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Re. Visit to Ash Field

Thank you for allowing me to visit your land as part of the Landscapes for Wild Pollinators and Farm Wildlife Project. Buglife is working with landowners and other conservation partners to develop a linked network of flower-rich habitats that will benefit insect pollinators, along with a host of other wildlife.

I have provided some general advice about grassland management as promised below, along with some ideas about which species are best introduced as plug plants. The timing of my visit wasn't optimum in terms of getting a true picture of the existing botanical community; it is important to get a complete picture of this before embarking upon the introduction of additional species, as it may be better to diversify the site through appropriate management. Botanical surveys are best undertaken from May until August.

Ash Field is within the B-Lines network and it would be great to see it continue to go from strength to strength as flower-rich habitat that will benefit wild pollinators and many other species. If I can provide and further information, advice or support in this respect; please let me know.

About the Landscapes for Wild Pollinators and Farm Wildlife Project

Buglife is working with landowners to implement measures from field-scale to landscape-scale that promote a healthy pollinating insect community. We can provide free, tailored advice and support to identify how to create the most suitable features for each site, and locate them where they will have the greatest positive impact. Much of our work is focused within the B-Lines network, however the project area is a hotspot for a number of rare and threatened insect pollinators and we will target effort in the most beneficial areas for these species.

Introduction to wild pollinators

- In 2010 the annual value of pollination services in the UK was estimated as £118M for strawberries, £54M for dessert apples, £46M for raspberries, £34M for culinary apples, £10M for pears and £8M for plums.
- There are over 4,000 pollinating species in the UK, with bumblebees, solitary bees, honeybees, hoverflies and other flies, being the most commercially significant.

- For a healthy wild pollinator community that can provide sustainable crop production; a range of sheltering and breeding sites and an unbroken food supply (from March to October) is essential.
- A healthy pollinator community has positive impacts on yield and quality of many important commercial crops (hoverflies have been shown to double the proportion of marketable strawberries; bee-pollinated strawberries are heavier and have improved shelf life; insect pollination has been estimated to add at least £11K/ha for Cox and £14K/ha for Gala apples).
- Some pollinator species such as hoverflies have predatory larvae that consume crop pests such as aphids, thrips and scale insects, which can reduce transmission of crop diseases.

Key principles in wild pollinator conservation

- **Increase flower availability** - a key way to benefit pollinator communities is to increase the amount and variety of flowering resource available throughout the year. Flowers are crucial for providing pollen and nectar for pollinator nutrition.
- **Manage woody habitat** - dense woody habitat provides shelter and nesting opportunities as well as important early and late sources of food. Management by cutting coppicing and/or laying can help promote a dense structure; cutting frequency of every three years or less will ensure many more flowers are available.
- **Provide nesting opportunities** - there is a wide range of nesting behaviour, some of the features that can be provided to help pollinators include bare or sparsely vegetated patches on sunny slopes and banks; tussocky grassland; standing and fallen deadwood; standing water. Artificial refugia can be used such as solitary bee homes, bee banks and hoverfly lagoons.
- **Identify how features can work together** - pollinators' ability to move and disperse through the landscape varies greatly; as a guide, most bumblebee species will forage in an area of around 500m - 1km from their nest, but for our smallest solitary bees the foraging distances can be as low as 100 - 200m around their nesting site. Providing feeding resources and potential nesting sites on a little and often basis to form linkages between more substantial habitat patches, will begin to restore the contiguous habitat networks that have been lost from much of our countryside.

Grassland management

The recommendations below regarding grassland management are general principles, which I hope will be helpful. I'm happy to provide any further detail you need going forwards with habitat restoration and ongoing management at the site.

Important factors with regards to grassland management for wildlife and restoration are the weed burden, soil profile, site preparation, and ongoing management - either as a hay-cut meadow (often with aftermath grazing) or as a grazed pasture.

Continuity of management is important, and grasslands historically managed as meadow or pasture should continue to be managed in this way. Whichever method is used, ensuring plant material is removed either as hay or grazed off by livestock is important in retaining (or moving towards) the low nutrient levels, which promote diverse communities of wildflowers.

Cutting grassland and removing the hay will prevent build up of a thatch layer that can suppress fine grasses and wildflowers, and increase nutrient levels. Scything may also be a management option to consider at Ash Field. The best time for cutting is from late July or August, as most wildflowers will have set seed, insects completed their lifecycles, and any ground-nesting birds should have fledged. Following scything, material can be left on site for a few days and turned occasionally to promote seed drop before being removed or baled). Where more dominant coarse grasses and plants are suppressing finer herbs and grasses, spring (March/April) or autumn (September/October) cutting can help to knock these back. It may be necessary to cut patches of vigorous species such as docks more frequently.

Grazing is a useful management tool and also helps to create structural diversity at a site, with livestock creating both bare patches, and allowing tussocky areas and patches of scrub to develop. With the practicalities of grazing infrastructure (stock-proof fencing, access to water) and the public use of the site, the introduction of grazing would need careful planning and management, and cutting is probably the most sensible option for Ash Field at the present time.

Grassland restoration

When restoring or enhancing grasslands by sowing seed, ground preparation is a key factor in determining success. Soil testing can provide a useful insight into the correct method and timing for the introduction of wildflower seeds. In addition soil pH is important in guiding the introduction of an appropriate species mix.

Species introduction methods

- Green hay - taken from a local donor site, green hay can be a relatively cheap and successful way to introduce species. Ground preparation must be undertaken prior to spreading, and hay needs to be transported quickly to prevent seed degrading. Because this method represents a moment in time of a flowering community - early and late flowering species can often be missed from the seed introduced.
- Natural regeneration - natural regeneration is a cost effective method that relies on the dispersal and colonisation abilities of plants; facilitated by grassland management practices that reduce nutrients and competition, and encourage spread (grazing).
- Plugs - plug plants are often used to supplement green hay or seeding, or to enhance existing meadows. Introducing species as plugs can give them an opportunity to evade competition from more aggressive plants although they can still be vulnerable during translocation and to damage from herbivorous animals.
- Seed - seed mixtures can be purchased and tailored to provide representative communities that replicate natural grassland. Ground preparation must be undertaken prior to seeding, and seed introduced by broadcasting rather than drilling, to mimic natural processes.

If it is considered appropriate to add new species; species selection should be informed by botanical survey and soil testing, as well as availability of species as seed and plug, and plant communities found in comparable grassland in the local area.

Some suitable species for consideration could include - Yarrow *Achillea millefolium*; Black knapweed *Centaurea nigra*; Meadowsweet *Filipendula ulmaria*; Dyer's greenweed *Genista tinctoria*; Meadow vetchling *Lathyrus pratensis*; Oxeye daisy *Leucanthemum vulgare*; Common bird's-foot-trefoil *Lotus corniculatus*; Cowslip *Primula vulgaris*; Selfheal *Prunella vulgaris*; Meadow buttercup *Ranunculus acris*; Yellow rattle *Rhinanthus minor*; Betony *Stachys officinalis*; Red clover *Trifolium pratensis*; Tufted vetch *Vicia cracca*

Wildflowers can be introduced by broadcasting seed, planting plugs and/or spreading green hay from a local donor site. Some species will have a higher success rate with a particular method. When green hay is used this is spread thinly by hand or with a muck spreader immediately after harvesting, and left to dry out; encouraging the seeds to fall. After a few days stock can be reintroduced to the site, which can help to bed seeds in through trampling, or you can use a light roller.

The best time to sow seed is generally from late-August to early-October when the soil is sufficiently warmed. Spring sowing is possible but some species are unlikely to germinate as their dormancy will not have been broken unless there are sufficiently late cold temperatures. It is important to remember that the viability of certain seeds can diminish rapidly. Seed should be spread as quickly as possible; particularly green hay, which is best sourced as locally as possible to prevent over-heating during transportation.

Most seeds will require contact with bare ground to trigger germination. Cutting the grassland or intensively grazing can be used to produce a low sward height before using a method such as harrowing to open up areas of soil, with at least 50% bare ground recommended.

Below is a list of species that are often establish better when introduced as plugs:

- Betony - grassland, heathland and woodland
- Bugle *Ajuga reptans* - damp woodlands, neutral or acidic grassland
- Common rock-rose *Helianthemum nummularium* - grassland and heathland
- Cowslip - calcareous and neutral grassland
- Cuckooflower *Cardamine pratensis* - wet grassland, woodland, wetland
- Devil's-bit-scabious *Succisa pratensis* - acid and wet grassland
- Dropwort *Filipendula vulgaris* - calcareous and neutral grassland
- Field scabious *Knautia arvensis* - calcareous and neutral grassland
- Gipsywort *Lycopus europaeus* - wetland
- Great burnet *Sanguisorba officinalis* - neutral and wet grassland
- Harebell *Campanula rotundifolia* - grasslands and dunes
- Horseshoe vetch *Hippocrepis comosa* - calcareous grassland
- Meadow saxifrage *Saxifraga granulata* - neutral grassland and damp woodland
- Meadow crane's-bill *Geranium pratense* - calcareous and neutral grassland
- Sneezewort *Achillea ptarmica* - wet grassland, wetland
- Wood crane's-bill *Geranium sylvaticum* - woodlands and grassland

Grassland restoration takes time. Many species are perennials and they spend the first one or two years forming a vegetative rosette with little evidence of flowering within the sward, and may be at low abundance for several years. It can be many years for a diverse mixture of wildflowers to develop, but it is a worthwhile journey to embark upon.

Scrubby/woody habitats

Many pollinators have only a short period as a winged adult and those that are active in the spring are particularly reliant on woody shrubs for their food. Woody shrubs begin to flower more profusely when left uncut for at least a year, and species such as Blackthorn, Hawthorn, Elder, rose, Wild cherry, Dogwood and Bramble are incredibly important for pollinators. Managing woody habitats such as hedgerows and scrub patches to promote dense structures will provide opportunities for pollinators to shelter and nest, and the associated species flowering around the bases of shrubs, such as dead-nettles and Ground ivy, are also important early food sources. Management by cutting, coppicing and/or laying will promote this dense structure. Cutting incrementally has also been shown to be of benefit to invertebrate communities, and leaving areas of standing and fallen deadwood is highly recommended.

Important factors with regard to woodland management for wildlife are a variety of structure, presence of trees of a range of ages, open areas such as rides and glades (which are often warm, sunny and sheltered), and deadwood habitat. The woodland that we looked at is coming towards a stage where it could be thinned to help the development of structural diversity. This is a process that will naturally happen over a longer period as a result of competition between individual trees, if a non-intervention approach is desired.

Another important habitat in woodland is deadwood. A supply of both standing and fallen deadwood is ideal as there is a succession of decay in deadwood. Different fungi and invertebrates (some of which can be very scarce) come in at different points of the decay process, and this will generally progress more fully in standing deadwood than fallen deadwood. Standing deadwood can be created by ringbarking selected trees - this can be done by removing a band of 10-20cm of bark (including the cambium) around the circumference of the tree. Ringbarking will result in the gradual death of a tree; providing standing deadwood and also a gap in the canopy that will allow light to penetrate. Hollows can be created in the top of fresh cut stumps to promote the collection of water; creating good conditions for hoverflies.

Coppicing can help to provide structural diversity within woodland - stems are cut close to the ground (or just above the height of the previous cut if this is continuation work). Coppicing is best undertaken during the winter; from November to February, when trees have lost their leaves and entered a dormant state. A slanted cut will help to prevent decay in the coppice stools, and you can consider piling brash (cut material) around the stools to prevent browsing from animals such as deer, which can affect the successive regrowth.

We didn't look in detail at the species in the woodland, but the below list of some of the woodland products from a range of typical woodland trees may be of interest as a contributor to the sustainable management of the woodland surrounding Ash Field.

Products from your woodland

- Alder - burns well; wood used for turning and carving, boats, fencing; stakes, charcoal; utensils
- Ash - burns well; wood used for furniture; hurdles; walking sticks; turning
- Aspen - burns quickly; wood used for crates; paper-making; oars; animal bedding
- Beech - burns well; wood used for furniture; tools; smoking food
- Blackthorn - burns slowly; wood used for walking sticks
- Crab apple - burns slowly; wood used for turning and carving; dye from bark
- Dogwood - burns well; wood used for skewers
- Downy birch - burns quickly; wood used for furniture, bowls and spoons; sap for wine.
- Elder - burns quickly; used for food and drink
- Field maple - wood used for turning and carving; sap used for food and drink
- Guelder rose - fruit used for food and drink
- Hawthorn - burns slowly; wood used for turning and carving; charcoal; fruit used for food and drink
- Hazel - burns well; wood used for hurdles, fencing and basket making; edible nuts.
- Holly - burns quickly; wood used for turning and carving
- Hornbeam - burns well; wood used for cogs; spokes; handles
- Pedunculate Oak - burns well; wood used for furniture, buildings and boats.
- Rowan - beams and tool handles; berries used in cooking.
- Silver birch - burns quickly; wood used for furniture, bowls and spoons; sap for wine.
- Wild cherry - burns slowly; wood used for furniture, fruit used for food and drink.
- Willow - burns slowly; wood used for fencing; furniture; charcoal; dye from roots
- Yew - burns slowly; wood used for bows; barrels; furniture; turning and carving

Nesting habitat

With a wide range of pollinating species there is an equally wide range of nesting behaviours. I have summarised these below and suggested practical ways in which to provide them. In planning provision for pollinators, having an approach of little and often with both feeding resources and potential nesting sites, will ensure that the features provided are at a scale that is accessible to these species (as a guide - most bumblebee species will forage in an area of around 500m - 1km from their nest, but for our smallest solitary bees the foraging distances can be as low as 100 - 200m). It is often possible to identify many corners that could be left unmanaged to provide longer vegetation and flowers that would have no impact upon the management of the crop, and would save on management time, which fits exactly with the little and often approach.

- Mining bees - solitary mining bees are an important group of pollinators that create nests by burrowing into warm soil. Creating or maintaining bare or sparsely vegetated patches on sunny slopes and banks or within flat ground can offer the sites needed by these species. Nesting banks will be used from year to year so if any are observed these can be maintained by cutting back vegetation in early spring.
- Subterranean bumblebees - mammal holes (such as those created by mice and voles) are reused by a number of bumblebee species; these are often located within woody habitats such as hedgerows so

managing these habitats to promote diverse structure and shelter that will attract small mammals, should also benefit these pollinator species (along with birds of prey such as Kestrels and owls).

- Open-nesting bumblebees - tussocks of coarse grasses are used by a number of bumblebee species, often in sunny situations. Allowing areas of long grassland and tall herbs to develop will provide these tussocks and also the woody stems (in plant species such as umbellifers) that are used by some solitary bees. Tussocks are also important overwintering sites for invertebrates, providing shelter and relative warmth.
- Deadwood - important for bees, flies and beetles and many other species. Having decaying wood from a range of woody species can be beneficial in producing both the dry rots (often favoured by nesting bees) and the wet rots (often associated with hoverflies and other flies). Fallen deadwood left in dappled sunlight can often provide the best results.

Artificial refugia are also an option and there are a wide range of possibilities to consider. At the largest end of the scale, artificial bee banks can be created using various grades of sand and earth, which have been shown to attract a vast range of different bee species. Solitary bee boxes of various designs are available that use either holes drilled directly in wood (hard woods like oak are most durable) or pithy and hollow materials such as bamboo canes, to provide nesting opportunities, and uptake of these can be very good (although best to avoid the plastic versions). Creating hoverfly lagoons can also be undertaken - essentially areas of standing water containing rotting vegetation, which the larvae of many species will feed on. These can be very small and mobile features such as buckets or troughs, but again have been shown to be very effective in encouraging hoverfly populations into an area.

Species recording

- Recording species is a fantastic way to get to know your site and further tailor the way in which you manage it. Kent and Medway Biological Records Centre is the guardian of species records in the county <https://www.kmbrc.org.uk/>. You can submit records from your site to them and also ask for a report of species that have been recorded in your local area.
- A really easy way to submit species records is using the website iRecord, and this will give you a nice running total of what you have at the site (and break it into groups of species), which can be really interesting <https://www.brc.ac.uk/irecord/>. To help you find grid references, you can use the site grab a grid reference <http://www.bnhs.co.uk/focuson/grabagridref/html/>.
- Encouraging local people to photograph and record what they see could be a really good way of engaging the local community and finding out more about the site. There are lots of useful online resources that could be helpful, along with recording groups and schemes to get involved with - I can give you some ideas if needed.

I hope that this information has been useful and interesting, and look forward to hearing about Ash Field as it develops.

Yours sincerely

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Buglife is a registered charity, and the only organisation in Europe devoted to the conservation of all invertebrates. Our income is made up of a contribution of membership, grant funding, corporate support and donations. Any donation you are able to make in respect of the assistance you have received from us would be appreciated.