical habitat works. Local Authorities are continuing to roll out more pollinator and biodiversity sites and have expressed interest in any future opportunities to work with Buglife.

Each site was assessed, and enhancements were planned and then delivered - either by planting and or seeding, and/or by a change in management regime (e.g. changes to mowing). Habitat was enhanced in urban and semi-urban areas in parks, areas of amenity grassland and at other opportunities such as road verges.

The habitats created and enhanced include wildflower-rich meadows, hedgerows, trees and shrubs, woodland understorey planting and planting of nectar rich bulbs. The plants and seed used for this project were appropriately sourced including Scottish provenance wildflower seed. A range of seed mixes were used to suit different soil types and site conditions, including wet meadow mixes, shaded mixes as well as pure wildflower mixes.

Yellow rattle (*Rhinanthus minor*) seed has been sown to enhance grasslands throughout this project. Yellow rattle is a hemi-parasitic plant which suppresses vigorous grasses by drawing the nutrients and water from the host, in turn creating space for other wildflowers to grow. The seed needs to be sown in the autumn as it requires a period of cold or a frost to assist germination.

Where appropriate, this project has installed bee banks alongside areas of flower-rich habitat. Bee banks were created using locally sourced material such as sand and soil to create the bank mound. The bee banks will provide places for ground nesting solitary bees to nest; they will also provide habitat for ground beetles and wasps, and basking sites for butterflies and damselflies.

The meadows created through this project will be cut in the autumn and lifted, leaving some areas uncut for overwintering invertebrates and other wildlife. The cutting is timed so that the wildflowers have seeded, and the space created through the cut will provide the conditions for the wildflowers to

establish and spread. Once cut, the grass cuttings will be removed from the grassland and either disposed of elsewhere on site or composted.

The habitat works have been carried out working in partnership with councils, landowners, local community groups and volunteers. Management Plans have been provided to each landowner. These management plans detail suitable land management practices and changes in management regimes which will ensure that the sites continue to benefit pollinating insects and other wildlife.

2.1 Edinburgh

In Edinburgh, 11 sites have been created and enhanced for pollinators along three different stretches of the John Muir Way (JMW). The three stretches of the JMW focussed on for habitat enhancement pass through the Magdalene and Bingham area in North East Edinburgh, The Meadows area to the South of the City Centre and the Corstorphine Hill area to the West of Edinburgh. Wildflower rich habitat has been created through sowing local provenance wildflower seed, planting nectar rich bulbs, plug plants and trees, as well as changing mowing and management regimes. Areas of existing long grass and wildflower meadows have been enhanced with Yellow rattle. Sites enhanced were identified with the help of Edinburgh City Council.

Figure 2: Sites to the West of Edinburgh outlined in red.

Figure 3: Sites to the South of Edinburgh City Centre outlined in red.

Figure 4: Sites in North East Edinburgh outlined in red.

2.1.1 Corstorphine Hill Local Nature Reserve, NT 20361 74296

Corstorphine Hill Local Nature Reserve (LNR) and associated woodlands are located to the northwest of the City of Edinburgh. The hill itself is a whin outcrop ridge. The total area covers approximately 75.8ha. Semi-natural Broadleaf Woodland is the predominant habitat, along with patches of unimproved and improved rough grassland and scrub. A good variety of typical woodland flowers such as Bluebells (*Hyacinthoides non-scripta)* and Red campion *(Silene dioica)* grow on site.

Habitat enhancements through this project were focussed on the grassland along the southern slope of the site. A total of 0.36ha (3,650m^2) of pollinator habitat has been directly created and enhanced which has included sowing Yellow rattle into an existing wildflower meadow to encourage greater floral diversity. Yellow rattle was also sown in patches throughout a section of unimproved rough grassland to suppress vigorous grass growth and provide space for other wildflowers to grow. In this same area 20 Oak and 45 Birch trees were planted by Edinburgh City Council to create a small copse and three new wildflower meadow strips were created by stripping the turf and sowing a traditional lowland meadow seed mix. Other enhancements included extending an existing hedgerow through planting a double staggered row of bareroot trees including a variety of species such as Blackthorn (*Prunus spinosa)* and Dog rose (*Rosa canina)*. The works at this site were carried out by Buglife, Edinburgh City Council and The Conservation Volunteers (TCV). The turf stripping was carried out by contractors.

2.1.2 Ravelston Woods LNR, NT 21748 74201

Ravelston Woods Local Nature Reserve (LNR) is Situated in the Blackhall District of Edinburgh, 3km west of the city centre, the LNR covers an area of 8.4 hectares and is renowned for its diversity of flora and fauna. The site is an ancient woodland with native trees including Oak, Ash and Holly which are mixed with planted exotics like Horse chestnut *(Aesculus hippocastanum*). In the spring a rich display of Bluebells carpets the woodland floor. The site consists of a small glade, which was enhanced by Edinburgh City Council and local volunteers in 2018, through clearing vegetation and sowing patches of wildflower seed. Water avens (*Geum rivale)* established within the patches which had been enhanced, providing valuable pollinator forage. Standing deadwood is left in the LNR providing important nesting and larval development sites for pollinating insects such as hoverflies and aerial nesting bees.

The woodland glade, which is an area of 1114m^2, was directly enhanced through the project by carrying out a hard cut and lifting the arisings in the autumn and through sowing Yellow rattle to suppress vigorous grasses. The vegetation around the edges was left uncut to benefit nesting and sheltering invertebrates, this microhabitat consists of taller herbs and shrubs including Brambles (*Rubus fruticosus agg.)* and Common hogweed (*Heracleum sphondylium).* Small strips were also enhanced through turf stripping and sowing native wildflower seed consisting of species suitable for wetter ground conditions. This work was carried out by TCV and Edinburgh City Council staff. The turf stripping was carried out by contractors.

2.1.3 Davidson's Mains Park, NT 20322 75262

Davidson's Mains Park is in the former village of Davidson's Mains which is now a district in the North-West of Edinburgh. Davidson's Mains Park comprises grasslands in a mixed woodland setting and a section of the John Muir Way runs through the park. Sections of the park are managed as amenity grassland providing space for outdoor exercise and large areas around the outer edges are left to grow throughout the summer months, there are also a couple of areas managed as annual wildflower beds, the total size of the site covers 13.3ha. In 2019 sections of banking along the woodland, either side of the entrance to Queensferry road were enhanced by planting plug plants as part of Buglife's John Muir Pollinator Way Project.

During this project 1.2ha of habitat was directly enhanced at this site for pollinators. This focussed on three types of enhancement:

- Habitat works included creating a section of wet meadow in an area renowned for seasonal flooding. The turf in this area was flipped over to expose bare ground before sowing the seed which was rolled in. This work was carried out by contractors.
- The sections of grassland left to grow throughout the summer months were enhanced through sowing Yellow rattle helping to suppress grass and provide space for other wildflowers to grow. The park rangers prepared the ground for sowing by using a brushcutter to hard cut and scarify the ground in several 2m² patches throughout the grassland. The sowing of the seed and further scarifying was carried out by Buglife's Conservation Officer.
- Sections of woodland were also enhanced through this project by planting a range of wildflower bulbs including Snowdrops (*Galanthus nivalis)* and Wild garlic (*Allium ursinum),* this planting was carried out by Edinburgh City Council park rangers (Figure 5).

Figure 5: Edinburgh City Council Park Rangers planting wildflower bulbs, Davidsons Mains Park. ©Edinburgh City Council

2.1.4 Bruntsfield Links Golfing Society, NT 19923 75777

Founded in 1761, the Bruntsfield Links Golfing Society is the fourth oldest in the world. The club is located on the north-west side of Edinburgh and is adjacent to a section of the John Muir Way. The 60ha site comprises mature trees, rough grassland, ponds, and areas of wildflowers all of which already support a diverse range of wildlife. The site is managed by the Golfing Society who have ambitions to create further biodiversity areas across the site.

Four sections of wildflower meadow were created through this project totalling 0.31ha (3,110m^2). The meadows were created with the help of the course greenkeepers who prepared the ground by cutting the grass short, rotovating the ground and levelling the soil creating a fine tilth for the wildflower seed to be sown into. A species-rich grassland mixture (80% grasses 20% wildflowers) was used, with an extra 20% wildflower seed to boost the floral diversity (Figure 6). This contained annuals, biennials and perennials and helped to provide colour and forage in the first year of establishment and greater floral diversity for future years. The wildflower seed was sown by the Buglife Conservation Officer and was rolled in by the greenkeeping staff.

Figure 6: Wildflower Meadow created at Bruntsfield Links Golfing Society ©Neil Hogg

2.1.5 Bruntsfield Links Park, Whitehouse Loan, NT 24892 72264

Bruntsfield Links Park is located off Whitehouse Loan in central Edinburgh and is managed by Edinburgh City Council. The Friends of the Meadows and Bruntsfield Links (FOMBL) are very active in this area. The park consists of mainly amenity grassland with tree-lined pathways and areas of wildflower bulbs. The parkland includes a fenced area which is child friendly equating to a total of 0.3ha (3000m^2).

At this site 452m^2 has been directly enhanced for pollinators through this project. Buglife helped FOMBL plant Grape Hyacinth (*Muscari Neglectum*) bulbs along the fence line in the enclosed area at Bruntsfield Links in autumn 2019 which will provide forage for pollinators in spring. Using local contractors, the project extended an existing wildflower patch planted by FOMBL this now totals 51m2 through sowing an urban pollinator wildflower mix and Yellow rattle seed.

2.1.6 Leamington Walk, NT 25317 72482

Leamington Walk is in central Edinburgh and is a popular destination for the local community and tourists. It is used as a commuter route and an area for outdoor exercise. A section of the green space along Leamington Walk consists of treelined pathways, wildflower bulbs and an existing wildflower meadow which was created by FOMBL in partnership with other local volunteers and organisations in agreement with Edinburgh City Council. This small patch is diverse with a good range of wildflower species present, providing pollinators and other wildlife with vital habitat.

Through this project the existing wildflower meadow has been extended, directly enhancing and creating pollinator habitat totalling 145m^2 within a 0.7ha site. The ground was prepared through local contractors by turf stripping and exposing bare ground. An urban pollinator wildflower mix was then sown by the Buglife Conservation Officer. Edinburgh City Council will continue to carry out an autumn cut, and the arisings will be removed by FOMBL with the help of local volunteers.

Whilst visiting Leamington Walk Meadow in the summer following sowing, various species of pollinating insects were seen foraging within the meadow. This included Common carder bee (*Bombus pascuorum*), Common red solider beetle (*Rhagonycha fulva*) and Davies' colletes bee (*Colletes daviesanus*) (Figure 7).

Figure 7: Davies' colletes bee (Colletes *daviesanus) foraging* on Corn marigold (*Glebionis segetum)* Leamington Walk Meadow. ©Claire Pumfrey

2.1.7 Melville Drive, NT 25630 72524

Melville Drive is a street that passes along The Meadows Public Park to the South of Edinburgh's City Centre and covers an area of 3.3ha. This area of Edinburgh is well used by the local community for commuting, dog walking and leisure activities and is very popular with visitors.

The road verges along this street are tree lined including Cherry blossom (*Prunus* species). Crocus bulbs have been planted by Edinburgh City Council providing a colourful display in late winter and spring as well as a nectar source for early emerging pollinating insects. A total of 0.33 ha (3300m^2) along Melville Drive has been enhanced through this project by planting snowdrop bulbs. This planting would coincide with the Crocus to provide valuable forage for early emerging pollinating insects as well as a beautiful display of flowers. The bulbs were planted by Buglife staff, FOMBL and TCV.

2.1.8 Milton Link, NT 31262 72584

Milton Link is a section of the A1 which runs in the North East of Edinburgh. The site is located within a built-up landscape in an area of social and economic deprivation. Along this section of road there is a footpath which forms part of the John Muir Way route. The footpath is shielded from the road by a tall and dense hedgerow which is significantly reducing pollutants from passing vehicles reaching the verges alongside the footpath. Footfall through the site is high as it is adjacent to Brunstane Train Station.

A 166m^2 wildflower strip has been created running alongside the footpath in a section which was previously cut on a regular basis. The total size of the site is 2460m^2. The works were carried out by contractors who rotovated and levelled the ground following a cut by Edinburgh City Council. A wildflower only seed mix with a high percentage of Yellow rattle was sown by the Buglife Conservation Officer shortly after the ground was prepared. A wildflower only seed mix was used reducing the amount of grass growth making management easier for Edinburgh City Council until a time when they can remove arisings.

2.1.9 Magdalene Greenspace, NT 30891 72461

Magdalene Greenspace is a 6ha site accessed via a footpath leading from Milton Link which is a continuation of the John Muir Way route. The site is comprised of woodland, scrub, and a section of wildflower meadow. Niddrie Burn also runs through the site. The site is subject to fly tipping and vandalism. The site improvements therefore aim to both create pollinator habitat and create healthier spaces for the local community.

The 330m^2 area identified within the site for enhancement had high nutrient levels, which are not an ideal starting point for establishing wildflowers. To reduce this enrichment, topsoil was removed by contractors. However, immediately after the UK entered national lockdown due to the Covid pandemic. This delayed the anticipated planting of a wildflower only mix; consequently, the plan for the site had to be amended and after discussions with the Local Parks and Greenspaces Officer a range of flowering shrubs were planted across the site. Species included Hawthorn (*Crataegus monogyna)* and Dog Rose. This is expected to not only provide a nectar and pollen source for pollinators but shelter and forage for a range of other wildlife including birds and small mammals. Planting was carried out by Edinburgh City Council.

2.1.10 Magdalene Drive, NT 30769 72698

Magdalene Drive is situated in an urban residential area. The site for improvement is focused on corner plots of green space totalling 1000m^2. This residential area has plenty of roadside verges and green space which connects to the John Muir Way as well as the Magdalene and Bingham green spaces.

This site was identified by Edinburgh City Council to trial sowing wildflower only mixes to improve the local area. If this site proves successful, then the same approach will be used at several other residential sites within the district. In total 300m^2 have been enhanced at this site. Contractors prepared the ground by rotovating immediately following a cut made by Edinburgh City Council. The Buglife Conservation Officer then carried out sowing and rolling of the wildflower seed.

2.1.11 Bingham Greenspace, NT 30178 72186

Bingham Greenspace is a site totalling 6.5ha of amenity grassland with sections of woodland and scrub. The John Muir Way runs through the site as does Niddrie Burn. There is also a small children's playpark. The site is well used by the local community for exercise and dog walking. Additionally, commuters regularly pass through the site.

Enhancements at this site were made in two separate areas. Area A to the West of the site totals 1400m^2 and Area B to the East of the site totals 1050m^2. The same works were carried out in both areas. The works were carried out by contractors who rotovated and levelled the ground following a cut by Edinburgh City Council. A wildflower-only seed mix with a high percentage of Yellow rattle was sown by the Buglife Conservation Officer shortly after the ground was prepared. A wildflower only seed mix was used to reduce the amount of grass growth making management easier for Edinburgh City Council until a time when they can remove arisings. The local community showed a lot of interest in the works whilst they were being undertaken by the Buglife Conservation Officer. Observing the required social distancing, this enabled important community engagement.

2.2 Falkirk

In Falkirk, 14 sites have been created and enhanced for pollinators within 2km either side of the John Muir Way. Wildflower rich habitat has been created through sowing local provenance wildflower and grass seed, planting nectar rich bulbs, plug plants and trees, and by changing mowing and management regimes. Areas of existing long grass and wildflower meadows have been enhanced with yellow rattle and nesting sites have been created through bee bank creation and rough grassland management. All sites were identified with the help of Falkirk Council.

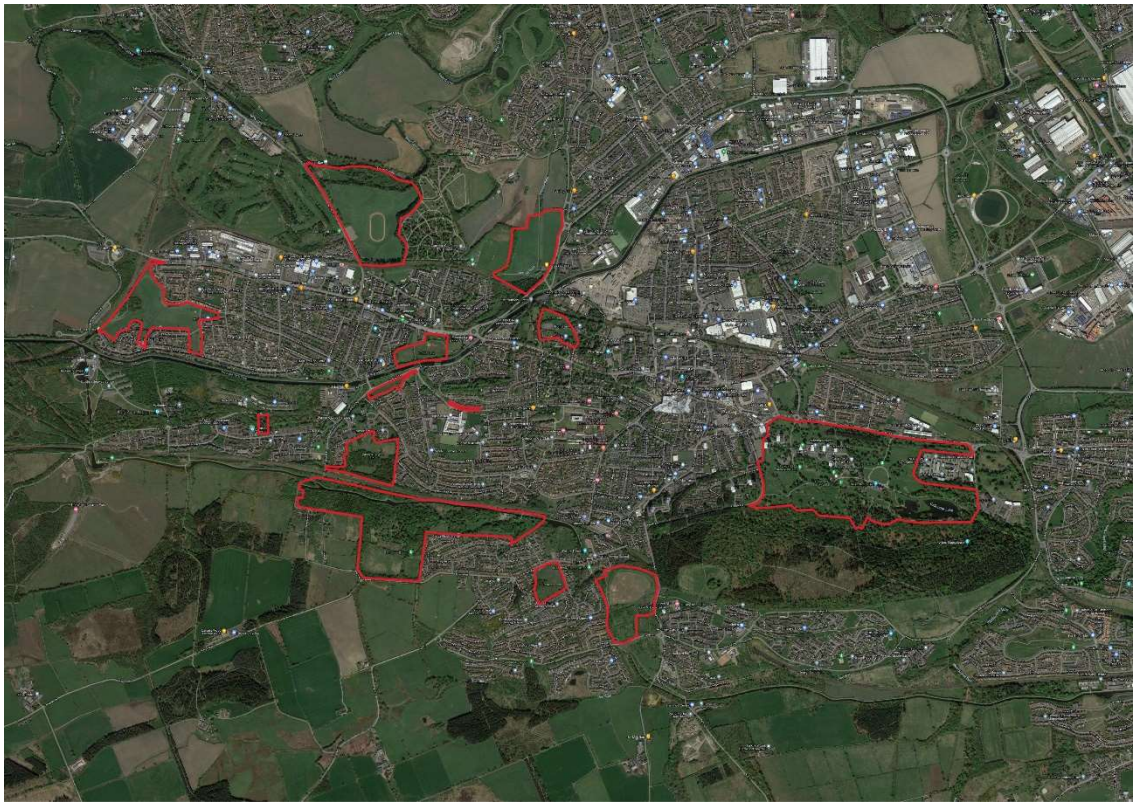

Figure 8**.** Falkirk Sites outlined in red

2.2.1 Princes Park, NS 87916 78864

Princes Park is a large park located in Glen Village along Slamannan Road (B803) in Falkirk. The full site covers an area of 3ha. There is a small play area for children and some large, scattered trees. Housing surrounds the park, and the very busy Falkirk High station is just to the north east. The park is well used by the local community for dog walking and playing. In the autumn of 2018, a native meadow of 0.65 hectares was sown through Buglife's Falkirk Pollinator Way project, working in partnership with Falkirk Council (Figure 9).

During the site visit for this project, it was identified that the meadow could be further enhanced through the sowing of Yellow rattle seed (Figure 10). The Buglife Conservation Officer and local volunteers scarified the ground to create bare patches and space for the seed to establish. The seed was lightly trodden in.

Figure 9. Red tailed bumblebee *(Bombus lapidarius)* on Birds-foot trefoil (Lotus corniculatus) Princes Park Meadow. ©Claire Pumfrey

Figure 10. Seven-spot ladybird *(Coccinella septempunctata)* on Yellow rattle *(Rhinanthus minor)* Princes Park Meadow. ©Claire Pumfrey

2.2.2 Summerford Park, NS 86881 79642

Summerford Park is in the South West of Falkirk and comprises of woodland, meadows and picnic areas. The Green Action Trust (GATrust) have carried out extensive work at the site with Falkirk Council to enhance it for wildlife. There is also an existing bee bank which was created by Buglife in partnership with Falkirk Council in 2018. The total size of the site is 7.5ha.

During the site visit for this project, it was identified that the three meadows totalling 1.5ha could be further enhanced through the sowing of Yellow rattle seed. Evidence at the site suggested grass growth had been vigorous and was likely suppressing other species. The lower meadows were enhanced by the Buglife Conservation Officer with support from the Falkirk High School rural skills students as part of their studies. The top meadow was enhanced by TCV as part of one of their green gyms. The meadows were scarified to create bare patches and space for the seed to establish. The seed was lightly trodden in.

2.2.3 Camelon Public Park, NS 87243 80220

Camelon Public Park is a large park located off Main Street (A9) Camelon, Falkirk. The full site covers an area of 3.4 ha. There is a small play area for children and some large, scattered trees to the North East of the site. A small burn passes through the North of the site. The park is well used by the local community for dog walking and playing. In the autumn of 2018, a native wet meadow of 0.8 hectares was sown through Buglife's Falkirk Pollinator Way, working in partnership with Falkirk Council. Small sections along the burn and the tree lined bank to the North East of the site were also enhanced through planting Crocus bulbs.

During a site visit it was identified that the meadow could be enhanced through sowing Yellow rattle seed. This was done by scarifying the ground to create bare patches and space for the seed to establish. The seed was lightly trodden in. The site visit carried out in October 2019 with Falkirk

Council's Biodiversity Officer also identified that the tree lined bank to the north east of the site could be enhanced through the planting of further nectar rich bulbs. This planting would provide valuable forage for early emerging pollinating insects. A mixture of Snowdrop (Figure 11), Wild daffodil *(Narcissus pseudonarcissus*), native Bluebell and Winter aconite *(Eranthis cilicica)* were planted 'in the green'. The bulbs were planted by Buglife Conservation Officers and Carmuirs Primary School pupils.

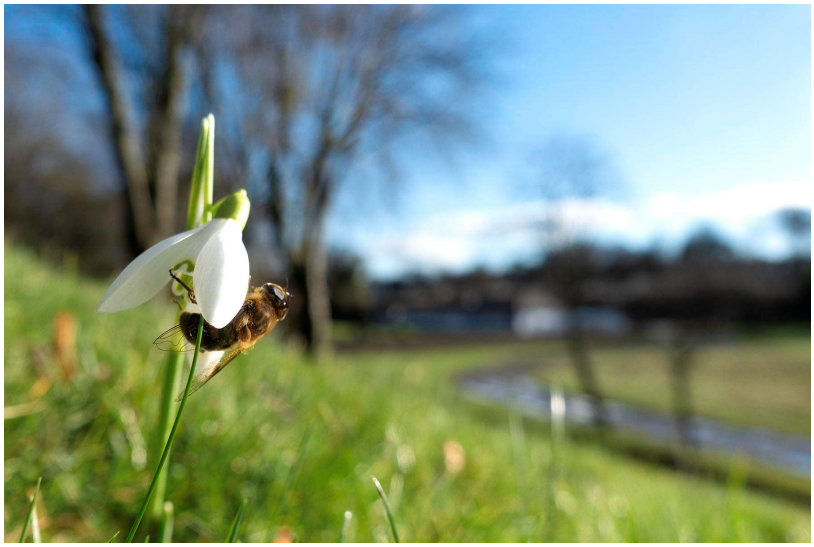

Figure 11. Common dronefly (*Eristalis pertinax*) foraging on Snowdrop (*Galanthus* nivalisi) immediately after planting. Camelon Public Park. ©Claire Pumfrey

2.2.4 Easter Carmuirs Park, NS 85583 80318

Easter Carmuirs Park is a 13ha area of amenity grassland with small patches of woodland, scrub, and rough grassland. It is situated in the Carmuirs district of Falkirk. The Forth and Clyde Canal runs adjacent to the site. Much of the site is directly surrounded by residential housing.

As part of the project an area of 135m^2 on a south facing slope immediately adjacent to the car park was enhanced by planting a range of wildflower meadow plug plants. The plug planting was undertaken in partnership with the Easter Carmuirs Tenants Residents Association and GATrust. The planting was undertaken by the Buglife Conservation Officer with support from TCV and families for the local area.

2.2.5 Dollar Park, NS 87941 80395

Dollar Park is a 3.2ha site situated in central Falkirk. It is made up predominantly of amenity grassland with scattered trees but also includes a play park, tennis court and walled garden. The site is widely used by the local community for recreation.

An area of 1420m^2 of pollinator habitat was created at this site through the project. This included a change in mowing management by Falkirk Council to create an area of rough grassland which provides nesting and sheltered sites for invertebrates. Adjacent to the rough grassland a 4m wide wildflower meadow strip was created using a traditional lowland meadow seed mix with added annuals, this would ensure that the site would also provide forage for pollinating insects. The wildflower meadow strip was created using a local contractor who rotovated, levelled, sowed, and rolled the area.

2.2.6 Bernardo's Trust, Tamfourhill, NS 86262 79806

The Bernardo's Trust site consist of a large house and surrounding gardens totalling 0.6ha. The premises are used by the Trust in the delivery of its charitable aims. Although the site is relatively small there was a great opportunity to carry out community engagement at this site. The gardens are predominantly woodland with clearings and are maintained by a gardener who enlists the help of local volunteers. The planting is focused on providing wildlife friendly areas and food for foraging workshops.

The enhancements at the site cover an area of 2500m^2. The initial plan was to carry out plug planting within the top section of the gardens as part of a community event. However, this was not able to go ahead due to COVID-19 restrictions. The enhancements were therefore carried out by the gardener who cleared sections of ground before planting a range of wildflower plug and pot plants suitable for the site. This included Wild honeysuckle (*Lonicera periclymenum)* which was planted to grow over an arch; this will provide forage for nocturnal moth species.

2.2.7 Glenfuir Road, NS 87001 80008

Glenfuir Road runs adjacent to the Forth and Clyde Canal. The site which this project has focused on is a wide road verge opposite the lock sixteen road bridge and totals 1ha in size. This greenspace expands to the residential housing along Strachan Street. The site comprises predominantly mown grassland with scattered trees and a strip of Daffodils *(Narcissus species).* The site is an important corridor between other sites enhanced through the project in central Falkirk.

The enhancements at this site cover an area of 2000m^2. A mixture of 6000 Snowdrop, Grape Hyacinth and large flowering Crocus bulbs were planted in the green by Buglife Conservation Officers. This will provide an early flowering nectar and pollen source for pollinating insects from late winter through to spring.

2.2.8 Westburn Avenue, NS 87467 79870

Along Westburn Avenue there is a wide road verge opposite Falkirk High School totalling 3000m^2. This area is managed by the Roads Department from Falkirk Council and has historically been mown regularly. The site is an extension of a greenspace corridor made up of woodland and scrub which connects to sites at Glenfuir Road and Camelon Public Park.

The primary enhancement was the planting of eight apple trees (*Malus species)* of mixed varieties. These apple trees are grafted to semi-dwarfing root stocks ensuring that they do not cause disturbance to the adjacent homeowners. Additionally, the Council plan to relax mowing around the new trees to improve biodiversity. The trees are set suitably back from the road to minimise the impact of pollutants on pollinators. The tree blossom at the site will offer additional forage for pollinating insects at a key time of year.

2.2.9 Stirling Road Playing Fields, NS 86719 81163

The Stirling Road Playing Fields site is opposite Falkirk Golf Club. The site has a total size of 24ha. It is bounded on the north by the River Carron and on the west by Stirling Road. The north of the site, closest to the river, consists of woodland and scrub. The rest of the site is characterised by amenity grassland with a boundary of trees. The site was a late addition to the project plan following discussions with Falkirk Council and their successful funding application for cut and lift machinery to enable effective management of the site.

Through this project 1.1ha of habitat was created in two separate areas on the site – in the north west and north east adjacent to the woodland, scrub and public footpath. This included a change in mowing management by Falkirk Council to create an area of rough grassland for nesting and sheltered sites for invertebrates. Adjacent to the rough grassland a wildflower meadow strip was created using a lowland meadow seed mix with added annuals, this would ensure that the site would also provide forage for pollinating insects. The wildflower meadow strip was created using a local contractor who rotovated, levelled, sowed and rolled the area.

2.2.10 Sunnyside Playing Fields, NS 87799 80645

Sunnyside Playing Fields is a 11ha site situated in the north of Falkirk. It is used by local residents for a range of sporting activities. Most of the site is regularly mown grass and there are two substantial areas of woodland. The site is connected to the Stirling Road Playing Fields site by the footpaths and greenspace of Camelon Cemetery.

Through this project 0.6ha of pollinator habitat has been created on a bank adjacent to the woodland and public footpath in the south of the site. This included a change in mowing management by Falkirk Council on the steeper sections of the bank to create an area of rough grassland for nesting and sheltered sites for invertebrates. Between the rough grassland and public footpath, a wildflower

meadow strip was created using a lowland meadow seed mix with added annuals ensuring that the site would also provide forage for pollinating insects. The wildflower meadow strip was created using a local contractor who rotovated, levelled, sowed and rolled the area.

2.2.11 Bantaskine Estate, NS 86970 79163

Bantaskine Estate comprises mature woodlands, grassland, and a section of the Union Canal. The site totals 36.5ha in size. The estate already provides varied habitat for pollinating insects including a wildflower meadow created by Buglife in a previous project, and through willow trees (*Salix sp)* which are an incredibly valuable early nectar source. However, on a site visit it was identified that the site would benefit from the installation of a bee bank for the benefit of ground nesting solitary bees and basking insects.

The bee bank was installed by local contractors in a picnic area north of Bantaskine Allotments (figure 12). The area surrounding the bank has been sown with a short turf wildflower mix. Interpretation has been installed next to the bee bank to raise awareness of the importance of the habitat at the site. The substrate of the bank is made of type one aggregate and is capped with a 30cm depth of builder's sand. It measures 10m x 2m and has been located to be south facing, maximising sunlight.

Figure 12. Bee bank creation being carried out by contractors at Bantaskine Estate. ©Claire Pumfrey

2.2.12 Bantaskine Allotments, NS 87014 79063

Bantaskine Allotments are located in the walled garden at Bantaskine Estate along Lochgreen Road in Falkirk. The allotments cover an area of 0.45 hectares. The allotments are leased from Falkirk Council by the Falkirk Allotment Society who manage the site and rent out the plots. The walled garden acts as a heat trap and the variety of fruit, veg and flowers grown on site which along with the organic principles applied will be attracting and supporting a range of invertebrates and pollinating insects.

110m^2 of wildflower habitat has been created at this site through planting a native hedgerow which included a variety of species such as Blackthorn*),* Hawthorn and Dog rose. The double staggered bareroot hedge has been planted along the metal fence to the South of the site and at the entrance to the allotments. The flowers will provide a nectar and pollen resource from late winter and the leaves will also provide certain species of moth and butterfly larvae with an important food plant. The hedgerow will also provide shelter and cover for a range of wildlife species including birds, and the berries and nuts will equally provide a valuable resource in the autumn. This hedgerow was planted by Buglife staff.

2.2.13 Policy Bing, NS 88380 78791

Lionthorn Policy Bing is a 10.9ha site that is comprised of woodland, hedgerows, scrub and wetland. It has a playpark and various footpaths through the site. A 1.4ha meadow was created in 2018 as part of the John Muir Pollinator Way and Falkirk Pollinator Way projects. The area has taken time to establish, and the second year was showing some real potential; the soil is very poor. The GATrust are developing plans for further enhancements at this site for people and wildlife. The site plan includes a 7-a side grass pitch with associated seating. During discussions around the enhancements at this site, it was identified that there was an opportunity for Buglife to create further meadow areas. The site has been a good opportunity for the Biodiversity Challenge Fund projects as complimentary works were also undertaken by Froglife as part of the Come Forth for Wildlife Project.

The enhancements undertaken through this project include the creation of an additional 0.4ha area of wildflower meadow. The works were undertaken by a local contractor under instruction from the Buglife Conservation Officer. In one section of the meadow a trial was conducted where a thin layer of topsoil was applied to the ground as the existing ground was so poor with a high gravel content. A high percentage of wildflower seed was used within a lowland grassland meadow mix to help encourage a colourful display in the early years of establishment.

2.2.14 Callendar Park, NS 89751 79485

Callendar Park is a 69ha site which is managed by the Falkirk Community Trust. This is a diverse site which includes Callendar House and its surrounding buildings. The grounds host a range of habitat features including woodland, ornamental gardens, a small loch, amenity grassland and meadows. It also has a pitch and put golf course and several play areas. This is a very popular site for visitors and is widely used by the local community. The John Muir way passes through the site.

Enhancements were made across two different areas including:

- Woodland planting totalling 3420m^2 in the centre of the park close to the parking in Seaton Place. Plug and bulb planting was undertaken by Buglife, Falkirk Community Trust and TCV; all organisations also received support from their volunteers. Species planted included:

Snowdrop, Red campion and Cow Parsley (*Anthriscus sylvestris)*. Additionally, a woodland seed mix was sown throughout the area.

- Areas totalling 2000m^2 on the northern boundary of the site alongside Callendar road were prepared and sown as wildflower meadow strips by a local contractor. These strips were set back at least 2m from the road to minimise the impacts of pollution on the meadows and pollinators.

2.3 East Dunbartonshire

In East Dunbartonshire, 9 sites have been created and enhanced for pollinators within 3kms either side of a 1.5km stretch along the John Muir Way. The sites identified are in Milton of Campsie and Kirkintilloch. Wildflower rich habitat has been created through sowing local provenance wildflower seed, including wet meadow and MG5 grassland mixes, enhancing existing grassland with plug plants and through planting nectar rich bulbs. Nesting sites have also been created through bee bank creation. All sites were part funded and identified with the help of East Dunbartonshire Council.

Figure 13. Sites in Kirkintilloch, East Dunbartonshire outlined in red

Figure 14. Sites in Milton of Campsie East Dunbartonshire outlined in red

2.3.1 Hillhead Community Centre, Kirkintilloch, NS 66529 74175

Hillhead Community Centre sits in a 0.5ha plot. The large community facility contains a café, hall and rooms for community learning and exercise. It is surrounded by maintained gardens which contain ornamental planting as well as a substantial car park.

There was an area at the site, adjacent to the car park, which was intended to be enhanced as a garden for the local community and education. This aim had not yet been implemented by the centre and the area was therefore identified as appropriate for enhancements under this project. The area is south facing making it appropriate for habitat enhancements for pollinating insects.

Three major enhancements were undertaken at the site in an area totalling 170m^2:

- Scrub had started to encroach and dominate the site and was therefore cut back leaving a margin of rough grassland and scrub on the eastern edge of the area. Using some of the brash and other offcuts from the clearance, habitat piles for invertebrates and other wildlife were created.
- The main section of rough grassland was enhanced through a hard cut and scarification of the ground with wildflower seed over-sown.
- A bee bank was installed at the top end of the site for the benefit of ground nesting solitary bees and basking pollinating insects. The bank was created in a crescent shape using a substrate of aggregate and capped with builders' sand to maximise the warmth captured (Figure 15).

Interpretation has been installed at the site to promote community engagement in the enhancements undertaken. The works were carried out by local contractors.

Figure 15. Bee bank at Hillhead Community Centre. ©Natalie Stevenson

2.3.2 Langmuir Park, Kirkintilloch, NS 67832 74537

Langmuir Park is a 2.6ha site located to the East of Kirkintilloch. The site is predominantly amenity grassland with a boarder of rough grassland containing mature trees. There are footpaths running through the site, a children's play park and football pitch. The site is connected to other project sites by greenspace corridors including along the Forth and Clyde Canal as well as the Merkland Nature Reserve. Butterfly Conservation have also been carrying out habitat enhancements for pollinators in the Kirkintilloch area which will be helping to provide connective corridors for pollinators to move across the landscape.

Two meadow areas were created on the site totalling 5000m^2. The meadows were prepared through rotovating, sowing and rolling by a contractor. An MG5 lowland meadow seed mix with added annuals was used for most of the area. Additionally, in the wetter sections a wet meadow seed mix was used.

2.3.3 Luggie Park, Kirkintilloch, NS 65929 73509

Luggie Park is a 17.7ha area of green space in the centre of Kirkintilloch which is situated alongside Luggie Water. The site comprises a mixture of woodland, amenity grassland, areas of bare ground, wet meadows, and rough grassland. The woodland consists largely of mature Beech (*Fagus sylvatica)* with some Sycamore (*Acer pseudoplatanus).* In the open areas of grassland there are some young plantings of quick-growing species such as Willow and Birch (*Betula sp*). The wet meadows include species such as Purple loosestrife *(Lythrum salicaria)* which is a valuable nectar source for long tongued insects such as the Garden bumblebee (*Bombus hortorum*). There is a network of footpaths running through the site which connect the green spaces with a children's play park and skate park.

The enhancements at this site were made across four areas located in two separate sections of the site, all meadows created and enhanced will undergo an annual cut and lift:

- Luggie Park 1 (4000m^2 in the west of the site): Whilst carrying out a site visit it was identified that an existing area of wet meadow could be further enhanced through the planting of pot grown wildflowers. 2,350 wetland plants were planted by contractors. Vegetation was removed, and bare ground created in the areas which were planted to allow successful establishment and prevent competition from grasses.

- Luggie Park 2 (4500m^2 in the west of the site): A wet meadow was created by rotovating, sowing and rolling using a contractor. The wet meadow mix contained species including Ragged robin (*Silene flos-cuculi)* and Devils-bit scabious (*Succisa pratensis*), as well as native grasses, sedges, and rushes.

- Luggie Park 3 (3000m^2 in the east of the site): A traditional lowland grass (80%) and wildflower seed (20%) mix was used with added annuals to create a meadow at this urban site. A contractor carried out the works through rotovating, sowing and rolling the area.

- Luggie Park 4 (2300m^2 in the east of the site): Another section of wet meadow (80% grasses, sedges and rushes, 20% wildflowers) was created below an area of wooded slopes. Two footpaths run adjacent to this meadow which overlook Luggie Water. Contractors carried out the works through rotovating, sowing and rolling the area.

Figure 16. Buglife staff checking germination at Luggie Park.

2.3.4 Waterside Road, Kirkintilloch, NS 66817 73448

The Waterside Road site is a wide road verge immediately adjacent to Kirkintilloch High School and Oxgang Primary School. The verge totals 0.7ha in size. The eastern half of the site is a graduated slope lined with trees, scrub, and sections of rough grassland on the higher slope, and regularly cut grass on the lower slope. The western half is flatter and comprised primarily of regularly cut grass. This site is closely connected to Luggie Park.

The enhancements at the site are in the western half near to the entrance to Kirkintilloch High School. The area totalling 67m^2 has been mechanically planted with a bee surprise bulb mix by a contractor. This mix contains a variety of species including Tulips, Grape Hyacinth, and early flowering Crocus to flower from February to May offering a consistent source of nectar from late winter through to spring, as well as an impressive colourful display for the local community (Figure 17). Species such as the Tree bumblebee (*Bombus hypnorum*) have already been seen foraging in this patch. The Council intend to expand on these enhancements in future years.

Figure 17. Bee Surprise Bulbs Planted Waterside Road, Kirkintilloch. © Jackie Gillespie

2.3.5 James Boyle Square, Milton of Campsie, NS 64906 76563

The site at James Boyle Square is an amenity greenspace with a small football pitch totalling 0.6ha. The amenity greenspace is bordered by scrub which includes Brambles and the Strathkelvin Railway Path boarders the north of the site. The Railway Path is an extensive woodland corridor and is wildly used by the local community for recreation. To the east, along the Railway Path, the site is less than 300m from a large area of mosaic habitat including scrub, heath, and grassland.

Through the project a lowland meadow of 1500m^2 was created at this site. The meadow runs along the outer edges of the amenity greenspace ensuring the site can still be used effectively for recreation. The works were carried out by a contractor through rotovating, sowing and rolling.

2.3.6 Kincaid Park, Milton of Campsie, NS 65408 76455

Kincaid Park is an extensive site on the eastern side of Milton of Campsie. The site is 5ha in size. It is connected to the James Boyle Square site by the Strathkelvin Railway Path which is part of the John Muir Way and is bounded on the north and east sides by Glazert Water. The site comprises of a mix of amenity grassland, woodland, rough grassland, and marsh on the land adjacent to the river. East Dunbartonshire Council have previously carried out enhancements at this site by planting native pot grown wildflowers.

The enhancements to this site through the project focus on an area of 2500m^2 on which a lowland meadow has been created. Annuals were added to the seed mix to provide forage for pollinating insects in the first year of establishment. Additionally, as the area is immediately adjacent to residential housing the annuals will provide a welcome splash of colour. The works were carried out by a contractor through rotovating, sowing and rolling.

2.3.7 Linden Lea, Milton of Campsie, NS 64672 76331

Linden Lea is an existing wet meadow created by Buglife in partnership with East Dunbartonshire Council as part of a previous project. The site covers a total area of 1ha and the existing meadow covers an area of 3800m^2.

Whilst undertaking a site visit with the East Dunbartonshire Street Scene Officer it was identified that although the meadow was establishing well it would benefit from further enhancements through the planting of native pot grown wildflowers. This planting was undertaken by local contractors immediately following a cut and lift in the autumn.

2.3.8 Munro Drive, Milton of Campsie, NS 64727 76110

Munro Drive consists of an area of greenspace covering 1ha. The site comprises of a mixture of woodland, amenity grassland and an existing wildflower meadow. This meadow was created by Buglife in partnership with East Dunbartonshire Council as part of a previous project. The site creates a corridor for pollinating insects from the mosaic of habitat on the edge of the town and connecting roadside verges.

The existing 2000m^2 meadow (figure 18) was extended by 160m^2 as part of this project. This new wildflower strip is expected to assist with the further establishment of the existing meadow through the natural dispersal of seed over time. East Dunbartonshire Council intend to carry out further enhancements at the site through the sowing of Yellow rattle. This work was conducted by contractors. The continuation of an annual cut and lift in the autumn will also aid the establishment of this site by reducing nutrient input and providing space for the wildflowers to establish.

Figure 18. Existing meadow at Munro Drive prior to habitat enhancements.

2.3.9 Redmoss Road, Milton of Campsie, NS 65064 76209

Redmoss Road has a wide roadside verge which totals 0.4ha. Enhancements focused on the eastern end of this verge. This road is an important route for residents and provides an essential corridor for pollinators to move between sites created and enhanced through this project in Milton of Campsie. The site comprises of amenity grassland scattered with trees, flowering shrubs and an existing wildflower meadow created by Buglife in partnership with East Dunbartonshire Council as part of a previous project.

An area totalling 100m^2 has been mechanically planted with a bee surprise bulb mix by a contractor. This mix contains a variety of species designed to flower from February to May offering a consistent source of nectar through late winter and spring as well as an impressive colourful display for the local community prior to the existing wildflower meadow coming into flower each year.

2.4 South Lanarkshire

In South Lanarkshire, 13 sites within the Clyde Valley, between Carluke and Lanark, have been created and enhanced for pollinators. New wildflower-rich habitat has been created through the sowing of native wildflower and grass mixes, planting nectar rich bulbs, plug plants and trees. Areas of existing long grass have been enhanced with Yellow rattle seed and flowering hedge plants have also been planted to restore hedgerows at some sites. All sites were identified with the help of South Lanarkshire Council.

Figure 19. Carluke site outlined in red

Figure 20. Crossford and Hazelbank Sites. South Lanarkshire outlined in red

Figure 21. Lanark and Kirkfieldbank sites. South Lanarkshire outlined in red

2.4.1 Carluke Golf Course, NS 83028 50404

Carluke Golf Course is situated just outside the town of Carluke and covers a total area of 43 ha. The site has a diverse range of habitats interspersed in and around the golf course including woodland, scrub, cut and uncut grass and hedgerows. The golf club 'Greens Team' manage the course and were very keen to get involved to make the golf course more wildlife and pollinator friendly.

The size of the golf course presented several opportunities for enhancement and five areas were chosen to focus on through a mixture of bulb planting, plug planting and shrub and hedgerow planting. Three areas were planted solely with spring flowering bulbs including Bluebells, Snowdrops and a mixture of crocus species (figure 22). One area was planted with a mixture of these bulbs and some wildflower plug plants, and another area was re-planted with pollinator friendly shrubs. One of these areas also included a sparse hedgerow which needed filling in and so bare root trees of flowering species were planted in the gaps (figure 23). The habitat works were carried out by a local contractor, with some help from the Greens Team and their volunteers. The total area enhanced at the golf course was 0.2 ha.

Figures 22 and 23. Bulb and hedgerow planting at Carluke Golf Course

2.4.2 Crossford Playpark, NS 82621 46770

Crossford Playpark is a small public park in the village of Crossford just off the A72. The site covers 0.4 ha and is largely amenity grassland with a few shrubs and trees, and playground equipment in one half of the park.

Habitat creation at this site covered an area of 100m^2 and was focused in the open area of amenity grassland in the south east corner of the park. A wildflower meadow strip was created here in a curved shape to make it aesthetically pleasing and allow space for members of the public to walk around it. Yellow rattle seed was also added to the wildflower strip a few months after it was originally sown to help suppress grass growth and help the wildflowers to establish. Rotovation of this site was carried out by South Lanarkshire Council and sowing was carried out by Buglife staff and local volunteers.

2.4.3 Crossford Park, NS 82743 46109

Crossford Park is a site covering 1.7 ha in the village of Crossford on the A72. It is a diverse site comprising mown grass, long grass, scrub and small sections of woodland.

Habitat enhancement at this site totalled an area of 0.1 ha and was focused on sections of long grass and mown grass. Grassy slopes on either side of the footpath in the north of the park were sown with Yellow rattle seed to help with grass management and make room for wildflowers to spread. Small wildflower strips were created at the base of two of these slopes, as well as a larger strip around the southern edge of the park adjacent to areas of woodland and scrub (Figures 24 and 25). Yellow rattle seed was also added to the wildflower strips a few months after they were originally sown to help suppress grass growth and help the wildflowers to establish. The combination of long grass and scrub with the newly created wildflower strips at this site will provide both nesting and sheltering habitat for insects as well as forage for pollinators. Rotovation of this site was carried out by South Lanarkshire

Council and sowing of yellow rattle and wildflower seed was carried out by Buglife staff, South Lanarkshire Council staff and local volunteers.

Figure 24. Hoverfly on Corn marigold, Crossford Park wildflower meadow. ©Joanna Lindsay

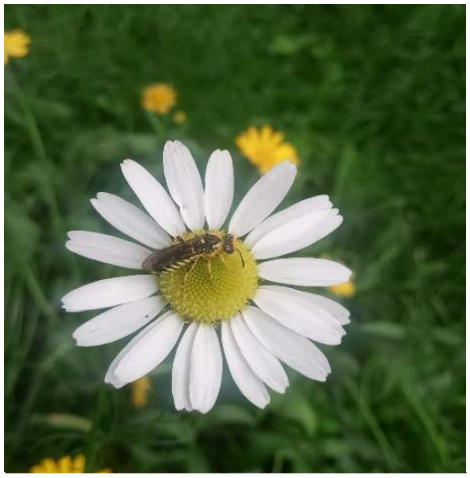

Figure 25. Sawfly (*Tenthredo sp*.) on Oxeye daisy, Crossford Park wildflower meadow. ©Joanna Lindsay

2.4.4 Hazelbank Park, NS 83516 45249

Hazelbank Park is a small public park in the village of Hazelbank on the A72. The site covers 0.6 hectares and comprises a wooded area to the north, amenity grassland to the south, and a hedgerow along the roadside. The river Clyde also runs directly adjacent to the park on the east side.

Enhancements at this site total an area of 347m^2 and include the creation of a new wildflower strip in the amenity grassland area, as well as improving the hedgerow by filling in gaps with bare root trees. Approximately 52 metres worth of gaps in the hedgerow were filled in by planting a mixture of flowering species including Blackthorn, Hawthorn and Dog rose (Figure 26). Yellow rattle seed was also added to the wildflower strip a few months after it was originally sown to help suppress grass growth and help the wildflowers to establish. The combination of flowering plants in the wildflower strip and hedgerow along with the sheltered woodland and scrub area at this site will provide diverse habitat and foraging opportunities for pollinators and other insects. Rotovation of this site was carried out by South Lanarkshire Council, sowing was carried out by Buglife staff and local volunteers and hedgerow planting was carried out by Buglife, volunteers and a contractor.

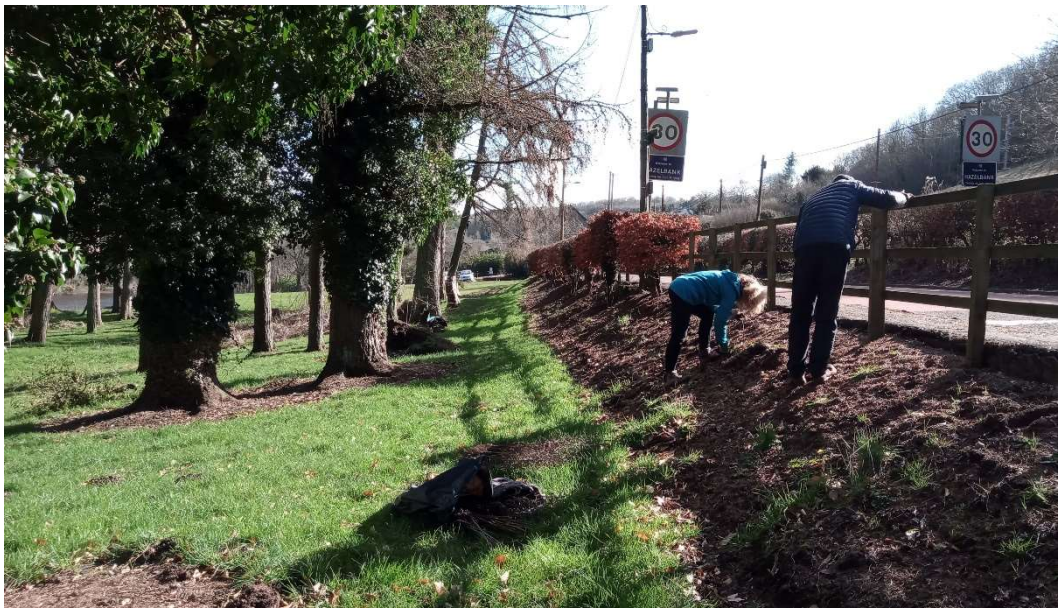

Figure 26. Hedgerow planting with volunteers, Hazelbank Park

2.4.5 Linn Crescent, NS 85425 43792

This site is a small area of unused amenity grassland of approximately 0.1 ha within a residential area in the village of Kirkfieldbank. A footpath runs through the site and hedgerows border the west and north edges.

An area on one side of the footpath of approximately 500m^2 has been transformed into wildflower meadow to provide foraging habitat for pollinators and create a colourful display for residents to enjoy. This meadow area was rotovated and sown by South Lanarkshire Council.

2.4.6 Kirkfieldbank Primary Site, NS 86440 43767

This site, which covers 1.5 ha, lies behind Kirkfieldbank Primary School in the village of Kirkfieldbank. It is a public area and is separate from the school grounds. The site consists of a large area of amenity grassland, much of which is used as a football pitch, and is bordered at the southern edges by uncut grassland and woodland. There is also a playground on the western side of the site.

Enhancements at this site total an area of 0.3 hectares and includes the addition of Yellow rattle seed onto a large uncut grassy slope on the eastern side of the site (figure 27), the creation of a wildflower meadow strip at the base of this slope and the restoration of a sparse hedgerow at the western side of the site. Approximately 18 metres worth of gaps in the hedgerow were filled in by planting a mixture of flowering species including Blackthorn, Hawthorn and Dog rose. Rotovation of the wildflower strip was carried out by South Lanarkshire Council, sowing of yellow rattle seed and wildflower seed was carried out by South Lanarkshire Council, Buglife and volunteers, and the hedgerow was planted by a contractor. Together, these enhancements will provide a diverse range of habitat for pollinators.

Figure 27. Buglife and volunteers sowing yellow rattle onto grassy slope, Kirkfieldbank

2.4.7 Castlebank Park, NS 87712 43451

Castlebank Park is a large public park in Lanark covering 5 ha. The site comprises a range of habitats and features including large areas of amenity grassland, wooded areas, gardens and a horticultural centre.

Enhancements at this site total an area of 0.4 hectares and included planting small areas next to the horticultural centre with wildflower plug plants and flowering shrubs, the creation of a large wildflower meadow (0.3 ha) on a previously frequently mown slope and a strip of grass next to meadow subject to reduced mowing. The planting of the plug plants and flowering shrubs was planned and carried out by the horticultural centre staff, with help from local volunteers and school pupils. The wildflower meadow was rotovated and sown by a contractor. The location of the meadow was chosen due to it being clearly visible from the footpath for the public to admire, but also due to it being a less well-used area.

2.4.8 Bellefield Road Recreation Ground, NS 4439088270

Bellefield Road Recreation Ground is a small public park in the north of Lanark. The site covers 0.7 hectares and comprises amenity grassland interspersed with playground equipment and a small grass football pitch.

A total of 274m^2 of pollinator habitat was created at Bellefield Road through rotovating and sowing a wildflower meadow strip along the eastern edge of the park to increase the floral diversity of the site

and provide forage for pollinators. Yellow rattle seed was also added to the wildflower strip a few months after it was originally sown to help suppress grass growth and help the wildflowers to establish. Rotovation of this site was carried out by South Lanarkshire Council and sowing was carried out by Buglife staff and local volunteers.

2.4.9 Kildare Park, NS 88639 44156

Kildare Park is a public park and playing field in the centre of Lanark, immediately adjacent to Lanark Primary School. The site covers 2.4 hectares and comprises a large football pitch which is slightly elevated from the surrounding amenity grassland, a small playground area and footpaths running through the park.

The areas chosen for habitat enhancements at this site – totalling 0.1 hectares - were the grassy slopes around the football pitch and a small section of flat ground at the bottom of the slopes, to minimise disruption to other areas of the park which are well-used. The slopes were planted with a variety of wildflower plug plants of five different species including Oxeye daisy (*Leucanthemum vulgare*), Yarrow (*Achillea millefolium*), Autumn Hawkbit (*Leontodon autumnalis*), Red clover (*Trifolium pratense*) and Devil's bit scabious (*Succisa pratensis*). Additionally, a narrow wildflower meadow strip was sown along the bottom of the slopes. The plug planting was carried out by a contractor and the wildflower strip was rotovated and sown by South Lanarkshire Council.

2.4.10 St Leonard Street, NS 89200 44142

This site is a regularly mown road verge between St Leonard Street and Cameronian Court in Lanark, covering 200m^2. The verge is on a fairly steep slope and has stone steps in the centre, connecting the footpaths on each road.

This area was chosen for enhancement through the planting of spring-flowering bulbs, as the verge had been planted with daffodils in previous years and would provide a colourful spring display for road users and residents in the houses opposite. A mixture of pollinator friendly species including Snowdrops, Wild garlic, Lesser celandine (*Ranunculus ficaria*) and Winter aconites were planted on the verge by Buglife and South Lanarkshire Council.

2.4.11 Lanark Loch Pitch and Putt, NS 89680 43119

Lanark Loch Pitch and Putt is a site of 1.7 ha to the west of Lanark Loch, consisting mostly of a putting green with unmown grassy slopes and trees bordering the site to the west and north.

Enhancements at this site total an area of 0.2 ha and includes the addition of Yellow rattle seed to the grassy slope on the western edge of the site to suppress grass growth and allow wildflowers to establish, as well as the creation of a wildflower meadow strip along the base of this slope (figure 28). The combination of these enhancements will provide suitable sheltering, nesting and foraging habitat for pollinators in close proximity to each other. Yellow rattle seed was sown by Buglife, South Lanarkshire Council and local volunteers, and the wildflower strip was rotovated and sown by South Lanarkshire Council.

Figure 28 Wildflower meadow creation at Lanark Loch Pitch and Putt

2.4.12 Lanark Moor Country Park, NS 89888 42834

Lanark Moor Country Park is a site of 4.9 hectares which lies to the south of Lanark Loch, comprising large areas of amenity grassland and woodland, some smaller areas of scrub, several footpaths and a car park.

Habitat enhancements at this site total an area of 0.3 hectares and include the transformation of three areas of amenity grassland into wildflower meadows as well as the planting of a small orchard with pollinator friendly fruit trees. The areas chosen for wildflower meadow creation were at the edges of woodland habitat within the park, so as to minimise disruption to other areas which are well-used by the public. The proximity of the woodland and wildflower meadows to each other will provide good foraging and sheltering habitat in the same area. The wildflower meadows were rotovated and sown by a contractor, and the orchard was planted by another contractor and South Lanarkshire Council.

2.4.13 Hyndford Road, NS 90479 42462

This site lies at the edge of Lanark Race Course adjacent to Hyndford Road/A73 on the eastern outskirts of Lanark. The site covers 1.2 hectares and is a large strip of unused grassland with scrub and woodland.

Habitat enhancements at this site total an area of 0.5 hectares and include the addition of Yellow rattle into the areas of woodland and scrub to suppress grass growth and allow wildflowers to establish, as well as the creation of a wildflower meadow strip along the edge of the scrub area. These enhancements will provide foraging, sheltering and nesting habitat for pollinators adjacent to each other. The yellow rattle was sown by Buglife and volunteers and the wildflower strip was rotovated and sown by South Lanarkshire Council.

Figure 29. South Lanarkshire Council staff planting fruit trees, Lanark Moor Country Park. ©Louisa Maddison

3. Volunteers and Community Groups

Local communities and volunteers have been engaged with across the four Local Authorities, raising awareness of the plight of our insect pollinators, about the project and what can be done to help our pollinators thrive. Prior to works taking place local community and friends of groups were contacted about the project and the proposed plans, inviting them to provide feedback and get actively involved in the habitat creation and enhancement works.

Community groups and schools were contacted and engaged with as part of the project, this included TCV in Falkirk and Edinburgh, FOMBL in Edinburgh (figure 30), Castlebank Horticultural Centre in South Lanarkshire, Lanark Grammar School in South Lanarkshire, and Bantaskine Primary School in Falkirk. A total of 334 people across the four Local Authority areas were actively involved in the habitat creation and enhancement works such as wildflower seed sowing and wildflower planting.

Figure 30. FOMBL and Buglife planting wildflower bulbs Melville Drive, Edinburgh ©FOMBL

The habitat creation events held through this project provided volunteering opportunities, improving both physical and mental wellbeing of those involved. The sessions have also provided important education opportunities for schools. This engagement with local groups should encourage a greater uptake of recreational use in these spaces and a sense of community ownership should evolve, benefitting local communities and biodiversity. Certain groups such as FOMBL in Edinburgh will be actively involved in the future management of sites, carrying out removal of grass cuttings from the meadows created during the project.

Plans were in place to run further sessions with more schools and community groups just before the UK entered a national lockdown in March 2020 due to Covid-19. Unfortunately, this led to the cancellation of all events due to lockdown restrictions. Sessions with schools and community groups had been planned at some of the sites. The schools and groups had been contacted and informed about the project and the sessions had been organised. Despite the sessions not going ahead, the groups were engaged via email and phone conversations and will have an awareness of the Central Scotland B-Lines project, including what has been happening in their local areas and will be able to visit the sites themselves at another time if they wish.

Due to the cancellation of community events and the inability to continue outreach in person, it was deemed beneficial to create interpretation for key sites across the different Local Authority areas. This includes signs about wildflower meadows and pollinators, and bee banks. This interpretation will provide further engagement and raise awareness of the importance of pollinators and their associated habitats.

4. Conclusions and Recommendations

The Central Scotland B-Lines Project has enhanced active travel and recreational spaces within East Dunbartonshire, Falkirk, Edinburgh and South Lanarkshire for users and biodiversity. 15.3 hectares of habitat have been directly created, restored, and enhanced for pollinating insects across 47 sites within the four Local Authority areas. The routes and spaces have been improved by sowing diverse wildflower seed mixes, changing mowing regimes, planting wildflower plug and pot plants, sowing Yellow rattle, planting trees and shrubs, bulb planting and creating bee banks.

The Local Authority areas which we have been working in across the central belt of Scotland are in urban and built-up areas. This made it difficult to identify larger sites for habitat creation and enhancement. This is because the Local Authorities do not have the capacity and equipment to manage such large sites as meadows using cut and lift machinery. The sites which have been enhanced need to be suitable for both pollinators and people ensuring the greenspaces still provide amenity areas for the local communities.

The original duration of the Biodiversity Challenge Fund project was 14 months however, eight months into the project the UK entered a national lockdown due to the Covid-19 global pandemic. This posed significant challenges for the project, practical habitat works, and site visits were not able to proceed during the lockdown period which disrupted and delayed many aspects of the project. As a result, the project was awarded a 6-month extension by NatureScot.

The most significant challenges caused by the pandemic included practical works being disrupted part way through completion, certain sites saw the ground prepared by contractors ready for seed sowing but then completion of sowing seed was delayed. This meant that ground works had to be re-visited in the autumn once contractors were able to safely go back out on site. With works unable to go ahead in the spring planting season and with strict restrictions in place, pollinator surveys were also not able to be carried out during the project. Local Authority and site staff were also operating on limited capacity with some officers on furlough, this along with events unable to go ahead meant that habitat works had to be adapted, with certain sites being dropped.

These factors along with others mentioned above have meant that not as much habitat has been enhanced and created as originally planned. Even though some of the direct habitat enhancements and creation may be small this only accounts for a small percentage of the total size of some of the sites such as Local Nature Reserves, Estates and Parks which have other habitat types present and will already be supporting pollinators and other wildlife. It is expected that the total area indirectly improved by the project is over 100ha connecting 451.16 hectares of habitat across the four Local Authority Areas.

Prior to lockdown local community and school groups were engaged with the project through various habitat creation events. This provided volunteering opportunities improving both physical and mental wellbeing of those involved and improved the understanding of pollinating insects and the ecosystem services that they provide. Taking regular walks and spending time noticing wildlife has helped many

people throughout Covid-19, the sites enhanced through this project are helping to create better places for both people and wildlife.

During Covid-19 the Local Authorities and landowners continued to provide support for the project and communication was kept throughout. Despite delays Buglife were able to continue planning with Local Authorities and landowners to get habitat works up and running again as soon as possible; maintaining momentum for the project.

This project is contributing to the delivery of the Scottish Pollinator Strategy and the development of ecological and social networks. Sites in Falkirk, Edinburgh, East Dunbartonshire and South Lanarkshire have been improved for pollinators providing connective habitat corridors. The habitat works have been carried out working with Local Authority partners and landowners, this has raised awareness around the importance of providing and managing habitat for pollinators and discouraging the use of pesticides to halt and reverse the decline of pollinator populations. It has also forged strong working relationships between Buglife and the different Local Authorities. These Local Authorities are continuing to roll out more pollinator and biodiversity sites; expanding on the work which has been carried out through the Central Scotland B-Lines project.

The pollinator habitat created and enhanced through this project will act as important 'stepping stones' across the four Local Authority areas and will allow the movement of species. It is recommended that the habitats created through this project continue to be enhanced through the additional planting of native wildflowers. This will provide further foraging habitat for pollinating insects as well as for other wildlife. The sowing of Yellow rattle, into areas dominated by grass, will further enhance these areas by reducing vigorous grass growth and provide habitat for wildflower species to grow and set seed.

It is also recommended that new meadows and flower rich areas are created, and existing sites expanded to provide additional wildlife areas and habitat corridors between the project sites. It is important that the wildflower meadows are cut and lifted once a year to reduce nutrients and provide space for the development of wildflowers. Whilst cutting the meadows, it is also important to leave areas long for over-wintering species of invertebrate and other wildlife, particularly small mammals, and birds. The area left uncut can be rotated every year to prevent grasses dominating and the area becoming rank.

A Buglife Conservation officer will carry out pollinator surveys in 2021 at the sites which have been enhanced through the project to gather valuable data and record how the enhancements have benefitted pollinators. It is recommended that this takes place with the local park's officers and local communities and continues into future years. Sites should be monitored regularly – at least once every two years for a minimum of 10 years – to ensure the correct management is being carried out, as well as to assess the biodiversity of the area. Surveys should be carried out around the same time each year (spring or summer) and should record the diversity and abundance of both plants and pollinator species, to determine whether the new habitat has been successful and if there have been any significant changes.

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