



Department
for Environment
Food & Rural Affairs

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The National Pollinator Strategy: for bees and other pollinators in England

November 2014





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Foreword by the Secretary of State for Environment, Food and Rural Affairs

There are so many plants in our fields and gardens and in the wild that are so common we can often take them for granted: apples, raspberries, oxeye daisies, foxgloves, oil seed rape, to name just a few.

But they could not flourish without their pollen being spread by bees and hundreds of species of other insects – hoverflies, wasps, moths, beetles and butterflies.

If these pollinating insects went into serious decline, the health of our £100bn food industry, which is at the heart of our economy, would be damaged. Without the service nature provides, some of that food would become a lot harder to grow and more expensive.

The beauty not just of our countryside but of our gardens and parks too would be severely affected. Britain would become a much more drab place.

That is why taking action to help these insects is a key part of my priorities to improve the natural environment and grow the rural economy.

Pollinators face many pressures which have led to declines in numbers, and a reduction in the diversity of species to be found in many parts of the country.

That is why we are publishing this National Pollinator Strategy, which over the next 10 years will build a solid foundation to bring about the best possible conditions for bees and other insects to flourish.

It is a shared plan of action. By working together we will ensure pollinators' needs are addressed as an integral part of land and habitat management.

To get to this stage we have been working hard with a range of organisations and scientists. I am enormously grateful to those who have worked with us so far. I am also very grateful to all of those who responded to the public consultation on the proposed Strategy, and to many of you for sharing examples of how you are already supporting pollinators.

I am delighted that some of our largest landowners are committed to taking action to support pollinators on their land – the National Trust, the Forestry Commission, the Ministry of Defence, to name a few. I am also delighted that so many organisations (listed below) are already committed to working with us on implementation.

Through this Strategy, we are also inviting the public, along with landowners, voluntary groups, businesses, local authorities and other, to play their part. This will ensure we help

pollinators across towns and cities as well as in the countryside; in window boxes, parks and gardens as well as hedges, woods and fields.

A particular challenge in developing proposals for action is uncertainty over the current condition of pollinators. There are questions over the impact the threats against them are having. There are also questions over how resilient agricultural and natural systems are to changes in pollinator populations. An important part of our role in the Strategy, and one of our priorities over the next three to five years, is to invest in science to address key gaps in our understanding to provide better evidence to inform our policies.

At the same time as improving the evidence base, there are actions we can take now. These actions build on current initiatives being taken by Government and others but bringing to them a greater focus on pollinators' essential needs for survival. Many of the actions are about making simple changes to land management. In July, we released advice to gardeners, landowners and others on our website *Bees' Needs: food and a home*. We are committed to reviewing the Strategy's aims and actions within the next five years when further evidence becomes available.

We want to continue working in partnership with landowners, interested organisations and the public to make the Strategy adaptable and accessible. With increased coordination and collaboration, we can achieve our goal of protecting the future of our pollinators.

Statement of collective action and cooperation

The organisations listed below have committed to:

- Working together to support Defra on the implementation of the National Pollinator Strategy, given its collaborative nature and its intention of inspiring action to support pollinators at all levels by many other organisations and individuals.
- Ensuring that our public campaigns and land management plans promote, and are consistent with the *Bees' Needs* message and advice.

Organisations:

Bee Farmers' Association, British Beekeepers' Association, British Retail Consortium, Buglife, Bumblebee Conservation Trust, Campaign for the Protection of the Rural Environment (Kent), CLA, Friends of the Earth, Horticultural Trades Association, KPMG, National Farmers' Union, National Federation of Women's Institutes, National Trust, Pesticide Action Network UK, Royal Horticultural Society, Soil Association, Waitrose, The Wildlife Trusts.

Academic partners include the University of Cambridge and the Centre for Ecology & Hydrology.

Many other organisations have committed to specific actions as their contribution to the Strategy (for example, see summary tables of actions at the end of this document).

Working together

The Government is committed to taking action to improve the state of our bees and other pollinating insects and to build up our understanding of current populations and of the causes of decline.

The actions outlined in this Strategy build on existing policies and initiatives in Government and in many other organisations. We want to draw on the skills, experience and enthusiasm that already exist among organisations and individuals across the country to put in place a united effort to make positive changes for our pollinators.

We want to do this on a voluntary basis and to build consensus. There is already a wide range of rules and incentives in place, including those associated with the reformed Common Agricultural Policy (CAP), and our work will build on these. We will not impose new requirements and regulations unless these prove absolutely necessary.

Our vision is to see pollinators thrive, so they can carry out their essential service to people of pollinating flowers and crops, while providing other benefits for our native plants, the wider environment, food production and all of us.

Many of the Strategy's actions are about expanding food, shelter and nest sites across all types of land so that our 1500 pollinator species can survive and thrive. These actions are supported by our Call to Action - Bees' Needs: Food and a Home – launched in July 2014 (www.beesneeds.org.uk). This outlines a series of simple things people can do to help pollinators find food and shelter¹. Our focus on 'food and a home' is based on evidence that loss of good quality natural and semi-natural habitats that feed and shelter pollinators has been a key driver of change to their populations².

This 10 year Strategy aims to deliver across five key areas:

1. Supporting pollinators on farmland

- Working with farmers to support pollinators through the CAP and with voluntary initiatives to provide food, shelter and nesting sites.

¹ 5 simple actions: Grow more flowers, shrubs and trees that provide pollen and nectar; leave patches of land to grow wild; cut grass less often; avoid disturbing or destroying nests; think carefully about whether to use pesticides. See page 24 for further details.

² Further details of the evidence is at Section 2 of the Supporting Document and in the independent report 'Status and value of pollinators and pollinating services', including consideration of other environmental pressures, such as pests and diseases, pesticides and climate change, and the gaps in our understanding. Both are published with this Strategy.

- Minimising the risks for pollinators associated with the use of pesticides through best practice, including Integrated Pest Management (IPM).³

2. Supporting pollinators across towns, cities and the countryside

- Working with large-scale landowners, and their advisers, contractors and facility managers, to promote simple changes to land management to provide food, shelter and nest sites.
- Ensuring good practice to help pollinators through initiatives with a wide range of organisations and professional networks including managers of public and amenity spaces, utility and transport companies, brownfield site managers, local authorities, developers and planners.
- Encouraging the public to take action in their gardens, allotments, window boxes and balconies to make them pollinator-friendly or through other opportunities such as community gardening and volunteering on nature reserves.

3. Enhancing the response to pest and disease risks

- Working to address pest and disease risks to honey bees whilst further improving beekeepers' husbandry and management practices to strengthen the resilience of bee colonies.
- Keeping under active review any evidence of pest and disease risks associated with commercially produced pollinators used for high-value crop production.

Actions to support these priority areas:

4. Raising awareness of what pollinators need to survive and thrive

- Developing and disseminating further advice to a wide range of land owners, managers and gardeners as part of Bees' Needs.
- Improving the sharing of knowledge and evidence between scientists, conservation practitioners and non-government organisations (NGOs) to ensure that actions taken to support pollinators are based on up-to-date evidence.

5. Improving evidence on the status of pollinators and the service they provide

- Developing a sustainable long-term monitoring programme so we better understand their status, the causes of any declines and where our actions will have most effect.

³ Integrated pest management (IPM) is a toolkit of management actions and techniques to control pests, weeds and diseases, and to ensure low pesticide input and/or targeted use to minimise risks to the environment – further details are given on page 14.

- Improving our understanding of the value and benefits pollinators provide, and how resilient natural and agricultural systems are to changes in their populations.

In taking action across these five areas, we want to achieve the **following outcomes**:

- More, bigger, better, joined-up, diverse and high-quality flower-rich habitats (including nesting places and shelter) supporting our pollinators across the country.
- Healthy bees and other pollinators which are more resilient to climate change and severe weather events.
- No further extinctions of known threatened pollinator species.
- Enhanced awareness across a wide range of businesses, other organisations and the public of the essential needs of pollinators.
- Evidence of actions taken to support pollinators.



Why insect pollinators are important and what we know about them

Most bees are pollinators. They eat pollen and nectar from flowers. When the pollen sticks to their bodies, it gets transferred between the flowers they visit. This fertilises the plants in the process, allowing them to reproduce, and grow fruits and seeds. This process is called pollination. Insects, like bees, that transfer pollen between plants are known as pollinators.

There are at least 1500 species of insect pollinators in the UK. The honey bee normally lives in hives managed by beekeepers. Others, like many species of bumblebees, solitary bees, moths, butterflies and hoverflies live in the wild.

Some crops, like raspberries, apples and pears, particularly need insect pollination to produce good yields of high quality fruit. If pollinator populations decline, it is extremely unlikely we will run out of food. But if there were far fewer of them, farmers would find it more difficult and expensive to produce some crops at the scale they do today.

If pollinators went into steep decline, our countryside would be a less beautiful place as they are essential for biodiversity and our wider environment. They maintain the diversity of wild flowers and support healthy ecosystems, particularly by helping plants to produce fruits and seeds which birds and other animals rely on. They are valued and appreciated by the public, and, as part of our natural world, contribute to our health and well-being.

What we know about pollinators – the evidence in brief

This is a patchy and complex picture. We have some understanding of the **occurrence and geographical distribution** of many species including those which are threatened. This includes evidence showing a decrease in the diversity of wild bees. For example, the data show that:

- Of the 26 bumble bee species recorded in the UK 80 years ago, two are no longer present and another six are now found in a much smaller area of the country. Recently however, one new species has arrived and another is being re-introduced.
- The number of bee species has fallen in many parts of the UK.⁴

Our understanding of the **population size of wild pollinator species** is limited, apart from moths and butterflies for which the data shows a mixed picture with many species in decline, at least in some areas, while some are holding their own or increasing. The patterns of change in these populations can vary between different parts of the country.

⁴ mainly because the range of many species that require semi-natural or flower-rich habitat has declined as these landscapes have shrunk. However, the range of some so-called generalist species, that can survive in a wider variety of habitats, has increased.

Most butterflies associated with semi-natural or flower-rich habitats have shown clear declines since the 1970s, although some less specialised butterflies have increased in number or expanded in range. Declines in numbers of many moths have been observed, particularly in the southern half of Britain, although the underlying causes are less well understood than for butterflies.

We have a limited understanding of the abundance of other pollinator species such as bumble bees and hoverflies, and how they are changing. In particular:

- We do not know exactly how many of these other species we have now, or how many we had in the past.
- It is therefore difficult to be precise about the rates of change or what are the underlying causes.

For the honey bee we do have good data. The total number of colonies has increased over the last few years, in step with the number of beekeepers. Even with this increase in colony numbers, it is not unusual for beekeepers to experience losses particularly over the winter. Losses can be associated with environmental effects (such as severe weather), pests and diseases, and management practices. For example, beekeepers reported losing a third of their colonies over the winters of both 2007 and 2012. This is a greater loss than is usually expected and was probably associated with the severe weather in both winters. Managed honey bees can be replaced when colonies are lost.

Overall, our interpretation of the evidence on the status of pollinators is that wild bees and other wild pollinators are likely to be less abundant than they were in the 1950s.

We know that **pollinators face many pressures**, including:

- habitat loss,
- pests and diseases,
- extreme weather,
- competition from invasive species,
- climate change, and
- use of some pesticides⁵.

The independent scientific review of the published evidence commissioned by Defra in 2013⁶ (the 'Status Report'), identified the loss of flower-rich habitat as the likely primary cause of the recorded decline in diversity of wild bees and other pollinating insects. Loss of these habitats is associated with past intensification of agriculture, urbanisation and

⁵ if not used in accordance with the law and authorisation conditions.

⁶ Vanbergen A.J., Heard M.S., Breeze T., Potts S.G., Hanley N., (2014) 'Status and value of pollinators and pollinating services'. We have published with this Strategy.

industrial development. Conversely, the reviewers conclude that provision of such habitats within the landscape can help maintain pollinator diversity. Pests and pathogens were identified as the key threats to managed honey bees, although past loss of flower-rich habitat was also considered important. The reviewers identified other factors such as invasive species or climate change as additional pressures to pollinator populations, and pointed out that these pressures interact in a way that we do not fully understand.

This Strategy recognises the need to address gaps in our understanding. Our plans for improving evidence and knowledge of pollinators are contained in key area 5 of the Strategy, detailed on page 25.



1. Supporting pollinators on farmland

Priority actions for government and others⁷:

- **promote opportunities to farmers** to support pollinators through both the mandatory and incentivised CAP measures, and through targeted voluntary actions which complement these as part of wider CAP efforts to improve the environment.
- secure commitment from **farm advice providers** to draw on the Bees' Needs simple actions and detailed advice to engage and inform farmers.
- develop and implement a programme of **pollinator events** on farms, supported by promotional and communication activities, including a new leaflet on 'Pollinator management for your farm business'.
- review and update current information on **Integrated Pest Management (IPM)**⁸, particularly for crops which are attractive to pollinators, and ensure its effective distribution to farmers through multiple channels.
- keep **ongoing research on IPM under active review**, to identify specific practical advice on supporting pollinators for promoting to farmers and growers. This should include technical workshops.
- **share IPM practices with farmers and growers** particularly on the management of crops which are attractive to pollinators, including on-farm demonstrations, farm walks and on-farm workshops.
- **revise and re-publish guidance on insecticide best practice**; and work with the National Register of Sprayer Operators to revise their training course to include more detailed coverage on the responsible use of insecticides.

How farming can help

Farmers and growers across pastoral, mixed and arable farmland are ideally placed to improve the quality and amount of diverse and flower-rich habitats for pollinators. The actions in this area build on the Government's existing policies on improving the environmental management of farmland, balancing this with the need to promote competition and protect food security. They are supported by emerging evidence that providing habitat through agri-environment schemes (e.g. buffer strips, pollen and nectar

⁷ A detailed list of all the Strategy's actions, including who and when, is at the end of this document.

⁸ Further details on IPM are given in this section of the Strategy.

mixtures, wild bird seed mixtures, hay meadows and wild flower areas) does attract pollinators.

Opportunities for pollinators are available through new measures in the reformed CAP:

- **Mandatory greening measures** as part of CAP Pillar I, specifically the new Ecological Focus Areas (EFA) to be applied to 5% of arable land. From 2015, farmers in England have the following options to meet their 5% EFA requirement: buffer strips; land lying fallow; catch crops or green cover; nitrogen-fixing crops; and hedges. In deciding which EFA options to select, we are encouraging farmers to consider, on a voluntary basis, how their selection and management of those EFA options can bring the greatest environmental benefit of their farm, particularly for bees and other pollinators.
- **Incentivised activities** in CAP Pillar II through the Rural Development Programme's Countryside Stewardship in which we are investing around £900 million from 2015 to 2020.

Countryside Stewardship - further details

- Countryside Stewardship will include options to provide pollen and nectar sources and nesting habitat. It will be focused on local priorities. This targeted approach means that farmers will be able to provide the right resources for pollinators where they are most needed.
- The Wild Pollinator and Farm Wildlife Package will be an important feature of this new scheme and will prioritise specific options to support pollinators, farmland birds and rare/scarce arable plants.
- Natural England will use this Package to encourage farmers in selecting the right options for pollinators. Defra is providing an additional £350,000 over three years to encourage uptake of these options in areas we expect to be of particular benefit to pollinators and to learn what works best.
- As part of Countryside Stewardship, we are developing proposals to bring together farmers, foresters and other land managers to work together at a landscape scale.

In addition, farmers and growers have many opportunities to take voluntary actions to support pollinators on their land, such as:

- sowing nectar and pollen-rich wildflower seed mixtures on fallow land or buffer strips;
- managing buffer strips through grazing and cutting to help prevent grass domination and further encourage wildflowers; and,
- management of hedgerows by reducing the frequency of cutting to encourage hedges to produce flowers.

Voluntary initiatives to support pollinators on farms are promoted by a wide range of organisations including the Campaign for the Farmed Environment (CFE)⁹ and others such as Plantlife, the Bumblebee Conservation Trust, the British Beekeepers Association and private sector companies. Initiatives by these groups complement both the mandatory and incentivised activities under the CAP and contribute to the Strategy's aims. In addition, we are working with the CLA on how best to signpost their members who are farmers, growers, woodland and forest owners to the opportunities for pollinators as set out in the Strategy.

Examples of voluntary initiatives to support pollinators on farms

- Campaign for the Farmed Environment (CFE) promotes cultivated un-cropped margins to support natural regeneration of arable flowers, and encourages farmers to leave edges uncut on unfertilised permanent pasture to provide pollen and nectar during summer.
- The Bumblebee Conservation Trust and the British Beekeepers Association both work with farmers and other landowners and provide advice.
- Syngenta in partnership with CFE and seed suppliers, Kings, are providing free packs of wildflower seeds and full agronomic support to farmers to help them establish new wildflower habitat for pollinators.

The CFE in particular has an important role in encouraging farmers to add environmental value on a voluntary basis to the mandatory greening measures, including retaining land under existing environmental management schemes and promoting actions to benefit pollinators on EFAs. Defra will review the CFE in 2015 and, in preparation for the European Commission's planned review of greening in 2016, we will assess the effectiveness of voluntary measures in making improvements for pollinators.

Working with the food and horticultural sectors

We are also working with the agricultural supply chain, the horticulture sector and food retailers to promote pollinator friendly practices, this will include:

- Endorsing and promoting the Royal Horticultural Society's Perfect for Pollinator logo for use on plants for sale.
- Exploring whether to develop an additional logo to guide farmers, other land managers and the public to the Bees'



⁹ The CFE is a partnership of the main farming and farm advisory organisations and also key environmental groups (Wildlife Trusts, RSPB, Game and Wildlife Conservation Trust). CFE is jointly funded by these organisations and Defra, with £670,000 from Defra in 2014/15. Of the 22 voluntary measures that CFE currently promotes to increase biodiversity on farms, 8 are on providing food and shelter for pollinators (6,7, 8, 13, 17, 18, 19 and 21). CFE also works with other groups such as the British Beekeepers Association.

Needs campaign and the five simple actions they can take to support pollinators.

- Food retailers signposting their farmers and growers to Bees' Needs; the opportunities for pollinators in the new CAP schemes; and to CFE's voluntary measures which support pollinators.
- Inviting other agricultural suppliers, in addition to Syngenta and Kings Seeds, to identify and sponsor initiatives to support pollinators on farms.

Integrated pest management

The issue of pesticide effects on pollinators has received much attention. The Strategy recognises that pesticides are one of the potential pressures that pollinators face. It also recognises that some pesticides, including neonicotinoids, have the potential to damage pollinators. The Government continues to support strict regulation of pesticides based on scientific risk assessment. We also believe that authorised pesticides need to be used responsibly and sustainably, minimising the residual risks.

The Strategy's actions on integrated pest management (IPM) brings increased focus on pollinators' to Defra's existing policies and plans on IPM and the sustainable use of pesticides¹⁰ under the UK's National Action Plan for pesticides. These policies and plans sit alongside:

- The tough regulatory regime governed by EU law to ensure that unacceptable effects to the environment do not occur when pesticides are used properly.
- Defra's existing policies to support organic farming methods which have also shown benefits for pollinators and other wildlife¹¹.

Integrated pest management draws on the full range of management actions, tools and techniques to control pests, weeds and diseases, and to ensure low pesticide input and/or targeted use to grow an economically viable healthy crop whilst minimising risks to the environment. It does not prohibit pesticide use but is a toolkit for combining effective crop protection with a full awareness of potential environmental impacts. Use of IPM may lead to a decrease in the volume of pesticides used by farmers and growers. For further details on IPM, go to Supporting Document published with the Strategy.

¹⁰ Directive 2009/128/EC on the sustainable use of pesticides seeks to promote low pesticide-input pest management including IPM and alternative approaches or techniques such as non-chemical alternatives to pesticides and organic farming. Further details on the regulatory regime, current pesticide policies and initiatives, and on Directive 2009/128/EC, are in Section 4 of the Supporting Document published with this Strategy

¹¹ Further details are in Section 2 of the Supporting Document.

Through the Strategy, we want to increase the uptake of IPM to help achieve a more targeted and risk-based approach to managing pests, weeds and diseases, with potential benefits for pollinators and other wildlife.

Wild flower meadows

Flower-rich habitats, such as meadows, are crucial to supporting pollinators by providing good sources of nectar and pollen throughout the summer and also shelter and nest sites. Conserving our remaining flower rich habitats directly supports pollinators and also brings other benefits including protecting threatened plant populations and the wildlife that depends on such habitats.

We will work with Plantlife and others to raise the profile of initiatives already underway to conserve and create good quality wild flower meadows. This will also include raising the profile of urban meadows, building on the People's Meadows project which is part of the Coronation Meadows initiative. For example, we are contributing to a large-scale project in Bristol to support its role as European Green Capital in 2015. One of the project's aims is to enhance the environment for pollinators and to help achieve this, Defra is funding the creation of three urban meadows.

Wild flower meadows – further details

- Projects like the Coronation Meadows and Save our Magnificent Meadows are crucial in conserving flower rich habitats and make a vital contribution to this Strategy by restoring and conserving some of our best species-rich meadows and creating new meadows.
- Set up by the Prince of Wales in 2013 and working with Plantlife, the Rare Breeds Survival Trust and The Wildlife Trusts, Coronation Meadows will establish a flagship meadow in all 105 counties across the UK. Using green hay from these existing flower rich meadows, the project will create over 60 new meadows to benefit wild plants and their associated pollinators as well as celebrating the importance of meadows to local communities. In 2015, around 15 of these new meadows are planned.
- Backed by a £3M grant from Heritage Lottery Fund, Plantlife is leading the Save our Magnificent Meadows Project to identify and restore nine important landscapes - covering a total of more than 7,000 acres—partly by connecting up isolated patches of habitat. The project is also equipping local communities with the passion, knowledge and skills to save their wildflower meadows.
- Other initiatives include the Yorkshire Dales Millennium Trust's campaign to restore hay meadows in the Yorkshire Dales, the Co-op's Community Meadows as part of its Plan Bee, and Buglife's community projects to create meadows in urban areas.

Case studies

We are working with partners to develop case studies to highlight the great work that so many are already doing to support pollinators. Some examples are included in the Strategy. Further case studies are at www.beesneeds.org.uk.

Case study: Upton Estate

Upton Estate covers 2000 acres and sits on the Oxfordshire/Warwickshire border between Banbury and Stratford Upon Avon. It is a mixed estate and includes a working farm. The farm's motto is 'Food for Us and Food for Wildlife'. It has signed up to entry level stewardship and high level stewardship agreements within Environmental Stewardship and conforms to the protocols demanded by Conservation Grade and LEAF Marque.

The Estate has created a range of habitats to support wildlife on approximately 10% of their arable land, including habitats to support pollinators – tussocky grass, flower rich field margins and legume mix plots. In addition, the Estate has been working with Butterfly Conservation to create habitats for locally endangered butterflies. As well as productivity gains (yields have been boosted by 30% over the last 10 years under high level stewardship) the farm has gained much publicity and accolades for its work.



2. Supporting pollinators across towns, cities and the countryside

Priority actions for government and others:

- secure additional commitments from **large-scale land managers** in cities, towns and in utility and transport businesses to follow Bees' Needs advice in managing their land. The Forestry Commission, the National Trust, the Defence Infrastructure Organisation (the Ministry of Defence land managers) and the Highways Agency have already committed to specific actions to support pollinators on their land.
- disseminate Bees' Needs and other relevant advice to owners and managers of **brownfield sites** to help them assess their value for wildlife.
- publish a policy and practice note to improve the environment for urban pollinators as part of the **Insect Pollinators Initiative (IPI)**.
- secure awareness and integration of Bees' Needs in current and emerging initiatives which seek to **improve local biodiversity and well-being**, including Green Infrastructure Partnership¹², the Green Flag Award Scheme¹³, Planning Guidance and biodiversity off-setting. As part of this action, we are supporting a special Bees' Needs award for pollinators as part of the Green Flag awards for 2015.
- hold **workshops on managing urban pollinators** for local authorities, developers, planners, local government ecologists, social landlords, landscape architects, brownfield site managers, Local Nature Partnerships.
- promote plants for pollinators as part of the **BREEAM¹⁴ sustainable building certification** scheme which already recognises plants with a known benefit or attraction to wildlife.
- hold an annual **Pollinator (Bees' Needs) Champions award ceremony** to celebrate pollinator-friendly practices by a wide range of land owners and managers (categories will include farmers, forestry/woodland owners, local authorities, developers,

¹² The Green Infrastructure Partnership is managed for Defra by the Town and Country Planning Association.

¹³ The Green Flag Award Scheme is managed for the Department for Communities and Local Government by Keep Britain Tidy.

¹⁴ BREEAM is the Building Research Establishment Environmental Assessment Method for buildings and large scale developments. It sets the standard for best practice in sustainable design, and includes land use and ecology as one of the nine key categories of sustainability for new building construction. <http://www.breeam.org/page.jsp?id=369>

businesses, community groups, schools and gardeners). This is a key part of our plan to sustain interest across society in doing the best for pollinators.

- develop **detailed guidance on use of pesticides** by amenity managers, including integrated and more sustainable approaches for weed control and pest management.
- develop **voluntary quality standards** to ensure availability of high quality native origin seeds for wildflower planting schemes.

How land owners, managers and gardeners can help

Loss of natural and semi-natural habitat to urban and suburban development over many years has had negative impacts on biodiversity and has reduced the availability of food, shelter and nest sites for pollinators. The priority actions in this area build on current policies and initiatives¹⁵, such as:

- the National Planning Policy Framework states that local plans should have a clear strategy for enhancing the natural, built and historic environment and supporting Nature Improvement Areas (NIAs)¹⁶.
- the twelve government-funded NIAs (£7.5m from 2012 to 2015) which have been in place since 2012. Although this funding comes to an end in 2015, many of the NIAs have secured funding that will enable them to sustain their good work into the future.
- Local Nature Partnerships (LNPs) which we set up to champion the natural environment locally and to work strategically with different partners and initiatives. A number of LNPs have already identified local action to support pollinators. We will discuss with the network of LNPs how best they can promote action to support pollinators locally and to help link current and future action across the wider landscape, including the links between rural and urban areas.
- actions to support pollinators by local authorities from across the country including Bristol City Council, Chesterfield Borough Council, Gloucestershire Council, Kent County Council and Wyre Forest District Council. In addition, many other organisations, including businesses, such as supermarkets, and civil society are taking action to support pollinators.¹⁷

¹⁵ Further details on current policies and initiatives are in Section 5 of the Supporting Document published with this Strategy.

¹⁶ NIAs are an example of our policies to establish a coherent and resilient network of habitats across the country which will be beneficial for all wildlife. They are locally determined and are supported through the National Planning Policy Framework.

¹⁷ Further details of actions being taken by local authorities and by many others are in Sections 1 and 5 of the Supporting Document published with this Strategy. The local authority information was supplied directly to Defra or

We will work with key partners and networks to support land managers, developers and planners to make simple changes, based on the Bees' Needs advice, to provide essential resources and habitat for pollinators across towns, cities and developments in the wider countryside. These will include owners and managers of parks and amenity grassland, brownfield sites, existing and new housing developments, retail and leisure parks, government departments, schools and education establishments, distribution centres, factory sites, car parks, cemeteries and transport and other infrastructure such as road verges, roundabouts, land beside railway lines, flood defences, sewage works and water treatment plants.

In support of these actions, many NGOs and other organisations stand ready to offer practical advice and expertise on pollinator-friendly management and planting to land managers and others. These groups include Buglife, The Wildlife Trusts, Plantlife, the Bumblebee Conservation Trust, Butterfly Conservation, Garden Organic, Sustain, the British Beekeepers Association, the Royal Horticultural Society and the Royal Botanical Gardens Kew Native Seed Hub.

Examples of commitments secured from large scale land owners/managers

- **The Forestry Commission** (England) will promote the Strategy's Woodland Information Sheet (see www.beesneeds.org.uk) and the importance of pollinators to woodland and forestry owners, managers, contractors and advisers including private woodlands and forests and the public forest estate.
- **The National Trust's** Farm Advisers will promote the Strategy to farming tenants and use opportunities to encourage them to take up the new agri-environment schemes to support pollinators and/or the voluntary measures promoted by the Campaign for the Farmed Environment.
- **The Ministry of Defence** will continue to promote and implement pollinator initiatives where practicable across the 238,500 hectare Defence Estate, a policy which is incorporated into their regional estate management contracts.
- **The Highways Agency** will undertake a programme of works to restore and enhance the grassland component of the soft estate (e.g., verges, embankments) to achieve a significant area of species rich grasslands estimated at 3,500 hectares by 2021.

The Supporting Document (Section 6) published with the Strategy provides further examples of commitments by these large-scale landowners and others such as the Royal Parks; it also include actions being taken across the Defra estate.

Case study: Coppermills Water Treatment Works

Thames Water asked the Bumblebee Conservation Trust to survey a number of their sites and two rare species of bumblebee were discovered. Following the surveys, the company took action on two trial sites, including the Coppermills Water Treatment Works. There they planted a bee-friendly mix in a woodland glade area and introduced yellow rattle to replace coarse grasses. They also tried mowing less often. The result was a 37% increase in bumble bee numbers.



3. Enhancing the response to pest and disease risks

Priority actions for government and others:

- improve **beekeepers' management of pest and disease risks** by continuing to work in partnership with the National Bee Unit (NBU) and beekeeping associations to implement the Healthy Bees Plan (see below).
- implement revised and updated policies to strengthen pest and disease control in honey bees. These follow a review in 2012 and public consultation last year. Monitor any evidence of pest and disease risks associated with ***Bombus terrestris audax* (buff-tailed bumblebee)** and **other commercially produced pollinators** and identify follow-up actions as required.

The Government has a long-established honey-bee health programme delivered by the NBU. Through this programme, we have a good understanding of pest and disease risks in honey bees and long-term trends in infection rates in colonies across England (and Wales). The programme has been effective in reducing pests and disease risks in honey bees and was expanded in 2009 by implementation of the 10 year Healthy Bees Plan. This focuses on improving beekeepers' skills in managing pests and diseases, particularly the *Varroa* mite, and emerging risks such as the small hive beetle and the Asian hornet. In addition, revised policies to further strengthen our response to honey bee pest and diseases were introduced in summer 2014 following Defra's 2012 review.

In contrast to our good understanding of honey bee health risks, our understanding of the pests and diseases affecting wild pollinator species is limited both in the UK and globally. We also have limited knowledge of the extent to which pests and diseases are transmitted between honey bees and other managed or wild pollinators and vice versa.

For some 20 years, large numbers of non-native bumble bees have been brought in from other EU Member States to pollinate high-value crops such as strawberries and tomatoes in glasshouses or poly-tunnels. In the last few years, native species are increasingly used. Recent evidence of pests and disease risks from commercially produced non-native bumble bees indicated that some of these colonies carried pests and diseases with the potential to spread to wild pollinators (Graystock *et al.* 2013)¹⁸; bumble bee producers

¹⁸ The GB non-native Species Risk Assessment for non-native *Bombus terrestris* bumblebees <http://www.nonnativespecies.org/index.cfm?sectionid=51> has been revised to reflect recent evidence. Graystock, P., *et al.*, The Trojan hives: pollinator pathogens, imported and distributed in bumblebee colonies. *Journal of Applied Ecology*, 2013. 50 *5)L p. 1207-1215

used this research as a call to action to reduce risks. Following a public consultation¹⁹, Natural England and Defra are reviewing licensing policy for commercially produced non-native bumble bees. Any changes would come into effect from January 2015. We will keep under review the potential risks from use of commercially produced bumble bees and other native pollinators.

Case study: Tregothnan Estate

The Tregothnan Estate is situated in Cornwall, south-east of Truro. Along with a private botanical gardens and arboretum, Tregothnan has an expanding commercial beekeeping operation. The Estate makes detailed observations on the health of the hives and how they are affected by their position in relation to terrain, flora, and proximity to neighbouring hives. Over 2014, Tregothnan has been able to increase the number of colonies of honey bees across the estate and will have roughly 40 hives by the end of this season. This has been a managed and sustainable period of growth, and they will be going into winter with strong hives with plenty of honey. There is a significant and varied gene pool of bees in the country. Looking ahead, Tregothnan will be undertaking a significant amount of work into the genetics of the different species, in particular production, hygiene, and temperament.



¹⁹ <https://www.gov.uk/government/consultations/wildlife-licensing-changes-to-class-licence-wml-cl22-non-native-bumblebee-release-in-commercial-glass-houses>.

4. The resources pollinators need to survive and thrive



Priority actions for government and others:

- **promote the Bees' Needs advice to all land managers through a wide range of channels**, including traditional and social media, NGOs, retailers, government departments and agencies, planners and agronomists.
- **develop and promote detailed evidence-based advice** for farmers, land managers, gardeners and members of the public on how to support pollinators; including case studies of good practice in different sectors. These will be posted on www.beesneeds.org.uk
- **advise members of the public** to consider planting a range of flowers and other plants in their gardens, balconies or window boxes to provide nectar and pollen as a food source for pollinators and to provide other resources such as shelter and nest sites.
- develop options to **improve knowledge-sharing** on pollinators' needs between scientists, conservation practitioners and NGOs. Improved knowledge sharing is important to ensure that action and advice, including Bees' Needs, are based on the latest evidence.

We will work with partner organisations and others to raise awareness about the resources pollinators need to survive and thrive. In particular, they need access to food supplies (particularly nectar and pollen from wild or cultivated plants including crops, wild flowers, shrubs, herbaceous plants and trees) all year, and particularly from February to October when they are most active. They also need places to shelter and nest during this period and over the winter. In addition, some pollinators need access to other food sources; for example, caterpillars of Red Admiral butterflies feed on stinging nettles as well as sheltering among them.

The core of our approach will be to continue promoting the Strategy's call to action for all land managers in towns, cities and the countryside, including gardeners. **Bees' Needs** and its set of simple suggestions underpins many of the other actions in the Strategy.

As part of our plans to sustain engagement, we will explore:

- the development of pollinator posters and other signs for land owners, managers and the public to use to identify and promote their pollinator-friendly land to others.
- simple data logging applications on mobile phones for everyone to capture their actions.

Bees' Needs Call to Action

We urge all land managers, including gardeners, window-box owners, councils, amenity managers and businesses to make these simple adjustments now to existing planting and management to improve the quality and extent of habitats suitable for pollinators. These simple actions are:

- 1** Grow more flowers, shrubs and trees that provide nectar and pollen as food for bees and other pollinators throughout the year. For example, pussy willow, primroses and crocuses in spring, lavenders, meadow cranesbill and ox-eye daisies in summer, ivy and hebes in autumn, and mahonia shrubs and cyclamen in winter.
- 2** Leave patches of land to grow wild with plants like stinging nettles and dandelions to provide other food sources (such as leaves for caterpillars) and breeding places for butterflies and moths.
- 3** Cut grass less often and ideally remove the cuttings to allow plants to flower.
- 4** Avoid disturbing or destroying nesting or hibernating insects, in places like grass margins, bare soil, hedgerows, trees, dead wood or walls.
- 5** Think carefully about whether to use pesticides especially where pollinators are active or nesting or where plants are in flower. Consider control methods appropriate to your situation and only use pesticides if absolutely necessary. Many people choose to avoid chemicals and adopt methods like physically removing pests or using barriers to deter them. If you choose to use a pesticide, always follow the label instructions.

A short animation highlighting these actions and how everyone can help is at www.beesneeds.org.uk.

5. Improving the evidence

Three groups of actions to improve the evidence base:

Group 1 – developing and implementing a sustainable long term monitoring programme. We want to establish recent and ongoing trends in pollinator populations and their status with greater confidence.

- develop and test a new **systematic and sustainable monitoring framework** for pollinators to be implemented by professionals and by using a “citizen science” approach involving volunteers logging observations and gathering other evidence²⁰.
- **implement new monitoring schemes.** Field testing of the new monitoring framework (from 2014 to 2016) followed by deployment carried out both by volunteer recording schemes and by professional monitoring groups (from 2016).
- continue ongoing work with **volunteer recording schemes** to improve standards in data collection, management and analysis for pollinators and other species.
- expand the pool of **taxonomic expertise** and people capable of identifying the many species of insect pollinators in the UK.
- **improve understanding** of who participates in volunteer recording schemes and their motivations to aid recruitment of additional volunteers into new monitoring schemes on pollinators (such as surveying pollinator species on farmland or degraded habitats).
- support **long-term storage of insect specimens** from the research projects funded by the Insect Pollinators Initiative (IPI)²¹ in anticipation of improved identification technology, potentially leading to lower cost monitoring programmes for pollinators in the future.

This work will build on existing monitoring schemes for insects and plants, where relevant, such as the Centre for Ecology & Hydrology’s Countryside Survey²².

²⁰ The project was commissioned by Defra in summer 2014 and is being undertaken by the Centre for Ecology & Hydrology, Leeds University, Reading University and the Open University, and entomology experts (Hymettus) and volunteers from recording schemes and societies (Bees Wasps and Ants Recording Society; Hoverfly Recording Scheme; Bumblebee Conservation Trust; Butterfly Conservation and British Trust for Ornithology).

²¹ A £10 million jointly funded research programme (2009 to 2014) the Biology and Biotechnology Research Council, the Natural Environment Research Council, the Wellcome Trust, Defra and the Scottish Government.

²² Further background on existing monitoring programmes and factors we will consider in developing the programme are in Section 7 of the Supporting Document published with this Strategy.

Establishing a baseline of evidence on how and why pollinator populations change and on the pollinating services they provide is important for evaluating the impact of the Strategy and determining additional actions to reverse undesirable trends or reinforce positive ones. This will build on the results from the IPI which will start to be available from 2014.

Group 2 – valuing pollinators

- feasibility study on need for and practicality of conducting primary research on the **relationship between pollinators, the services they provide** and economic output [Subject to the feasibility study, we will aim to either commission follow-on research or reassess how we can proceed in the absence of data.]
- scoping study to consider the **benefits of research interactions between pollinators and wild plants**. This will include identifying the evidence gaps and assessing whether basic ecological research on the relationships between pollinators and wild plants is necessary to guide policy development.
- study to develop a framework for assessing the **indirect benefits and the socio-cultural value** that the public gain from pollinators, such as fruits and berries contributing to a healthy diet and the contribution of pollinators to nature-rich environments leading to improved health and well-being.

We want to improve our understanding of the relationship between the state of pollinator populations, the economic benefits they provide and the indirect benefits to society. Section 7 of the Supporting Document provides further background, in particular the rationale for undertaking feasibility and scoping studies. We will consider the results from the IPI to help inform the specifications of the three scoping studies outlined in this section.

Group 3 – impacts of crop protection measures on pollinators

- determine **the effects of neonicotinoids** on populations of wild and managed pollinators in field conditions.
- assess the **impact of the restrictions on neonicotinoids on farmers' decisions** on cropping, pesticide use and other management changes. [Over a longer timescale, changes in use of pesticides will be captured through surveys such as the Pesticide Usage Survey.]

In May 2013, the European Commission adopted Implementing Regulation 485/2013 which from 1 December 2013 prohibited the use of three neonicotinoid insecticides (clothianidin, imidacloprid and thiamethoxam) on crops visited by pollinators. A review of the data will be initiated in 2015.

The Regulation sets a number of data requirements to be addressed by crop protection companies. There have been suggestions that bees and other pollinators may suffer unacceptable sub-lethal effects from exposure to these three insecticides.

The decisions followed advice from the European Food Safety Authority (EFSA). Their assessment was based chiefly on laboratory studies, mainly on honey bees. Although there are a number of regulatory field trials, these were not considered in the EU assessment.

Defra is considering further work required to produce robust evidence in field conditions. We are also participating in the work of the EFSA and the European Commission to draw up new guidance on the risk assessment of pesticides in relation to bees.

There is also a need to understand more fully the impacts of other pesticides on pollinators in field conditions²³. The EU process for assessing the risk to bees and for taking regulatory decisions is currently being updated and, over time, the risk assessment of all pesticides will be brought up to the new standards.

Where are the main evidence gaps and our approach

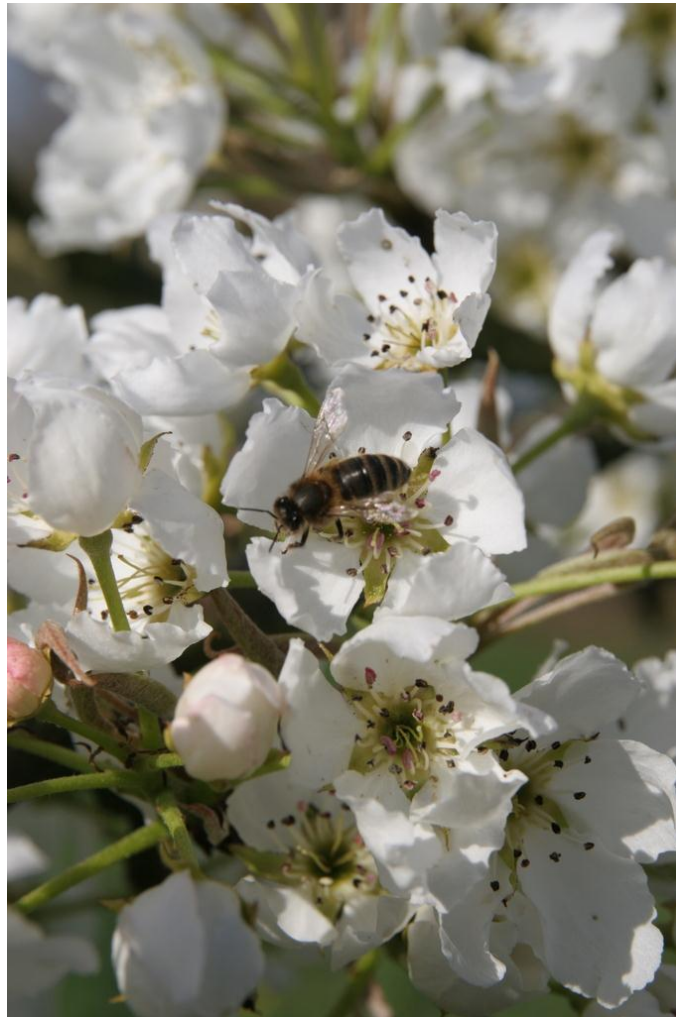
Evidence gaps

- What is the current status of insect pollinators and what are the options to assess changes in status over time?
- How do we future-proof a cost-effective, fit for purpose pollinator monitoring system?
- Are pollination services in crops and wild flowers adequate or not?
- What are the key drivers of change in pollinator status and services, and the interactions between these factors?
- What are the effects of neonicotinoids on populations of wild and managed pollinators in the field?
- How will farmers change their practices in response to the restrictions on the use of neonicotinoids?

The Strategy's evidence actions will address these key gaps in our understanding about pollinators. In particular, their status and the relationship between this and the benefits they provide. This lack of data has led to a high level of uncertainty about pollinator trends and benefits. Given the complexity of the issues, we will take a step-by-step approach to addressing these gaps to assess whether it is worthwhile continuing. This allows us to build a more considered evidence base whilst closing off approaches that either will not deliver scientifically or can be replaced by a more cost-effective approach.

²³ The Centre for Ecology & Hydrology (CEH) is undertaking research to quantify the impact on honeybees of two commercial neonicotinoids seed treatments in commercially grown crops of oilseed rape ('Clothianidin' Bayer CropScience and 'Thiamethoxam' Syngenta). CEH researchers have designed, and are overseeing the delivery of this pan-European, field experiment to take place during 2014-2015. <http://www.ceh.ac.uk/science/impacts-neonicotinoids-honeybees-largescale-field-experiment.html>

The Strategy's evidence actions build on Defra's long-established research programme in policy areas relevant to pollinators such as on biodiversity and pesticides^{24 25}. The pesticides programme includes work on alternatives and resistance. These are increasingly important to support more sustainable farming systems, such as Integrated Pest Management, and to combat the impacts of reductions in the range of chemicals available. Defra also funds research on honey bee health and the programme has included projects on mites of bees, exotic pest threats and husbandry techniques. In addition, Defra is funding studies to identify new treatments for honey bees, and between 2009 and 2014 has been jointly funding the £10 million IPI.



²⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221078/pb13908-evidenceplan-biodiversity-ecosystems.pdf

²⁵ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221065/pb13921-evidenceplan-pesticides.pdf

A framework to deliver positive change for pollinators

The Strategy provides a framework for Government and a wide range of national and local organisations, businesses, NGOs and individuals to work together, and to do more as we find out more. Through collective effort we can achieve greater results for pollinators. In particular, we want to improve their overall status and to reduce losses in the diversity of pollinator species.

The Strategy:

- covers all wild and managed pollinator species across England and seeks to support generalist and specialist species.
- seeks to support rare and threatened species of conservation concern²⁶.
- is relevant to all types of land uses across the country – from agriculture and forestry, through urban, retail and business areas, to public and private land. Everyone has a role.
- is also relevant to protecting a wide range of natural or semi-natural land suitable for pollinators such as arable margins, species-rich meadows, calcareous grassland, hedgerows, scrub, heathland, fen and moorland, including designated sites such as Sites of Special Scientific Interest.

Principles guiding implementation

We will:

- **Build partnerships and consensus.** We will build partnerships to expand and join up pollinator actions already being taken by Government and others, such as local authorities, civil society and businesses. This work will be driven by our understanding of what pollinators need to thrive. We will raise public awareness so that people and organisations know how to help pollinators.
- **Improve our understanding.** From 2014 to 2019 we will improve our understanding of pollinator populations and trends and pollination services in England. We will also address gaps in understanding of pollinator interactions with crop production and wild flowers. This is an important part of the Strategy and the basis for informing future policy development.

²⁶ Building on current policies, such as designation of species of principal importance for conserving biodiversity in England under Section 41 of the Natural Environment and Rural Communities Act (2006). Providing resources and habitat for pollinators in general, should also improve the status of these species.

- **Think globally.** We will coordinate and drive forward this work in partnership with the Devolved Administrations and contribute to emerging international work on understanding the problem and current baselines.

Given the general backdrop of uncertainty over the status of many pollinators, the Strategy is an important starting point and must be flexible and adapt to new data and understanding as they emerge. We will keep it under review, refreshing the aims by 2019, identifying any necessary targets and additional policies, including mandatory or incentivised measures, to strengthen our response based on an improved understanding of the baselines, the impact of pressures and the role of pollinators. The review will also consider lessons learned from the initial policy actions and partnership working. We will work with interested parties on the review as the evidence emerges from 2016 onwards.



Delivery and measuring success

Defra will be accountable for overall delivery of the Strategy, including investment to address key evidence gaps. This includes £500,000 in 2014/15 for work to improve the evidence base. Defra will work with Natural England and with the Pollinator Advisory Steering Group²⁷ to develop an implementation plan to be in place within six months of publication of this Strategy. The plan will set out details of how we will deliver the priority actions and monitor their impacts. Defra will coordinate the development of pollinator-relevant policies with other Departments and with the Devolved Administrations.

Whatever we do will be compatible with the Government's other priorities. We do not intend to introduce new burdens or regulations, although we will keep this under review. Instead we want to build on the current enthusiasm and momentum across society to inspire voluntary action. This will complement the range of mandatory and incentivised measures already in place to support pollinators²⁸.

Pollinator Advisory Steering Group

Although the Government and its agencies will play a leading role in coordinating delivery of the Strategy, we cannot achieve success alone. We need to draw on the skills, experience and enthusiasm of all interested parties. That is why we have developed this strategy in consultation with the Pollinator Advisory Steering Group. We will continue to draw on the Group's expertise to review and adapt the Strategy by 2019 and, as necessary, identify additional actions as further evidence emerges and as we learn lessons about the impacts of the actions and the results from our monitoring programmes and understanding of the causes of any pollinator declines.

The governance structure for implementation²⁹ also sets our plans on coordinating policy development and implementation with the Devolved Administrations, and with the Department for Communities and Local Government through our established coordination arrangements.

Links to other policy areas

The Strategy is an integral part of biodiversity policy, as shown below. Other policies areas supported by actions in the Strategy include the UK Pesticides National Action Plan and work to further develop the concept of payment for ecosystem services to apply to pollination services.

²⁷ A list of members is given in Section 3 of the Supporting Document published with this Strategy.

²⁸ For example: beekeepers are legally obliged to report certain honey bee diseases to government so that we can take actions to reduce or eliminate further spread; and public bodies have a statutory duty to have regard for conserving biodiversity in exercising their functions.

²⁹ Further details of governance of the Strategy are given in Section 3 of the Supporting Document published with this Strategy.

Links to biodiversity policy

The National Pollinator Strategy follows The Natural Choice (the Natural Environment White Paper, 2011) and Biodiversity 2020 (2011), both of which set out many initiatives that will deliver benefits for pollinators, including Nature Improvement Areas and the 200,000 hectare target for increasing the extent of priority habitats.

In delivering the Strategy's actions, we will be guided by the 'more, bigger, better and joined' principles of the 2010 Making Space for Nature independent review of England's wildlife sites and ecological network, chaired by Professor Sir John Lawton:

Making Space for Nature (2010) – more, bigger, better and joined

The Making Space for Nature review argued that we must:

- **improve the quality of current wildlife sites by better habitat management;**
- increase the size of existing wildlife sites;
- enhance connections between sites, either through physical corridors or through 'stepping stones';
- create new sites; and
- reduce the pressure on wildlife by improving the wider environment.

These principles are embedded in the Natural Environment White Paper (2011) and in Biodiversity 2020 (2011). In line with these principles, **maintaining and improving the quality of current wild-flower rich natural or semi-natural habitats**, including designated sites such as Sites of Special Scientific Interest, is an important priority for the National Pollinator Strategy.

Measuring success

To measure progress with policy implementation, we need a common understanding of the baseline from which we are starting and an agreed set of measures against which to track our progress. We do not currently have this, but our work over the next five years to develop the evidence base will provide information on pollinator numbers guiding our work to identify where action should be taken.

In the interim, we will measure progress through existing or emerging indicators and monitoring plans, including:

- working to develop a pollinator indicator under the planned Biodiversity 2020 monitoring strategy, and assess the feasibility of reporting against existing or planned monitoring data.
- extending the monitoring and evaluation framework for Nature Improvement Areas to include pollinators.
- monitoring current agri-environment schemes and the emerging new environmental land management schemes under CAP reform to assess whether they benefit overall populations of pollinators (and other wildlife).
- in addition, we are looking at whether and how to expand the Biodiversity Action Reporting System so that land managers and others could capture their pollinator

initiatives on these map-based records <http://ukbars.defra.gov.uk/> . Defra will also explore with partners possible opportunities for capturing local initiatives through existing mobile application programmes on pollinators.

We will coordinate the production of a progress report with key partners on implementation of the Strategy in autumn 2015, one year on from publication. Our aim would be for the report to include progress on implementing the delivery plan, on the priority actions we have identified, on how well we are building partnerships and the evidence base, and on raising awareness to support what we are trying to achieve.



Further details of the Strategy's actions

	Policy Actions	Lead/others	2014	2015	2016	2017
1	Promote the Bees' Needs simple actions to all land managers through diverse communication channels	Defra , and the Pollinator Advisory Steering Group (PASG)				
2	Develop and promote web-based detailed Bees' Needs advice for land managers	Fera , Natural England, Defra, scientists, PASG				
3	Members of the public to consider growing a range of plants to provide pollen and nectar sources for pollinators	Members of the public				
4	Improve knowledge sharing of pollinators' needs between scientists, conservation practitioners and NGOs.	Defra , Natural England, scientists and NGOs				
5	Promote opportunities for farmers to support pollinators through new CAP measures and voluntary actions	Defra , Natural England, CFE, NFU, supply trade and NGOs				
6	Secure commitment from providers of advice to farmers to draw on Bees' Needs advice	Defra , Natural England, CFE, agronomists, NGOs				
7	Develop and implement a programme of pollinator events on farms.	CFE (funding confirmed to end of 2015)				
8	Review and update guidance on Integrated Pest Management (IPM).	HSE , Defra, LEAF, VI, AHDB, CFE				
9	(a)VI to revise guidance on insecticide best practice and (b) to work with National Register of Sprayer Operators on training courses	VI , National Register of Sprayer Operators				
10	Share IPM practices with farmers and growers including on-farm demonstrations, farm walks.	Defra , HSE , CFE, LEAF, AHDB, VI and NGOs				
11	Keep under active review ongoing research on IPM to identify practical advice to support pollinators and promote to farmers/growers.	Defra , HSE , LEAF, AHDB, VI, scientists and NGOs				
12	Secure commitment from large-scale land managers to follow Bees' Needs advice.	Defra , land managers, businesses				
13	Disseminate Bees' Needs to brownfield site managers.	CIRIA				
14	Publish policy and practice note on urban pollinators (part of Insect Pollinators Initiative).	IPI Programme Management Group				
15	Secure awareness of, and integrate Bees' Needs advice into Planning Guidance and local biodiversity initiatives (eg, Green Infrastructure Partnership, Green Flag Awards, biodiversity off-setting).	Defra , DCLG, TCPA, KBT, local authorities and Natural England				
16	Workshops on managing urban pollinators for a wide range of land owners and managers such as local authorities, developers, planners, Local Nature Partnerships.	Defra , scientists, CIRIA, TCPA, ALGE and NGOs				
17	Promote plants for pollinators as part of BREEAM's sustainable building certification	BREEAM				
18	Annual Bees' Needs champions award ceremony to celebrate excellent best practice by a wide range of land owners and managers	Defra , NGOs				
19	Develop pesticide guidance for amenity use	HSE , Defra				
20	Develop quality standard to ensure availability of high quality native origin seeds for wildflower planting schemes.	Kew's Native Seed Hub and Millennium Seed Bank				
21	(continue to) improve beekeepers' management of pest and disease risks of honey bees through the Healthy Bees Plan.	Defra , NBU, beekeeping associations				
22	Implement revised policies to control pest and disease risks of honey bees.	NBU , Defra, beekeeping associations				
23	Monitor and keep under active review evidence of disease risks from commercially used bumble bees and take actions as required	Defra				

Key: dark grey squares indicate development; light grey squares indicate implementation

AHDB – Agriculture and Horticulture Development Board ALGE – Association of Local Government Ecologists
 BREEAM - Building Research Establishment Environmental Assessment Method CFE – Campaign for the
 Farmed Environment CIRIA – Construction Industry Research and Information Agency HSE – Health and
 Safety Executive (Chemicals and Regulation Directorate) IPI – Insect Pollinators Initiative LEAF – Linking
 Environment and Farming NBU – National Bee Unit NFU – National Farmers’ Union TCPA – Town and
 Country Planning Association VI – The Voluntary Initiative NGO – non government organisation

	Evidence Actions	Lead/ others	2014	2015	2016	2017
1	Develop and field-test a new monitoring framework that can be implemented by professionals and volunteers ³⁰ .	Defra , with partners				
2	Implement new monitoring scheme(s).	To be confirmed				
3	(continue to) Improve standards of data collection, management and analysis in volunteer recording schemes.	Defra , Joint Nature Conservation Committee, Natural England, volunteer recorders				
4	Expand pool of taxonomic expertise and capability for identifying insect pollinators.	To be confirmed				
5	Improve understanding of motivations of volunteer recorders to aid recruitment of additional volunteers into new monitoring scheme for pollinators.	Defra with volunteer recording schemes				
6	Support long-term storage of insect specimens from research projects in anticipation of improved identification technology.	Defra and other funders of the Insect Pollinators Initiative, Natural History Museum				
7	Feasibility study on conducting primary research on relationship between pollinators and pollination services in the crop production.	Defra				
8	Scoping study to consider benefits of research on ecology of pollinator/wild plant interactions.	To be confirmed				
9	Study to develop a framework for assessing the indirect benefits and socio-cultural value of pollinators to the public.	Defra				
10	Determine the effects of neonicotinoids on wild and managed pollinators in field conditions ³¹ .	Pesticide manufacturers				
11	(continue to) Assess the impacts of restrictions on neonicotinoids on farmers’ decisions on cropping and pesticide use.	Defra				

Key: Dark grey squares indicates commissioning of project and timeframe for completion

³⁰ The project was commissioned by Defra in summer 2014 and is being undertaken by the Centre for Ecology & Hydrology, Leeds University, Reading University and the Open University, and entomology experts (Hymettus) and volunteers from recording schemes and societies (Bees Wasps and Ants Recording Society; Hoverfly Recording Scheme; Bumblebee Conservation Trust; Butterfly Conservation and British Trust for Ornithology).

³¹ The Centre for Ecology & Hydrology (CEH) has been commissioned to undertake research to quantify the impact on honeybees of two commercial neonicotinoids seed treatments in commercially grown crops of oilseed rape ('Clothianidin' Bayer CropScience and 'Thiamethoxam' Syngenta). CEH researchers have designed, and are overseeing the delivery of this pan-European, field experiment to take place during 2014-2015. <http://www.ceh.ac.uk/science/impacts-neonicotinoids-honeybees-largescale-field-experiment.html>

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- Page 22: Tregothnan Estate
- Page 28: Royal Horticultural Society/Mike Sleigh
- Page 30: Katherine Baldock, Urban Pollinators Project
- Page 33: Royal Horticultural Society/Mike Sleigh