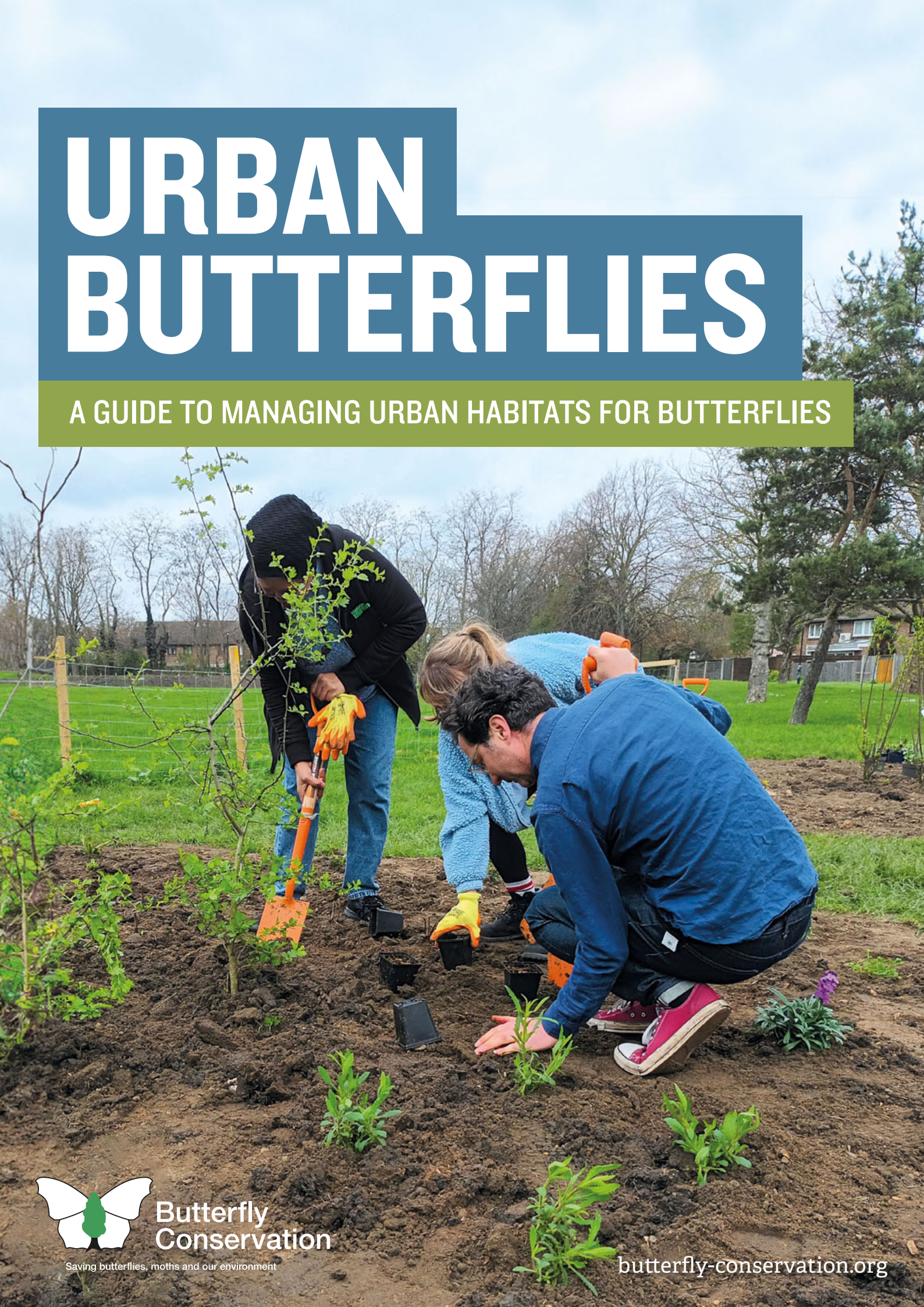
URBAN BUTTERFLIES

A GUIDE TO MANAGING URBAN HABITATS FOR BUTTERFLIES



Butterfly Conservation

Saving butterflies, moths and our environment

butterfly-conservation.org

Urban habitats for butterflies

Butterflies are declining and they need our help to recover. 80% of butterflies in the UK have declined since the 1970s. Urban greenspaces can play a vital role in their recovery as they provide valuable habitats where butterflies can thrive. They are becoming increasingly important as habitats in the countryside are lost or no longer suitable. This booklet describes the main habitat requirements of butterflies associated with urban greenspaces, gives advice on management and provides case studies of habitat improvement in an urban setting.

Improving habitats for butterflies will help support a wide range of moths and other invertebrates as well as other wildlife such as bees, birds and bats. As planting for wildlife becomes increasingly popular in urban areas, making sure we plant the right species in the right place will help support a wide range of wildlife. Conserving butterflies and moths in urban areas can make an important contribution to nature's recovery and people's enjoyment of nature.

Green spaces

Urban greenspaces that support butterflies include gardens, parks, allotments, churchyards, school grounds and road verges. They vary in size from small gardens to large country parks but even the smallest space can be valuable for butterflies as they can provide the food and shelter needed for butterflies to complete their life cycle.

Key features include: abundant nectar sources; warm, sunny and sheltered situations; caterpillar foodplants such as nettles, Holly, Ivy, elms, Bird's-foot-trefoil and native grasses.

Habitats that support butterflies include: grassland and scrub; trees and woodland; hedgerows and wetlands. Providing a variety of habitat types will support the greatest diversity and abundance of butterflies.

Species rich short and tall grassland, scrub and trees

Butterfly life cycles

To complete their life cycle, butterflies need:

Caterpillar foodplants: The caterpillars of many butterflies feed on only one or two species of plant. For successful development some species need the foodplant growing in the right condition (e.g. height of vegetation, shelter, or specific growth forms such as large, lush plants).

Adult butterfly food sources: Usually flowers for nectar or honeydew produced by aphids. Adult butterflies are far less choosy than their caterpillars.

Shelter: For adults to establish territories, to provide warm conditions for adults to bask and for egg and caterpillar development.

Over-wintering sites: For hibernating eggs, caterpillars, chrysalises or adults (e.g. dense vegetation, grass tussocks).

Butterflies of urban habitats

This table lists those butterflies most often associated with urban habitats, although not all are found throughout the UK. The main caterpillar foodplants are given together with brief descriptions of their habitats or habitat condition. For urban habitat creation schemes, it is important to provide both the required caterpillar foodplant and the right habitat condition.

Butterfly	Main caterpillar foodplants	Habitat condition
Small Skipper	Yorkshire-fog	Tall grassland
Essex Skipper	Cock's-foot	Tall grassland
Large Skipper	Cock's-foot	Tall, often damp grassland
Dingy Skipper	Common Bird's-foot-trefoil	Variable sward height (short/medium) and bare ground
Grizzled Skipper	Agrimony, Creeping Cinquefoil, Wild Strawberry, Bramble	Variable sward height (short/medium), bare ground and taller areas with spring nectar plants
Brimstone	Buckthorn, Alder Buckthorn	Scrubby grassland, woodland, hedges
Large White	Cabbage family, Nasturtium	Gardens, allotments, arable fields
Small White	Cabbage family, Nasturtium, Wild Mignonette	Gardens, allotments, arable fields
Green-veined White	Wild crucifers (e.g. Garlic Mustard)	Damp, lush vegetation
Orange-tip	Cuckooflower, Garlic Mustard	Damp, grassy vegetation
Green Hairstreak	Common Rock-rose, Gorse, Broom, Common Bird's-foot-trefoil, Bilberry	Sheltered grassy or scrubby vegetation
Purple Hairstreak	Oaks	Woodland, hedges, isolated trees
White-letter Hairstreak	Elms, including sucker regrowth	Hedges, scrub, rides, isolated trees
Brown Hairstreak	Blackthorn	Hedges, woodland edges and scrub
Small Copper	Common Sorrel, Sheep's Sorrel	Warm, dry situations in a variety of habitats
Small Blue	Kidney Vetch	Dry, sheltered grassland and disturbed habitats, with mosaics of short and tall swards with patchy scrub

White-letter Hairstreak

Small Copper

Holly Blue

Gatekeeper

Small Skipper

Butterfly	Main caterpillar foodplants	Habitat condition
Brown Argus	Common Rock-rose, Dove's-foot Crane's-bill, Common Stork's-bill	Calcareous grassland and disturbed habitats, especially sheltered and south or west facing slopes
Common Blue	Common Bird's-foot-trefoil, Black Medick	Sunny, sheltered grassy vegetation
Holly Blue	Holly, Ivy	Hedges, field margins, woodland rides, gardens, parks
Red Admiral	Common Nettle	Sunny sheltered situations
Small Tortoiseshell	Common Nettle, Small Nettle	Sunny sheltered situations
Peacock	Common Nettle	Sunny sheltered situations
Comma	Common Nettle, Hop, currants, elms	Open woodland, woodland edges, gardens
Speckled Wood	False Brome, Cock's-foot, Yorkshire-fog, Common Couch	Tall, shady, grassy vegetation, in woodlands, scrub, hedges, parks, gardens
Wall	False Brome, Cock's-foot, bents, Wavy Hair-grass, Yorkshire-fog	Short, open grassland with broken or stony turf
Marbled White	Red Fescue, also Sheep's-fescue, Yorkshire-fog, Tor-grass	Tall, unimproved grassland
Gatekeeper	Fescues, bents and meadow grasses, Common Couch	Tall grassland near hedges, rides and scrub
Meadow Brown	Fescues, bents and meadow-grasses, also Cock's-foot, False Brome	Open grassland
Ringlet	Cock's-foot, False Brome, Tufted Hair-grass, Common Couch, meadow-grasses	Slightly shady, damp, tall grassland
Small Heath	Fescues, bents and meadow-grasses	Dry, well-drained, short, sparse grassland

Managing urban habitats for butterflies

Allow some areas to grow tall and wild. Native long grasses support grass-feeding butterflies like Meadow Brown and Gatekeeper. Bramble in a sunny spot provides nectar and shelter.

Wildflower or meadow areas provide nectar and caterpillar food-plants. They should be in full sun and ideally contain patches of scrub or hedges for shelter.

Large nettle patches in open, sunny grassland support breeding Peacock and Small Tortoiseshell, smaller patches in sunny spots can support Red Admiral.

Peacock caterpillar feeding on stinging nettles

Sow or plant caterpillar food-plants such as Bird's-foot-trefoil and Garlic Mustard.

Creating a variety of habitats with flower-rich grassland, native shrubs and trees will support many butterflies and moths by providing food and shelter for adults and caterpillars. Other wildlife will benefit too. In smaller spaces one or more features will help connect larger habitats nearby.


Holly Blue laying eggs on ivy

Provide a wide variety of native trees and shrubs. Elm supports the rare White-letter Hairstreak butterfly and over 30 moth species. Holly and Ivy provide food for caterpillars of Holly Blue. Purple Hairstreak breeds on Oak and Brimstone uses Buckthorn.

Avoid using pesticides and fertilisers to maintain a healthy environment for wildlife.

Use plug plants to create a flowering lawn with low growing wild-flowers such as Self-heal and Wild Thyme.

Formal plantings can contain good nectar plants such as Verbena. These will support bees and other insects as well as butterflies.

Species-rich low fertility chalk grassland with scrub edge habitat in Bromley.

Grassland and scrub

Grassland is often the main habitat type present in urban sites. The type of grassland varies with soil acidity (acid, neutral, alkaline) and moisture (dry or damp grassland). The best for butterflies are species-rich, supporting a wide range of native grasses and wildflowers and can occur on any soil type.

Our best species-rich grasslands occur on poor soils where lots of plants compete for limited nutrients and coarse grasses can't dominate. Soils with high fertility tend to be dominated by coarse/broad-leaved grasses with no space for wildflowers to germinate whereas low fertility soils support fine grasses and wildflowers and have space (e.g. bare patches) for germination.

We can help control and reduce soil fertility by cutting and then collecting the grass cuttings. This prevents nutrients returning to the soil which occurs when grass is cut and then left in-situ to rot down. Reducing soil fertility also means there is less grass to cut which can lead to a reduction in resources required for grass maintenance.

Urban habitats tend to have higher fertility soils so reducing soil fertility is an important consideration. To reduce costs cuttings are ideally composted on site avoiding locations where nutrients might run-off onto meadow areas.

Scrub habitat is native shrubs, bushes and small trees sometimes referred to as 'successional habitat'. It is an integral component of grassland, with the grassland/scrub edge providing the warm, sheltered conditions preferred by many species. Native species such as Buckthorn, Hawthorn, Blackthorn and Dog-rose provide shelter and food sources for many butterflies and moths. They can be planted in small groups to help establish this important habitat feature which is often missing from urban grasslands.

Shrub block in grassland

Grassland Management

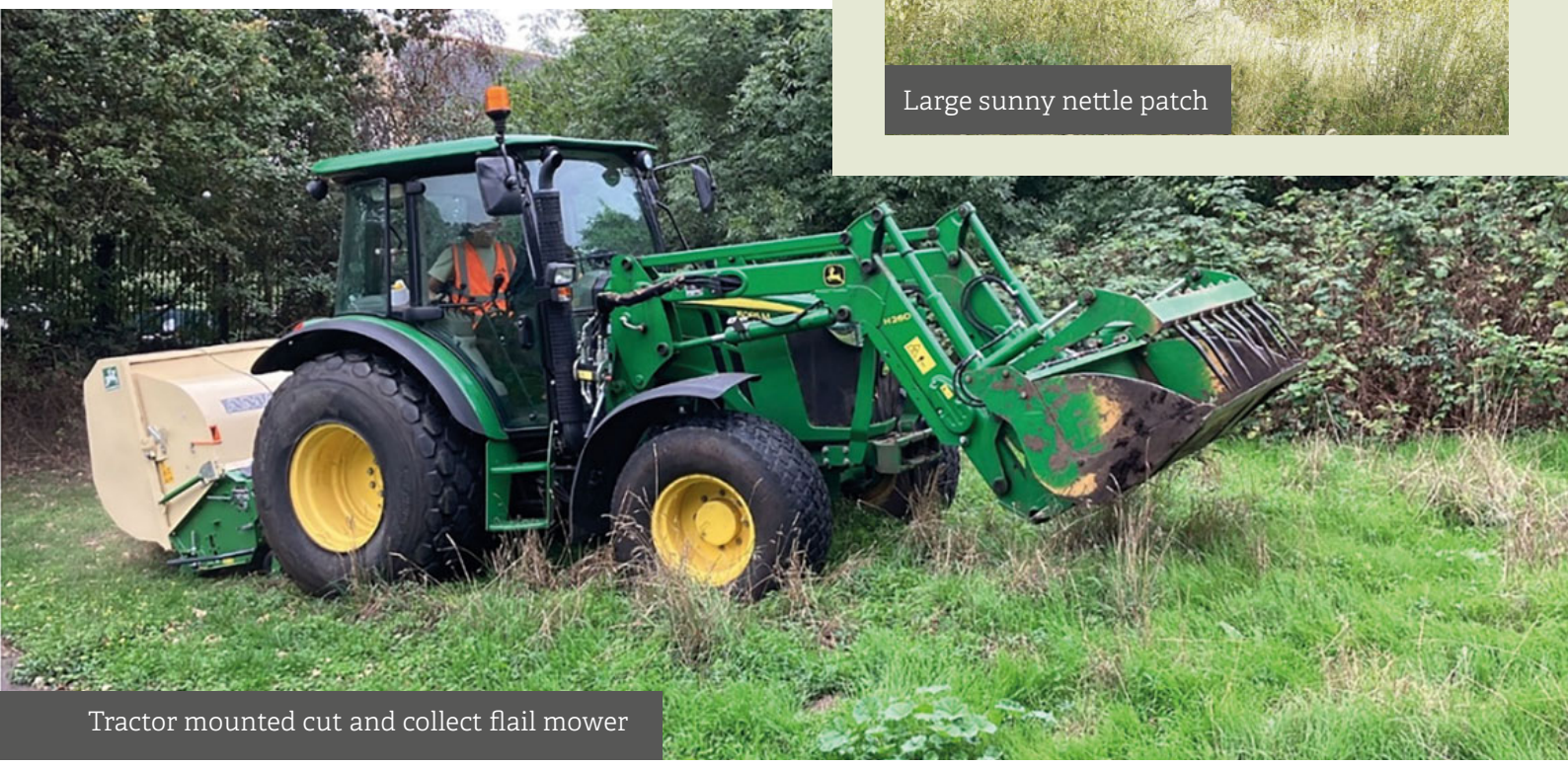
Grassland management by 'cut and collect' can take many forms from a flail collector behind a tractor to a small ride on mower or raking by hand.

The method used will depend on available resources and the size of the space. Cut and collect helps maintain species-richness but can also improve it by reducing nutrient levels. This occurs over time when cut and collect is established on a site annually or bi-annually. There are several methods for reducing soil fertility which are summarised below and can be used to create wildflower meadow areas.

Management guidance

- Cut areas once or twice a year in early spring (before April) or in the autumn (after August).
- Avoid cutting grassland too short, no less than 5cm in height, as many species require longer vegetation.
- Always leave some part of the site uncut each year as over-wintering refuge habitat (e.g. 1/3 of grassland area, scrub and woodland edges identified in rotational cutting plan).
- Retain patches of scrub and cut on rotation.
- Retain nettle patches in sunny positions.

Large sunny nettle patch



Tractor mounted cut and collect flail mower

The egg of the Small Skipper butterfly is laid in the dead leaf sheath of the grass Yorkshire-fog. The caterpillar hatches and immediately spins a tiny cocoon in which to spend the winter. It starts feeding on fresh grass leaves in April. Tall grassland must be left uncut over winter to support this species.

Small Skipper egg laying

Transport for London case study

In 2019, Transport For London (TFL) initiated two wildflower verge trials alongside A roads in London. Management was changed from four to eight cuts with clippings left behind to two cuts per year with clippings collected to reduce nutrients being returned to the soil.

Signage on site communicated the changes to the public. Site selection was based on suitability for conversion to wildflower meadows, accessibility for cut-and-collect mowing equipment, and considered road safety implications and proximity to residential properties. Following its success the trial was expanded to almost 130,000 square metres in 2023 with an aim to double that in 2024.

The original trial sites now support many wildflowers including knapweed and Red Clover with 11 butterfly species recorded on one site with Meadow Brown being the most numerous. Managing road verges in this way can help improve habitat connectivity for butterflies.

Avery Hill grassland

Meadow Brown on grassland verge

Fertility reduction and meadow creation methods

- **Method 1 - Repeat cut and collect:**
  Allow grass to grow long, cut and collect clippings, then repeat this process a further two times over the growing season to three cuts in total, in approximately April, July and September.
- The following year return to an annual cut and collect in September with additional cut in April if needed to control grass growth and encourage wildflowers. This method works well over large areas with machinery but can also be completed in smaller areas by hand.
- One cut and collect per year will improve the habitat condition but the improvement will take much longer than more frequent cutting to start with.
- Meadow seeding using a native perennial mix can be considered once grass growth is reduced and you have allowed some time to see what appears naturally first (though that is not essential). Bare patches need to be created by scarification to ensure seed is in contact with the soil with seeding ideally completed in early spring or autumn. Including Yellow Rattle in the mix can help control and reduce grass growth.

Greenway Pollinator Trail case study

Newham council established The Greenway Pollinator Trail by creating over 6km of wildflower verges along the traffic free Greenway route, which runs above a Thames Water sewer, to improve the natural environment and support biodiversity.

Cut and collect mowing and scarification prepared the verges for seeding with a mix of native wildflowers and grasses to create a thriving habitat for bees, butterflies and moths. The pollinator trail includes four habitat feature areas designed to support specific species with interpretation boards highlighting the species and the foodplants provided. Eight butterfly species have been recorded in the last year including Brimstone, Holly Blue and Brown Argus.

Fertility reduction and meadow creation methods

- **Method 2 - Turf / topsoil removal:**
  Strip turf to expose bare soil for seeding with a wildflower meadow mix. This removes competitive grasses and allows wildflowers and fine grasses to germinate.
- Removing turf and topsoil exposes low nutrient subsoil which is ideal for seeding and establishment of species-rich meadow with reduced maintenance requirements.
- Topsoil depth is normally around 150mm. It can be moved elsewhere on the site or used to form a shelter bank that will help create the warmer conditions favoured by butterflies.
- This method works well on a small - medium scale (approx. 20m2 – 1000m2) to create feature areas or help introduce meadow species into long grass.
- Cornfield annuals such as Corn Marigold and Cornflower can be included in the seed mix for colour in year one as perennials often need more time to develop. Wildflower plug planting can aid establishment and help engage local volunteers but is not essential.
- Annual cut and collect mowing in September will help maintain species-rich habitat. On larger sites leave some areas uncut each year on rotation.

Clapham Common case study

Amenity grassland was transformed into a series of wildflower meadow areas by removing topsoil and seeding the exposed subsoil.

Topsoil was used to form surrounding banks that help protect the meadows, provide shelter and minimised the cost. Grass pathways are maintained between meadow areas to allow the public to walk among them. Initial colourful displays of Corn Marigold in year 1 were replaced by Oxeye Daisy, Knapweed and Birds-foot Trefoil in year 2.

Small blocks of native scrub planting were added to provide further food sources and shelter for wildlife. Most of the meadow areas are cut and collected around September each year with some areas left uncut for over-wintering habitat.

Meadow creation

Year 1

Year 2

Fertility reduction and meadow creation methods

- **Method 3 - Importing substrates:**
  Strip turf and topsoil and replace with low nutrient substrate such as limestone, low nutrient soil or sandy gravel and seed with a meadow mix.
- Recycled materials such as crushed concrete can also be considered.
- This method works well as part of larger scale habitat creation schemes and provides the best conditions for long-term species-rich grassland

Burgess Park case study

Large meadow areas were created at Burgess Park as part of a redevelopment programme. Topsoil was removed and replaced with a sandy gravel low nutrient substrate and seeded with a meadow mix.

Site signage explained how the 'slow growing meadow' will take time to develop with low nutrients helping to prevent vigorous plant species taking over. Many bare patches remained in year 1 allowing space for fine grasses and a variety of wildflowers to develop. Plant species include Sainfoin, Oxeye Daisy, Knapweed and Bird's-foot-trefoil with 12 butterfly species recorded along the meadow/woodland edge including Common Blue.

Year 1

Year 3

Common Blue on Sainfoin

Horticultural planting

Areas of formal planting in parks and gardens can provide valuable nectar sources, shelter and caterpillar foodplants. Providing nectar-rich flowering plants from spring to autumn will help support the most species.

Herbaceous border with Verbena

Management guidance:

- Spring flowering plants include Aubretia, Bugle and Primrose;
- Mid summer plants include Knapweed, Wallflower and Verbena bonariensis;
- Late summer plants include Iceplant, Rudbeckia and native Scabious.
- Shrubs such as Lavender, Hebe and Privet also provide good nectar sources.
- Cuckooflower & Garlic Mustard are foodplants for the Orange-tip and Green-veined White. Nasturtium is a foodplant for white butterflies.
- Holly and Ivy provide shelter, nectar sources and foodplants for many species including Holly Blue butterfly.
- Climbers like Clematis and Jasmine provide useful cover and nectar.
- Herbs such as Thyme, Rosemary and Wild Marjoram are great nectar sources and work well in community gardens.
- See wild-spaces.co.uk/ for planting ideas and guidance.
- Allowing plants to die back naturally in autumn and not cutting them back until the following spring helps provide over-wintering habitat for caterpillars and pupae. Leave cut stems in a quiet corner where possible.

Beckton Butterfly Garden case study

A new butterfly garden was created at Beckton Park as part of an improvement programme. The garden was designed to integrate with the landscape by using multiple circular flower beds with grass pathways between them.

Turf was removed and replaced with topsoil for planting with a variety of foodplants and nectar sources including Garlic Mustard, Honesty, Bugle, Wallflower, Coneflower, Plume thistle, Wild Marjoram, Cranesbill, Lavender, Catmint, Sedum, Aster and Purple top (Verbena). A layout plan ensured taller plants and shrubs such as Hawthorn were located in the centre of the beds surrounded by medium size and then smaller plants.

The layout allows for both sunny and more shaded conditions for a variety of species with shelter and additional food sources provided by new shrubs and surrounding trees. Once fully established the garden will be an amazing space for everyone to enjoy with intimate spaces where people can connect with nature.

Hedgerows and field margins

Hedgerows are likely to be present in all urban areas. Some of these will be remnants of the ancient and species-rich hedgerow network, whereas others will be of more recent origin.

Hedgerow trees and shrubs provide breeding habitat for some butterflies. The grassy vegetation in the bases of hedges and in field margins, provide breeding habitat for many more species, particularly on warm, sheltered south-facing sites.

Mixed species hedge with tall standards including Elm and long grass margin

Management guidance:

- Maintain tall, thick, hedges – avoid severe flailing and annual trimming. Periodic hedge-laying is the best approach. Alternatively cut hedges in late winter on 2-5 year rotation.
- Include Buckthorn and Alder Buckthorn for Brimstone and Blackthorn for Brown Hairstreak and many moth species.
- Hawthorn is a great all-rounder that provides nectar in the summer and is a foodplant for over one hundred moth species.
- Retain or increase the number of tall standard hedgerow trees including Elm.
- Maintain wide grassy margins alongside hedgerows and in field margins. Cut once a year, or every 2-3 years in the autumn (after August). If practical, remove the clippings.
- Maximise native tree, shrub, grass and wildflower species richness to provide a range of caterpillar foodplants and nectar sources.

Margravine Cemetery case study

Existing hedgerows were enhanced with additional shrub planting including Blackthorn where Brown Hairstreak eggs have now been recorded. Long grass margins are left alongside the hedges and new shrub planting.

Brown Hairstreak eggs are often found on young Blackthorn. Suitable sites can be checked for eggs in early winter.

Trees and woodland

Native trees and shrubs provide valuable nectar, foodplants and shelter habitat that helps support all stages of the butterfly life cycle.

The majority of adult butterflies and moths drink nectar from flowers, and aphid honeydew on leaves of trees and shrubs. Willows (especially Grey and Goat Willows) are very important caterpillar foodplants for moths (and the Purple Emperor butterfly), and crucially provide early spring nectar for butterflies, moths and many spring insects. Ivy provides an important foodplant, and shelter at any time of year, but is even more important as an autumn nectar source for overwintering butterflies and moths.

Many species over-winter as adults caterpillars, eggs or pupa in the soil, leaf litter, attached to the stem of a plant or in thick Ivy in trees. Mosses and lichens provide food for larvae of smaller moths, which in turn can be important as food for breeding birds.

The best woodland for butterflies comprise native, deciduous trees and usually have an open canopy, varied age structure (including recently cleared and regenerating patches), and wide, sunny paths and glades. Over-mature and decaying trees are important for moths and other invertebrates.

Sunny woodland glade provides ideal habitat

Scallops cut back on woodland edge

Management guidance:

- Manage sites to include butterfly caterpillar foodplants Holly, Ivy, Oak, Elm, Blackthorn, Honeysuckle and Buckthorn where suitable.
- Planting disease-resistant Elm will help replace the loss of Elm trees to Dutch elm disease and support the rare White-letter Hairstreak butterfly.
- Understory can include food sources such as brambles, nettles, bluebells, Garlic Mustard, Self-heal and Red Campion.
- Birch, willows, Apple, Aspen, Alder, Hazel, Dog-rose, Cherry, Rowan and Field Maple are important moth caterpillar foodplants.
- Providing a mix of species will support a diversity of butterflies and moths. They can be planted in small copses or individually for smaller sites and gardens.
- Improve woodland structure by thinning and coppicing, widening/creating paths where the canopy is closed, cutting 'scallops' or bays in the path edges and cutting back trees on the corners of ride junctions.
- Establish tall grassy path margins and cut on a 3-6 year rotation in late autumn with cuttings collected and cut scrubby path margins on a 8-20 year rotation in autumn and winter.

Purple Hairstreak butterflies lay their eggs on the buds of Oak trees in summer. The caterpillars hatch out the following spring to feed on the flower buds and leaves.

Blythe Hill Fields case study

The Friends group were keen to improve biodiversity with a variety of native trees and shrubs planted to enhance amenity grassland and existing meadow areas.

Eighty native shrubs were planted by local volunteers in a series of small groups and protected with a low rope fence. Some larger 'standard' trees were planted alongside the shrub blocks to create an open woodland zone with other standards planted to extend an existing treeline and add more diversity. 'New Horizon' disease-resistant Elm trees were planted to support the rare White-letter Hairstreak butterfly with Oak, Blackthorn and Common Buckthorn providing further food sources and valuable shelter habitat.

Shrub planting

Woodland zone

Damp grassland and wetlands

Areas of damp grassland and wetland, associated with streams, canals, ponds, small pools and ditch margins can provide ideal conditions for butterflies such as the Orange-tip and Green-veined White, as well as a range of moths.

Large urban wetlands, such as reedbeds, fens and marshes provide important breeding habitat for a significant number of specialist moths and other invertebrates. Wetlands also provide cool damp areas as a refuge from drought in a rapidly warming climate.

Management guidance:

- On larger fens and reedbeds, maintain a range of successional stages.
- Retain areas of scrub at different age structures.
- Maximise plant species richness, including shrubs, to provide a range of caterpillar foodplants and nectar sources.
- Lightly graze areas of damp grassland, preferably with cattle or ponies, or cut on rotation in late autumn (after September).
- Manage reed by cutting on a minimum 4 year or longer rotation. Rake out accumulated litter to slow drying out. Leave in piles at edge of reedbed.
- Remove scrub by winching or pulling out bushes, leaving small pools for other invertebrates.
- Dig out parts of reedbeds to restart succession.
- Larger areas of fen and marsh can be maintained by grazing, mowing and/or scrub management. Grazing and mowing intensity should retain some short vegetation and tall tussocky areas.

Green-veined White on Cuckooflower

Clapham Common wetland case study

Local community groups wanted to create additional wetland habitat to increase biodiversity and bring people closer to nature.

A new pond with wetland planting was designed to support amphibians, aquatic invertebrates and butterflies and moths with fenced boardwalks and a viewing platform providing access which helps minimise disturbance.

Damp meadow plants such as Cuckoo Flower provide nectar and foodplants for Orange Tip, Small and Green-veined White butterflies with pond margin plants like Marsh Woundwort supporting the Garden Tiger moth and Hemp Agrimony supporting 13 butterfly species.

Wetland design at Clapham Common

Butterfly Conservation

Saving butterflies, moths and our environment

Butterfly Conservation is the UK charity dedicated to saving butterflies, moths and our environment. Our research provides advice on how to conserve and restore habitats. We run projects to protect threatened species and we are involved in conserving hundreds of sites and reserves. The Wild Spaces campaign seeks to transform 100,000 spaces for people, butterflies and moths. Visit our website for more information **butterfly-conservation.org**

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