

To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra Official  
16/06/14 11:21

**NPS core group: in confidence study outline**

Dear members of the core stakeholder group for the NPS,

At the meeting of the core stakeholder group on 4 June, [REDACTED] [REDACTED] outlined the current work in the EU and UK to develop the evidence on the effects of neonicotinoids on pollinators. We're pleased to attach the summary note that you requested on this, with thanks to [REDACTED] for producing it.

Pesticide companies are carrying out a range of studies, including field studies, and Bayer and Syngenta intend to collaborate on a larger field study. [REDACTED] flagged up at the meeting that it would be helpful to have the views of the core group on the design of this study. The study outline has now been received and is attached to this email. **Core group members are requested to treat the company documents in confidence and not to share them more widely.**

Any comments that core group members wish to offer on these points would be very much valued. Could all comments please be sent directly to [REDACTED] [REDACTED] in Defra [REDACTED] and copied to [REDACTED]. It would be very helpful if comments could be received by Friday 27 June.

It is possible that some of you may have some involvement in the design or running of these or similar trials. We would still value your comments but would ask you to state your interest.

The Government is, of course, keen to make sure that companies carry out studies that address the developing needs of the EU regulatory system. The Government also has an overlapping but broader objective to ensure that good evidence is gathered which addresses the scientific questions around neonicotinoid use. For this reason, we would welcome your thoughts on these broader questions. For example, do you think there are side experiments that could be designed to take advantage of the main field study or could the trial be used to help throw light on the socio-economic impacts of the current restrictions.

Many thanks

[REDACTED] [REDACTED] (Defra Official)  
Attachments – 160614-1 (attached separately), 160614-2

**Document 160614-2**

**EVIDENCE ON NEONICOTINOIDS AND POLLINATORS**

**Note for the NPS core stakeholder group**

1. This short paper summarises the work being taken forward in the EU and UK to develop understanding of the effects of neonicotinoids on pollinators and to generate the data required for regulatory decision-making.

The EU evidence process

2. Commission Regulation 485/2013, which imposed restrictions on the use of three neonicotinoids with effect from 1 December 2013, requires pesticide companies to submit confirmatory information as regards:

- (a) the risk to pollinators other than honey bees;
- (b) the risk to honey bees foraging in nectar or pollen in succeeding crops;
- (c) the potential uptake via roots to flowering weeds;
- (d) the risk to honey bees foraging on insect honey dew;
- (e) the potential guttation exposure and the acute and the long-term risk to colony survival and development, and the risk to bee brood resulting from such exposure;
- (f) the potential exposure to dust drift following drill and the acute and the long-term risk to colony survival and development, and the risk to bee brood resulting from such exposure; and
- (g) the acute and long term risk to colony survival and development and the risk to bee brood for honeybees from ingestion of contaminated nectar and pollen.

3. Companies are required to submit this information to the Commission, the Member States and the European Food Safety Authority (EFSA) by 31 December 2014. The Regulation also states that “Within two years from the date of entry into force of the present Regulation [26 May 2013] the Commission will initiate without undue delay a review of the new scientific information which it has received.”

4. The initial evaluation will be carried out by the Rapporteur Member State for each active substance: Belgium (clothianidin); Germany (imidacloprid); Spain (thiamethoxam); and France (fipronil, not authorised as a plant protection product in the UK). Their assessments will be reviewed by EFSA and the other Member States.

5. Normally, data are generated according to defined standards set out in guidance documents. However, the guidance document covering the risk assessment for bees is not yet agreed. EFSA therefore agreed a process by which protocols for studies starting in 2014 can be reviewed. Companies submitted a number of study plans for consideration. The final reports for each set of protocols were published on 3 June and can be accessed at the [EFSA website](#). The reports list the studies, comments made by Member States and the views of the company and Rapporteur.

#### The UK evidence process

6. Defra has an ongoing programme of work relevant to developing our understanding of the effects of neonicotinoids and other pesticides on pollinators. Projects currently under way are listed below. Further details of these and of previous projects can be obtained from the [Defra research webpages](#).

<b>Project code</b>	<b>Project title</b>
PS2035	Pilot study to measure drift of dust containing neonicotinoid compounds from seed treatments during drilling of autumn sown crops in the UK
PS2036	Collection of data relating to seed drilling methodologies as part of the

	outdoor vegetable, grassland & fodder crop pesticide usage surveys
PS2370	Interpretation of pesticide residues in honeybees
PS2372	Quantifying exposure of bumblebees to neonicotinoids and mixtures of agrochemicals
PS2374	RFID assessment of the effects of pesticides on foraging bees
PS2376	Evaluation of procedures to improve estimates of exposure of pollinators to neonicotinoid Insecticides
PS2556	Development and improvement of methods for the Wildlife Incident Investigation Scheme

7. There is clear evidence that neonicotinoids can have a range of lethal and sub-lethal effects on bees. Defra's earlier assessment was that unacceptable effects are not likely to occur in the field. However, further research is needed to address this key question of real world exposures and effects – which is the focus of the EU data requirements. Such research does, of course, need to be well designed and likely to give reliable scientific evidence. There is also great advantage in the research being transparent, so that independent experts and stakeholders have the chance to comment on the study design and to see the results.

8. A field study of the scale and design necessary is a substantial undertaking. It would need to run for several years and would cost several million pounds. Defra does not see its role as carrying out such a study. In part this is because it would require the use of public money to generate data of commercial value. But it is also arguably inconsistent with the Government's role as the regulator.

9. Defra has therefore held discussions with the key companies to understand their plans to generate evidence. This includes the governance arrangements as well as the content and design. The companies are planning studies to begin this Summer (on top of earlier work) and have agreed to provide their detailed plans to be examined by our own experts and by the independent Pollinators Expert Advisory Group. We will also wish to take views from key pollinator stakeholders, including this group.

10. In looking at the industry plans we will consider whether it would be appropriate for Defra or the Research Councils to supplement the work.



<p>five simple actions for all land managers to take to benefit pollinators.</p> <p><u>Points made during discussion.</u> 1) The group queried the timing of the EAC inquiry given that the consultation was now closed. 2) A number of group members had been asked to give evidence at the inquiry. 3) Whether the inquiry would delay production of the delivery plan? 4) It was suggested that the independent Status Report on Pollinators should be published with the Strategy.</p> <p><u>Actions:</u> Defra would begin work on a delivery plan during the recess. The Status Report was available online and would be published after the correction of a small error.</p>
<p><b>Call to action and animation script; awards/competition (paper 2)</b></p> <p>Following the March meeting with stakeholders and in the light of comments from the consultation workshops in April, Defra had decided to re-shoot the pollinator animation to address a number of technical errors and to make the script more policy neutral. Paper 2 contained the updated script. It included the new simple actions for the 'Call to Action', to be launched in July. In addition, [redacted] was proposing to alter the original plans to have a pollinator awards ceremony, and instead to hold a 'champion of champions' ceremony.</p> <p><u>Points made during discussion.</u> 1) Concerns raised that the introduction to the animation did not make clear that pollinator decline is historic rather than current. 2) Suggestions to think carefully about recommended flower species in point 1 of the simple actions e.g. what type of land manager we had in mind, use data indicating most visited flowers. 3) On point 2, the value of weeds and 'weedy areas' should be emphasised; dandelions and nettles were suggested as examples. 4) Shown two options for point 5 (the pesticide action), the group agreed on option 1 with the suggestion to remove the words 'alternatively' and the reference to organic- approved pesticides. 5) The group agreed to the proposal of a 'champion of champions' event as a positive way to raise awareness for the pollinator cause.</p> <p><u>Actions:</u> [redacted] to re-visit simple actions following suggestions of the group. [redacted] to circulate the draft of 'Call to Action' website to this group before launch.</p>
<p><b>Pesticides update</b></p> <p>In May of 2013 the European Commission placed restrictions on the use of neonicotinoids. By May of 2015 this decision will be reviewed in the light of further scientific developments. EFSA is working to update its risk assessment guidance for pesticide effects on bees and pollinators. The current investigations funded by pesticide companies were transparent and peer-reviewed, but findings were not published altogether for competitive reasons. Whilst undertaking small some smaller scale work on neonicotinoids, it would be extremely expensive for the government to fund large scale scientific studies, and, in addition, would be inappropriate given the state's regulatory role on pesticides.</p> <p><u>Points made during discussion.</u> 1) The Swedish were running a large scale study and hoped to announce results soon for the first year of research. 2) It should be clearly communicated to the public that it would be costly in both time and money for the government to set up studies into neonicotinoids, and that this was inappropriate given the government's role as regulator.</p> <p><u>Action:</u> [redacted] to send out summary to the group summarising work being done in the EU and UK to develop our understanding of the effects of neonicotinoids on pollinators.</p>
<p><b>High level statement of collective action and cooperation (Paper 3)</b></p> <p>Paper 3 was a statement of collective action for the core group to sign up to with the aim of including it in the Strategy's Foreword or as part of the press notice on publication.</p> <p><u>Points made during discussion.</u> 1) this statement should have wider reach and be signed off by others too, not just this group.</p> <p><u>Action:</u> Include this paper in a future meeting of this group closer to the strategy publication date.</p>
<p><b>Strategy governance (paper 4)</b></p> <p>Paper 4 was a draft chapter for the Strategy on governance. It was put together in response to the stakeholder request for further clarity on the information flow during implementation of the NPS. It was structured around the different policy areas that were represented on the Pollinator Programme Board.</p> <p><u>Actions:</u> [redacted] to circulate membership of the Pollinator Programme Board. Bee Health Advisory Forum to be added</p>

into governance structure.

#### Asian hornet

The Asian hornet arrived in France in 2004. In preparation for its possible arrival in the UK, we were developing contingency plans.

Points made during discussion: The group agreed to assist with the publicity of the Asian hornet, particularly in distinguishing it from the European hornet.

Actions: [REDACTED] to develop package of information on the Asian hornet.

Document 240614-2

## NATIONAL POLLINATOR STRATEGY POLICY PROJECT BOARD TERMS OF REFERENCE

### Background

1. Speaking at the Friends of the Earth Bee Summit on 28 June Lord de Mauley launched an urgent and comprehensive review of current policy, evidence and civil society action on pollinators to identify what needs to be done to integrate and step up our approach to protecting bees and other pollinators. The review will examine the various causes of decline across different bee species and insect pollinators, and provide the basis for a new *National Pollinator Strategy*, bringing together pollinator-friendly initiatives and providing a way forward for new action.
2. The *National Pollinator Strategy* is planned for publication in April 2014, following a public consultation, with priority actions identified under the Strategy implemented from May 2014 onwards.
3. The work is led by the Safeguarding Plant and Animal Health Directorate, reporting to Peter Unwin as SRO.

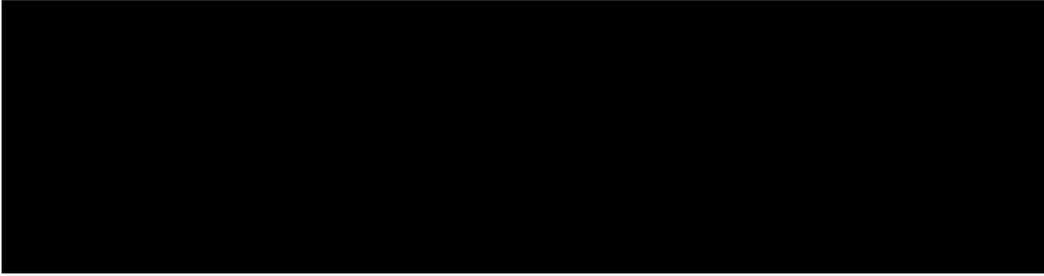
### The role of the Project Board

4. The work of the project will be overseen by a Project Board made up of policy representatives from across Defra:
  - a) To oversee the development of the National Pollinator Strategy for England, in preparation for consideration of options by Ministers;
  - b) To monitor delivery against the project plan and address emerging issues through exception reporting from the project team;
  - c) To manage the Risk Register for the project;
  - d) To review and agree the communications plan for the project.

### Membership of the Project Board

#### Chair

#### Members



## **Meetings**

The board will meet four times (see timeline) at key stages during the development of the Strategy and will from time to time be asked to resolve issues by correspondence between meetings.

August 2013

**To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra Official**  
**26/06/14 16:40**

**NPS Stakeholders: Call to action and pesticides**

Hi

Please find attached an update on the call to action and information on an application for an emergency authorisation for a neonicotinoid.

Please could you also take a few moments to fill in the doodle poll for the next meeting – at the moment the afternoons of Friday 11<sup>th</sup> or Monday 14<sup>th</sup> are the preferred options.

<http://doodle.com/cuixqxtbagn7cbfg>

Call to Action

I'm pleased to attach the near final draft of the five simple actions and associated 'pop-up' paragraphs for each action. Our aim with the 'pop-ups' is to provide a bit more detail on each action ready for the expected launch in July of the call to action. We've drafted these pop ups in consultation with the Pollinator Evidence Advisory Group.

As you're aware, when we publish the final strategy in October, we will also issue initial detailed advice for land managers (building on the simple actions).

I should point out that the simple action on pesticides is a little different to the one we discussed when we met on 4 June in the light of further discussions with policy colleagues and Ministers. In particular it seeks to be relevant for farmers as well as gardeners and amenity managers etc by advising that control methods should be suitable to your circumstances and asks all to minimise use of pesticides; and it recognises that barrier pest control methods are applicable to all growing situations (conventional and organic).

If you have any significant/showstopper comments on the attached draft, please send to [REDACTED] by close 30 June (with apologies for short notice).

Pesticides

You will probably have seen media reports that the Government is considering "emergency authorisation" of a neonicotinoid seed treatment for use on oilseed rape.

Emergency authorisation is written into the EU pesticides law – Regulation 1107/2009. The Regulation allows Member States to authorise, "for a period not exceeding 120 days, the placing on the market of plant protection products, for limited and controlled use, where such a measure appears necessary because of a danger which cannot be contained by any other reasonable means."

An application for the use of thiamethoxam on winter oilseed rape has been received and is being processed.

thanks

[REDACTED] (Defra official)

Attachment – 260614

**Document 260614**

**Draft 25 June 2014 (including input from PEAG).**

#### Simple actions

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 buddleia in autumn, and mahonia shrubs and cyclamen in winter.

Pop-up paragraphs:

#### Some principles

There are no hard and fast rules about which flowers, shrubs and trees to plant, we just need more of them in our gardens, balconies, allotments, farms, and the landscape around our homes and across our towns and cities.

The important principle is to make sure you select and sow a wide range of plants that produce pollen and nectar resources throughout the year. This will help as many pollinators as possible which often have quite specific and different food needs during the year, so one size doesn't necessarily fit all.

Gardeners, allotment holders and amenity managers may wish to look for the Royal Horticultural Society's 'Perfect for Pollinators' logo at their garden centre or suppliers. Consider planting single flowers rather than double flowers as they provide more pollen and nectar. Look at what the pollinators are visiting in garden centres – often a good sign.

If you are sowing wild flower seeds or laying wildflower turf to support pollinators, you should aim to use seed of local provenance or turf with native plants as far as possible.

#### Which plants and when?

The resources provided by flowering plants can be split into three key periods during the year. Getting the timing right is crucial so that plants are in flower from February to October with no gaps:

**February/March to May** when many insect pollinators are emerging from winter hibernation and need to access some energy resources pretty quickly. Examples of good plants for this period include goat and grey willows, pussy willow, dandelion, blackthorn, hawthorn and some of the fruit trees like apples, pear and plums. Garden plants include aubretia, wallflower, heathers, crocuses, primroses and flowering currants (*Ribes*)

**June to mid-July** when most insect pollinators are on the wing and actively foraging for food and fuel to produce and feed the next generation. There are many examples of good plants for this period with the more common ones including ox-eye daisy, red and alsike clover, birds foot trefoil, self-heal, knapweed, vetches, thyme, betony and brambles. White and red deadnettles and thistles provide great natural resources. Poached egg, foxglove, snapdragons, cornflowers, mallow, lavenders, meadow cranesbill and honeysuckle represent just a few of the more commonly sown garden and border species.

**End of July to October** when insect pollinators are looking to build up their energy levels and reserves before they head into hibernation over winter. There are considerably fewer plants that produce these important hibernating resources, but garden plants that do include Michaelmas daisy, buddleia and asters, while in the wider countryside common ivy is a very important source.

In addition, several bumble bee species remain active during the winter particularly in urban areas of south east England. Plants to provide resources for this period include cyclamen and mahonia shrubs. Specific flowers are beneficial to pollinators of conservation importance (known as section 41 species under the Natural Environment and Rural Communities Act 2006). For example for section 41 bumblebees, good plants include clovers, deadnettles, knapweeds, foxglove, comfrey, and birdsfoot trefoil.

Note: Bumblebees classified as Section 41 are the brown-banded carder bee (*Bombus humilis*), the moss carder bee (*Bombus muscorum*), the red-shanked carder bee (*Bombus ruderarius*), the large garden bumblebee (*Bombus rudratus*), the short haired bumblebee (*Bombus subterraneus*), the shrill carder bee (*Bombus sylvarum*).

2. Leave patches of land to grow wild and weedy with plants like stinging nettles and dandelions to provide other food sources (such as leaves for caterpillars) and breeding places for butterflies and moths.

Pop up paragraphs:

As land managers and gardeners, you can take simple actions to manage your existing land, green spaces and gardens to provide food sources and/or breeding places for pollinators. Examples of what you can do include:

#### Farmers and growers

- identify and protect existing patches of un-cropped land eg, near buildings and barns or near telegraph/power poles, to allow wild flowers to flourish. Grasses and other plants like stinging nettles, garlic mustard, sorrel, birds foot trefoil, are important as larval food plants for many of our butterflies.
- Leave patches of tussocky grassland as nesting or hibernating sites for wild bees.

#### Land owners, foresters, estate managers, local authorities, Highways Agency, railway, reservoir managers, facility managers and their contractors

- Identify and protect existing patches of natural and semi-natural land to allow wild flowers, shrubs and trees to flourish providing places for breeding and nesting, as well as food sources for pollinators.
- Manage existing mixed species woodland by coppicing and thinning to provide food sources such as brambles and wild roses, and nesting places for pollinators. Creating sunny rides and other open areas in woodland allows wild flora to grow and creates good conditions for foraging pollinators

#### Gardeners

- If possible, leave patches of long grass where caterpillars can pass the winter.
- Leave perennial plants uncut over the winter as their hollow stems can shelter hibernating pollinators.
- Let some weeds flourish in your garden, even if just in one corner. Be kind to dandelions as they provide floral resources for pollinators early in the year. Be aware that butterflies and moths tend to lay their eggs directly on the leaves of plants like stinging nettles and brambles for their larvae (caterpillars) to eat.
- Thistles and brambles are also good floral resources for pollinators.

3. Cut grass less often and ideally remove the cuttings to allow plants to flower

Pop up paragraphs

#### Some principles

Native flowering plants in grass areas, field corners, verges and specially sown flower-rich habitats support the greatest diversity of insect pollinators by providing nectar and pollen resources, places to

nest or breed and leaves for caterpillars. Hence it's important to get the management right, particularly the cutting or grazing regime, to give the most benefit to pollinators.

In established pasture, lawns or grass-flower mixes, some wildflower species can take several years to establish or re-appear. So when you start to cut the grass less often or to reduce grazing intensity, it's important to be patient and persevere

By delaying cutting and removing vegetation in established lawns or verges until after the majority of plants have flowered will help to lengthen the time the area of grass and flowers can deliver nectar and flower resources for pollinators.

Where possible, avoid cutting lawns and verges after September as this will help to protect bumble bee nests in those areas and also help the caterpillars nesting there survive until next spring.

For newly sown grass-flower mixes, it's important to be aware that the new sward will need regular hard cutting in the early phase of growth to remove fertility, encourage the flowers to establish and reduce the dominance of the grasses.

4. Avoid disturbing or destroying nesting or hibernating insects, in places like grass margins, bare soil, hedgerows, trees, dead wood or walls

Pop-up paragraphs:

As well as making sure there are adequate food resources throughout the year for insect pollinators, it is also important to make sure they can nest in safety so that they and the next generation can survive over-winter to start again in the following spring.

Some bumble bees nest underground in small mammal holes, under sheds and in heaps of compost or leaves which tend to be dry and dark, while others make nests above ground in thick grass or in trees. A few solitary bees make their nests in your lawn and many others favour bare patches of compacted soil, especially if sloping and with a southern aspect, where they can dig vertical nest tunnels. Other solitary bees nest above ground and you can provide them with hollow reeds, canes or twigs, or wooden blocks with holes of different sizes drilled into them (2mm to 10mm), or buy commercially available bee hotels, and hang them somewhere warm, sunny and sheltered about 1-2 m above the ground.

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 aim to minimise the use of pesticides. 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.

Pop up paragraphs:

Gardeners, allotments and amenity managers

Minimise use of pesticides or use non-chemical alternatives where possible. In particular, avoid using pesticides on flowering plants or where pollinators are active or nesting.

You could protect your plants by removing pests by hand or building barriers around vulnerable plants, such as netting or cardboard barriers, or by companion planting such as marigolds to ward off aphids.

Farmers, growers and large-scale amenity managers

For a balanced approach to managing pests on a larger scale, you should, wherever possible, follow a low pesticide-input approach such as Integrated Pest Management (IPM) or alternative husbandry methods such as organic farming if they suit your business needs and circumstances.

IPM entails the use of a range of approaches to prevent or suppress harmful organisms. These may include: crop rotation; appropriate cultivation techniques; balanced fertilisation, liming and irrigation; hygiene measures; protecting beneficial organisms; and using resistant or tolerant cultivars and certified seed and planting material. Avoid spraying 'just in case' (prophylactically). Use thresholds where possible to determine the need for plant protection measures. Where measures are needed use

biological, physical and other non-chemical methods where possible. Where pesticides have to be used as part of IPM, choose products that are as specific as possible and have the least side effects.

For further advice on IPM go to:

Linking Environment and Farming (LEAF):

<http://www.leafuk.org/leaf/farmers/Inforesources.eb?deliver=1LOUBS3NC1.9NHA94VAL5CMI>

The Voluntary Initiative:

<http://www.voluntaryinitiative.org.uk/ipmp>

The Agricultural and Horticultural Development Board and its operating divisions including:

<http://www.hgca.com/crop-management.aspx>

<http://www.hdc.org.uk/publications>

Organic farming limits the use of pesticides, encouraging the use of alternative non-chemical methods. These include rotation of crops, increasing genetic diversity, use of resistant crops and biological pest control.

For further advice on organic farming go to:

The Soil Association

<http://www.soilassociation.org/whatisorganic/organicfarming>

Organic Farmers and Growers

<http://www.organicfarmers.org.uk/about-organics/an-introduction-to-organic-farming/>

To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra Official  
04/07/14 16:16

**National Pollinator Strategy Stakeholder Meeting**

Please find attached the agenda for our meeting on 11 July and papers 1a (ToR), 1b (governance), 2 (mock-up of worksheet) and 3 (Asian hornet guide).

Attachment – 040714-1, 040714-2, 040714-3, 040714-4

Teleconference details: [redacted] then enter participant pass code [redacted] then #.

Please can you let me know if you can't make it or you will join by teleconference so I can arrange your security passes to be prepared.

Sorry about the size of the email which is because of the images.

[redacted] (Defra official)

To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra Official  
30/06/14 12:11

Hi

The best time for everyone seems to be Friday 11 July between 2pm and 4pm. The meeting will be in Room 203 in Nobel House.

The agenda and any discussion papers will be sent to you at the end of the week.

I look forward to see you then.

[redacted] (Defra official)

**Document 040714-1**

**National Pollinator Strategy – core stakeholder group  
Meeting on 11 July 2014  
14:00 – 16:00 room 203 Nobel House  
Defra, London  
Agenda**

No.	Item	Introduced by	Time	Purpose
1.	Welcome and introductions	[redacted]	14:00	Information
2.	Actions from 4 June meeting	[redacted]	14:05	Information
3.	Update on project to design and test a National Pollinator and Pollination service	[redacted]	14:10	Information

	Monitoring Scheme (NPPMS)			
4.	Call to action, plans for launch and roles (Bees' Needs webpage; animation)		14:35	Information and decision
5.	Governance for implementation and future of this group (Papers 1a and 1b)		14:55	Information and decision
6.	Progress with concordat and additional signatories		15:10	Information
7.	Progress with initial detailed advice ready for October (Paper 2)		15:20	Information
8.	Pesticides update		15:35	Information
9.	Raising Awareness		15:45	Discussion
10.	AOB and close		15:55	

Document 040714-2

Draft

## Terms Of reference for England's Pollinator Advisory steering group

### Role

The Group's main purpose is to work together and with Government to support implementation of the National Pollinator Strategy, given the collaborative nature of the Strategy and its intention of inspiring action to support pollinators at all levels by many other organisations and individuals.

PASG is the core leadership group of stakeholders working with Government officials to steer implementation and delivery of the Strategy, including yearly progress reports. The Group will also consider emerging and new evidence from the planned monitoring programme and commissioned research and review the implications for policy development, including as part of the Strategy's commitment to review and refresh the aims and actions by 2019. In addition, the Group will identify and consider lessons learned from the initial policy priority actions and from partnership working, and how to adapt and improve as necessary.

Being a member of PASG does not replace the opportunity for bilateral exchanges to continue to inform policy nor does it circumvent stakeholders' opportunities to continue to input to formal consultations. The benefit of the Group is in providing an opportunity for early discussion on emerging or developing policy and evidence issues as well as increasing transparency and understanding for all participants of positions across the range of interests.

PASG will focus primarily on feeding into the implementation plan of the National Pollinator Strategy. This would include helping plan public engagement events and helping to promote the 'Call to Action'. It will involve reflections on how the Group itself should develop. In addition, it may also cover strategic, longer term and cross-cutting matters with a potentially high impact and where communication with and input from the various sectors are key to success.

PASG may also look to establish sub-groups on specific themes or projects, or seek views from others on specific issues with a particular focus on areas where Government and stakeholder groups can work together to deliver effective solutions to the challenges that face pollinators.

### **Advice to Ministers**

Where applicable, the views of PASG would be reported via Defra's Pollinator Programme Board to Ministers, both where there was consensus agreement and where there were differing views. The Group would be invited to reach a consensus in the form of a paragraph of text which would be included as the agreed Group view in any submission to Ministers. This might either express a united view on the issue, or identify areas of disagreement and uncertainty. This does not circumvent stakeholders' rights to make direct approaches to Ministers or to comment publicly on the issues in question.

### **Membership**

The Group is made up of representatives of relevant organisations in the public, private and voluntary sectors and other interested stakeholder groups, Defra officials and representatives from the Devolved Administrations as observers.

Following the first year, the group will be reviewed. This will include a discussion over whether to widen membership, if deemed beneficial to the implementation of the Strategy.

### **Chair:**

[REDACTED]

PASG will be served by a secretariat based within Defra.

### **Meetings and Ways of Working**

PASG will meet quarterly.

Those attending the Group need to have any associated costs paid for by their own organisation. The exception to this would be where there was a consensus on the Group that additional members were needed for their individual expertise.

PASG will have procedures for dealing with time critical issues, including ensuring decisions that need the Group's input are taken so as to meet timescales for business. This may require rapid consultation, in most cases via an email network.

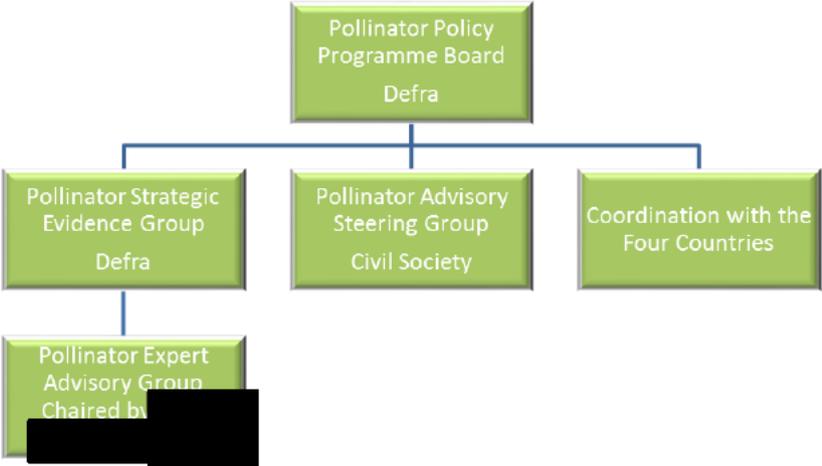
PASG will work with their members and other stakeholders through communication and engagement channels with relevant sectors and interests and open reporting of their work.

### **Membership**

[REDACTED]



### Organogram of Groups Core to the Delivery of the National Pollinator Strategy



Document 040714-3

### Governance and Strategy implementation

The implementation of the National Pollinator Strategy will rely on strong partnership and communication between multiple groups both inside and outside of Government. Only by working together across policy areas and with our different key stakeholders can we deliver at a local and national level for pollinators. Delivery of the Strategy will be overseen by:

**Pollinator Programme Board**

The PPB is composed of policy leads within Defra. The PPB will oversee the development of a delivery plan for the Strategy and monitor implementation. It will address emerging issues through exception reporting from the project team, manage the Risk Register for the project and be involved with the communications plan for the NPS.

The following groups will provide advice to the Programme Board:

**Pollinator Strategic Evidence Group**

PSEG has the role of overseeing the evidence requirements for pollinators and evaluating the quality of this evidence. The Group will coordinate with the relevant policy areas and evidence groups both inside and outside of Defra, and communicate with impact to the Department’s Chief Scientific Advisor and Ministers.

**Pollinator Advisory Steering Group**

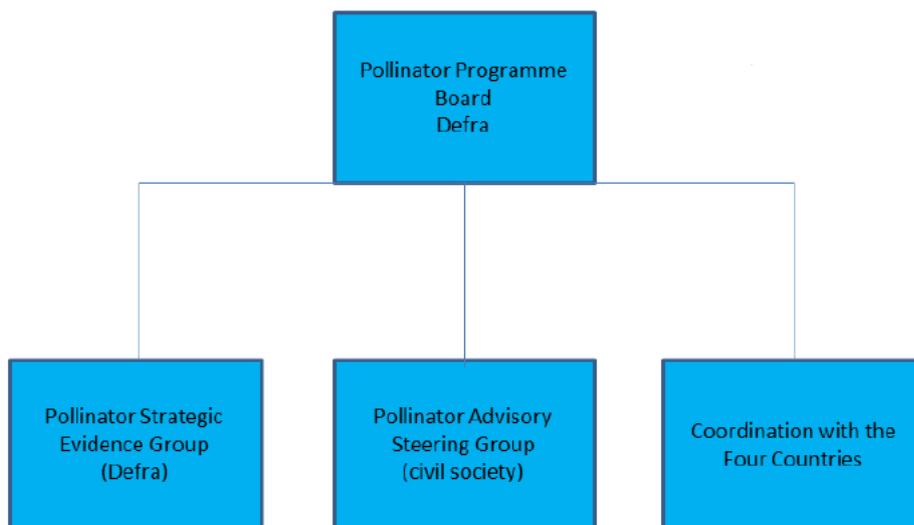
PASG is the core leadership group of stakeholders working with Government officials to steer implementation and delivery of the Strategy. The Group will work with Defra on the Strategy’s delivery plan; and consider emerging and new evidence from the planned monitoring programme and

commissioned research, and review the implications for policy development. It will identify and consider lessons learned from the initial policy actions and from partnership working, and how to adapt and improve as necessary. In addition, the Group will play an important role in keeping Government abreast of any outside developments of significance to pollinators

#### **Four Countries Biodiversity Group**

This Group is the forum for communication and coordination with the Devolved Administrations. It will enable the sharing of lessons learned and for coordination of work across borders with Scotland, Wales and Northern Ireland.

#### **Core Governance structure**



#### **Delivery**

The core NPS Governance structure has the role of setting objectives and Key Performance Indicators in order to define what success looks like in the implementation of the Strategy. Over the period of at least 12 months it will monitor progress made and assess whether objectives are being met. Following this first year of implementation, the governance structure will be reviewed. It will also be considered whether involvement of further stakeholders would be beneficial.

#### **Measuring success**

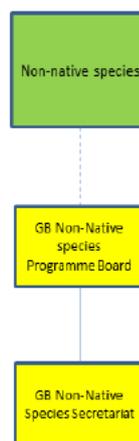
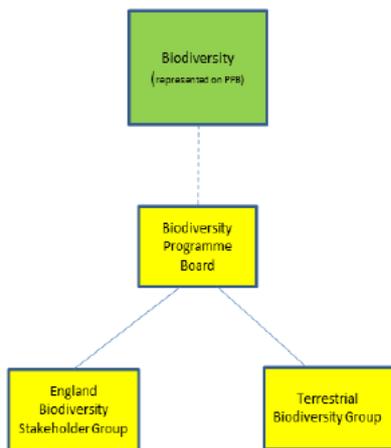
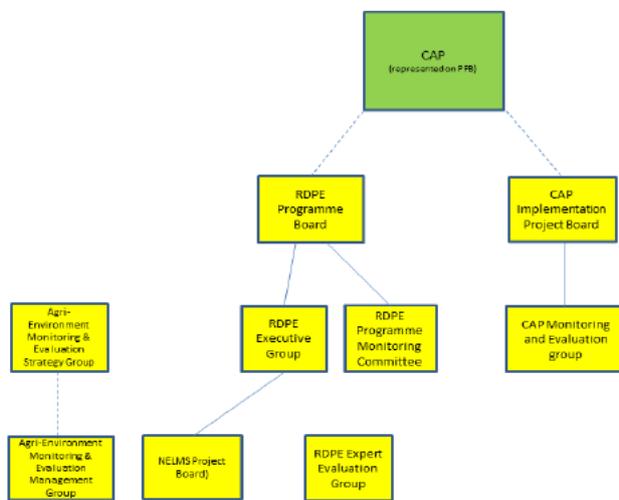
Progress will be measured by monitoring delivery of the Evidence actions and Priority actions laid out in the Strategy. Given the urgency of acquiring further evidence and taking actions to provide essential resources for pollinators, delivering these actions on time and to a high quality is particularly crucial. It is, however, important to keep in mind the broader vision of the Strategy, and ensure that all of the actions are delivering for pollinators. This can be measured by considering the key outcomes defined at the start of the Strategy. That is:

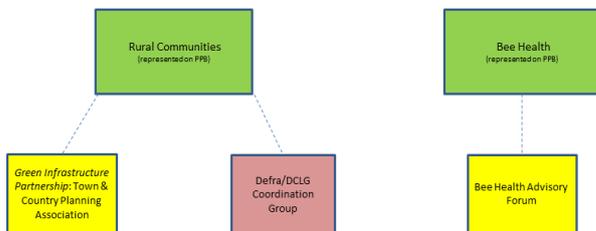
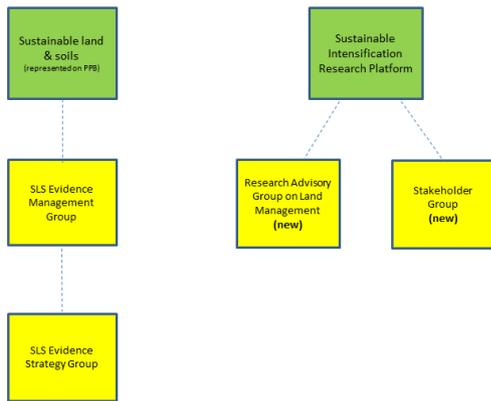
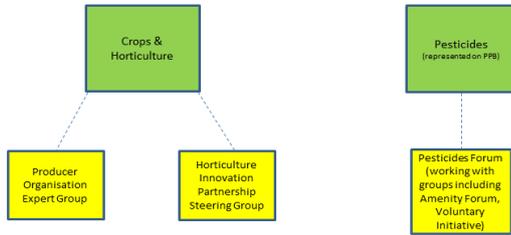
- 1) More, bigger, better, joined-up, diverse and high-quality flower-rich natural or semi-natural habitats (including nesting places and shelter) supporting our pollinators on farmland and public land, in towns, cities and gardens, along transport networks and on land surrounding other infrastructure.

- 2) resilient healthy bees and other pollinators to support pollination services;
- 3) no further human-induced extinctions of known threatened pollinator species;
- 4) enhanced awareness across a wide ranges of businesses, other organisations and the public of the essential needs of pollinators and evidence of actions taken to support them.

**Cross-policy working**

The Strategy touches on many different policy areas. In order to facilitate communication and shared understanding between these different areas, many are represented on the Pollinator Programme Board. They include chemicals and emerging technologies, CAP, biodiversity, plant health, sustainable land and soils, rural communities and evidence. Each of these policy areas will in turn have their own networks and governance structures, through which different elements of the Strategy will be implemented. The organograms below represent the key groups who will be involved in the Government’s delivery, feeding information into the core NPS governance structure.





Document 040714-4

**Authorship: The National Bee Unit and the Non Native Species Secretariat.**  
**How to spot an Asian hornet**

The Asian hornet (*Vespa velutina*) is currently not a species that is present in the UK. The problem with the arrival of this hornet is not the danger it poses to people, its sting is likely to be no more dangerous than of our native hornet, but the threat it poses to honeybees and other beneficial insects. The Asian hornet is a specialist predator of bees, killing them and feeding them to its larvae. Our native hornet does not usually feed on bees.

Since its accidental introduction into France via an import from China the Asian Hornet has rapidly extended its geographical range. It is now widespread in France and is present and spreading in Spain, Portugal and Italy (and has been reported in Belgium). We now consider there to be a high risk that this non-native species will arrive in the UK, either on imported goods from continental Europe or even by cross-Channel flight.

Any suspected sightings should be reported by e-mail to [alertnonnative@ceh.ac.uk](mailto:alertnonnative@ceh.ac.uk). . These are the key features that allow you to distinguish between the Asian hornet and our native European Hornet, *Vespa crabro*:

- The Asian hornet is slightly smaller - queens measure up to 30mm long; workers up to 25mm. *Vespa crabro* queens measure from 25 to 35 mm, while workers measure from 18–24 mm;
- The Asian hornet has a dark brown or black velvety body (thorax);
- Crucially, the Asian hornet has just one yellow stripe on the 4<sup>th</sup> abdominal segment (*V. crabro* has a much more “striped” yellow abdomen);
- The lower sections of the Asian hornet’s legs are yellow – it is sometimes called the “yellow legged hornet”;
- For further ID details please see (<https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=208>). We have also produced an article on “mistaken identities” which covers other insects that may be confused with *V. velutina* (<https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=166>).

Do not under any circumstances disturb or provoke an active hornets’ nest.

*Images of Asian and European hornets*



Images should acknowledge Jean Haxaire, 2014 (AH) and Richard Ball (EH)

Here are images Asian and European hornets with scale reference



Picture of Asian  
Hornet With S...



Picture of  
European Hornet...

Here are schematics of the Asian and European hornet abdomen side by side



Schematic of  
Asian Hornet Ab...

Sketched courtesy of Fera, Crown Copyright

To Members of the Pollinator Advisory Steering Group from NFU representative  
07/07/14 13:00

### National Pollinator Strategy Stakeholder Meeting

Thanks for this [REDACTED] It's fantastic to see how engaged the public are in the issue of pollinators, and organisations like Friends of the Earth have to be congratulated for playing a significant part in raising awareness.

The challenge for us all now is to make sure this public engagement is based on a basic but sound understanding of evidence around pollinators (which is complex), and that this high level of public interest is channelled in a useful and responsible way.

It is concerning that even this YouGov article contains myths and factually incorrect information about pollinators, and it also highlights some public misunderstanding of what this issue is about...

- 'The continual decline in bee numbers...' – as the NPS status report states clearly, we unfortunately don't have the evidence to be able to state whether insect pollinators are currently in decline or not. As we know, there is some evidence of a slowing in biodiversity declines in the last 20 years, and for solitary bees this evidence shows there has been some increase in biodiversity during that time.
- 'Many believe a main cause of the decline is pesticides...' – this is different to the consensus of expert opinion, which is based on an expert understanding of all the evidence, and concludes that habitat alteration is the most important factor responsible for pollinator declines.
- '...Barack Obama has even outlined plans to create a new task force to investigate their [pesticides] effects on bees and other vital pollinators.' – this is a pretty clear example of journalistic sensationalism trying to ride on public opinion that most people think Obama is a good guy, so if he says it, it must be true. The interesting thing here is that while the Obama administration has created a task force to investigate, last time I looked they'd stopped short of placing restrictions on the use of neonicotinoids. So actually, I would guess that if the public knew all the facts, their opinion would be that the position of the Obama administration is actually weaker than the position of the EU – but journalists don't point that out. I guess because the popularity of the EU is not as high as Obama's.
- As [REDACTED] mentions, it's concerning that the article refers to 'Colony Collapse Disorder', when we all know that there is no CCD in the UK. I believe there are plenty of experts who even question the existence of CCD in the USA - as a unique and new phenomenon – not disputing there are a range of factors impacting on and causing significant problems pollinators.
- 'Scientists blame the virus-spreading varroa mite and one of the most widely used pesticides in the world, neonicotinoids, for Colony Collapse Disorder...' – as per above, this is quite an over-simplification/misunderstanding/misrepresentation of what 'scientists' think.
- 'Other, less orthodox causes have also been blamed: scientists in India claim that interference from mobile phone signals is disrupting bees' navigation senses, lowering the number of eggs laid by the queen bee.' – now we are getting even further away from the credible evidence base around this issue, but again the statement gets rubber-stamped with the authority of 'scientists'. This doesn't do science any favours at all, and is more likely to be a hindrance than a help in providing some genuine benefit for pollinators.

For us to have confidence that actions to help pollinators to survive and thrive are actually going to deliver benefits for pollinators, these actions have to be evidence-based.

We all have excellent avenues at our disposal to communicate with the public. As the core leadership group of stakeholders working to help deliver the National Pollinator Strategy – should we all be working to bust myths and make sure public understanding is built on factually-correct information?? From an NFU point of

view I would not see this as a problem, because ultimately our goal here is the long-term sustainability of pollinator populations, and not about meeting the expectations of popular public opinion.

Kind regards

██████ (NFU rep)

**To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Friends of the Earth representative**  
04/07/14 16:22

This YouGov poll shows that bee decline is now top of people's environmental concerns

<http://yougov.co.uk/news/2014/06/27/bees-dying-most-serious-environmental-issue/>

Headlines:

- British people consider the decline in bee numbers to be the most serious environmental issue (85%) – more than climate change (83%)
- Bees are the one endangered species most people would save – 57% (over red squirrels – 14%)

The write up confuses overall bee decline with colony collapse disorder, so it's not clear if that's what people were asked for their views on.

But even so.

██████ (Friends of the Earth representative)

**To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra official**  
04/07/14 16:16

Please find attached the agenda for our meeting on 11 July and papers 1a (ToR), 1b (governance), 2 (mock-up of worksheet) and 3 (Asian hornet guide).

Teleconference details: ██████████ then enter participant pass code ██████████ then #.

Please can you let me know if you can't make it or you will join by teleconference so I can arrange your security passes to be prepared.

Sorry about the size of the email which is because of the images.

██████ (Defra official)

**To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra official**  
30/06/14 12:11

Hi

The best time for everyone seems to be Friday 11 July between 2pm and 4pm. The meeting will be in Room 203 in Nobel House.

The agenda and any discussion papers will be sent to you at the end of the week.

I look forward to see you then.

██████ (Defra official)

To National Farmers Union representative from Defra Official  
08/07/14 15:56

**NPS Stakeholders: Call to action and pesticides**

██████ (NFU representative)

Thanks for your email which I've discussed with colleagues in pesticide policy. I can see that you feel strongly about the message in the simple action on pesticides and I hope that you find my comments helpful even though they may not fully address your concerns.

From our perspective, domestically, we have a long-standing policy of minimising pesticide use. We take "minimising" to be a flexible concept meaning using as little as the individual feels they can. It does not necessarily mean stopping the use of pesticides – or even using less.

In terms of SUD requirements, we are required to "ensure that the use of pesticides is minimised or prohibited in certain specific areas" (areas used by the general public or vulnerable groups; in the close vicinity of healthcare facilities; protected areas established under the WFD and the birds and habitats directives; areas recently treated with pesticides and used by or accessible to agricultural workers; on or along roads, railway lines, very permeable surfaces, or other infrastructure close to surface water or groundwater; or on sealed surfaces with a high risk of run-off into surface water or sewage systems). We have said to the Commission and others that despite the SUD limiting it to specific situations that this is something we promote amongst all users.

Our approach on minimising use is recognised by others such as the EU Endure Network which produced a country profile on the UK which states that 'the UK's National Action Plan builds on the experience gained from two previous pesticide strategies to reduce risk and minimise use...'

We feel that the simple action on pesticides is consistent with our policies in this area. In finalising this simple action and the pop up paragraph that sits behind it, we've taken on board some of your suggestions and also borrowed from the VI advice. The headline for this action on the Bees' Needs webpage will be state ' Minimise use of pesticides if you can' , followed by the long message starting 'think carefully.....' then the pop up paras:

Pop up paragraphs:

Gardeners, allotments and amenity managers

Minimise use of pesticides or use non-chemical alternatives where possible. In particular, avoid using pesticides on flowering plants or where pollinators are active or nesting.

You could protect your plants by removing pests by hand or building barriers around vulnerable plants, such as netting or cardboard barriers, or by companion planting such as marigolds to ward off aphids.

Farmers, growers and large-scale amenity managers

For a balanced approach to managing pests on a larger scale, you should increase use of Integrated Pest Management (IPM). You could also consider husbandry methods such as organic farming if they suit your business needs and circumstances.

IPM entails the use of a range of approaches to prevent or suppress harmful organisms. These may include: crop rotation; appropriate cultivation techniques; balanced fertilisation, liming and irrigation; hygiene measures; protecting beneficial organisms; and using resistant or tolerant cultivars and certified seed and planting material.

Good practice in relation to pest control includes the following actions:

- Monitor your crops regularly to identify any pest problems, and take action as necessary based on the results;
- Use pest thresholds, where possible, to determine the need for plant protection measures. Take action only when the thresholds have been exceeded;
- When measures are really needed use biological, physical and other non-chemical methods where possible;
- Where pesticides have to be used, choose products that are as specific as possible and have the least side effects. Plan to use as little as possible and only what you need.

For further advice on IPM go to:

Linking Environment and Farming (LEAF):

<http://www.leafuk.org/leaf/farmers/Inforesources.eb?deliver=1LOUBS3NC1.9NHA94VAL5CMI>

The Voluntary Initiative:

<http://www.voluntaryinitiative.org.uk/ipmp>

<http://www.voluntaryinitiative.org.uk/en/wildlife/advice>

The Agricultural and Horticultural Development Board and its operating divisions including:

<http://www.hgca.com/crop-management.aspx>

<http://www.hdc.org.uk/publications>

Organic farming limits the use of pesticides, encouraging the use of alternative non-chemical methods. These include rotation of crops, increasing genetic diversity, use of resistant crops and biological pest control.

For further advice on organic farming go to:

The Soil Association

<http://www.soilassociation.org/whatisorganic/organicfarming>

Organic Farmers and Growers

<http://www.organicfarmers.org.uk/about-organics/an-introduction-to-organic-farming/>

regards

■■■■■■■■■■ (Defra official)

**To Defra officials from National Farmers Union representative**

**30/06/14 16:31**

Hi ■■■■ (Defra official)

We've got a couple of comments, not surprisingly in respect of section 5 of the call to action regarding pesticides, and the first is a certainly a showstopper.

The NFU has worked with CRD and Government for some years on the basis that our key aim is to minimise the risks associated with pesticide use, not minimising use per se (because minimising use does not necessarily minimise risk). This principle forms the core basis of the UK National Action Plan for the

Sustainable Use of Pesticides. And yet, here we are, in a strategy about pollinators (not pesticides) with a proposal recommending an aim to minimise the use of pesticides.

I understand you are struggling to find a simple message – but this version is overly simplistic and goes against what we consider is a fairly core principle of the way we have worked to date with CRD and Government. As such the NFU cannot support or endorse the use of any wording referring to minimising pesticide use.

I understand some organisations think the NFU should butt out and not concern itself with messages to gardeners etc. However, we do not agree with the arguments that there is some kind of fundamental difference between pesticide use in gardens, allotments or by amenity managers and professional use in farming and growing businesses. Exactly the same principles apply. The principles regulating use are the same. Policy should still be evidence and risk-based rather than driven by overly-precautionary hazard-based ideology. If we compromise our principle approaches to pesticide use in the area of amateur products, then we compromise it across the board.

This seems like a retrograde step. We know some organisations are looking to the strategy to push an anti-pesticide agenda by recommending that members of the public do not use pesticides in their gardens. We made it clear some while ago that we believe it would be wholly inappropriate for the strategy to do this and gold-plate and go beyond the on-label, regulatory and best practice positions on pesticide use. This would contradict and undermine Government's position as the regulator. By all means we can encourage gardeners to consider whether use is necessary, whether alternative control methods could be used, and that if pesticides are used they should ensure they follow all the on-label instructions. However it would be a mistake for the strategy to recommend not using garden pesticides, which is in effect what the circulated proposal to 'minimise the use of pesticides' is saying.

Secondly, under the 'Farmers' section it talks about IPM as though it is an either/or strategy for farmers to adopt. It's not. All farmers need to adopt IPM approaches and it is not solely fixated on pesticide use – there are a diverse range of options (as listed lower down in the pop-up) – the aim should be to encourage farmers to increase their uptake of IPM approaches – it is not a case of being either in or out. Also we do not agree with the phrasing of the sentence that can effectively be read as saying 'For a balanced approach to managing pests on a larger scale, you should, **wherever possible**, follow .....alternative husbandry methods such as organic farming if they suit your business needs and circumstances'. 'Organic farming', the brand, is being presented as better for pollinators. Again the reality is not as simple as this. The evidence shows some aspects of organic, such as greater plant diversity, can give rise to greater pollinator diversity/abundance, but it also shows that 'intensive' organic production is on par with conventional farming regarding its pollinator credentials. So the answer here would be for conventional farming to provide a greater diversity of flowering plants, not for conventional farming to all turn organic.

Maybe say something like... 'For a balanced approach to managing pests on a larger scale, you should increase use of Integrated Pest Management (IPM) approaches. You could also consider alternative husbandry methods such as organic farming if they suit your business needs and circumstances' would be better.

Also we think the statement 'Avoid spraying 'just in case' (prophylactically)' looks like a statement parachuted in and is very open to interpretation. You could read it as saying 'avoid using all seed treatments', when in fact seed treatments involve better targeting and the use of a lower volume of active ingredients, which has to be compatible with a more sustainable approach to pesticide use? Also is it quite possible that seed treatments will be an important future delivery mechanism for biopesticides. Also when does the use of a threshold make a treatment not prophylactic? Within the same season, or between season's? If you suffered total crop loss as a result of a pest, every year for the last 10 years – would it be more sustainable to apply a 'prophylactic' pesticide 'just in case' or would it be more sustainable not plant the crop without effective crop protection? With the debates around neonicotinoids, this is an extremely

contentious area at present and we do not think this sentence can be included without significant contextualisation, which I suspect would go beyond your requirement for a simple pop-up explanation.

Sorry to present you with more work, but our genuine aim is to make the NPS and all its actions as robust and evidence-based as possible. We are not trying to turn it into a partisan political broadcast to promote particular ideological positions.

Kind regards

■■■■ (NFU representative)

**To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra Official**  
**26/06/14 16:40**

Hi

Please find attached an update on the call to action and information on an application for an emergency authorisation for a neonicotinoid.

Please could you also take a few moments to fill in the doodle poll for the next meeting – at the moment the afternoons of Friday 11<sup>th</sup> or Monday 14<sup>th</sup> are the preferred options.

<http://doodle.com/cuiguxtbn7cbfg>

#### Call to Action

I'm pleased to attach the near final draft of the five simple actions and associated 'pop-up' paragraphs for each action. Our aim with the 'pop-ups' is to provide a bit more detail on each action ready for the expected launch in July of the call to action. We've drafted these pop ups in consultation with the Pollinator Evidence Advisory Group.

As you're aware, when we publish the final strategy in October, we will also issue initial detailed advice for land managers (building on the simple actions).

I should point out that the simple action on pesticides is a little different to the one we discussed when we met on 4 June in the light of further discussions with policy colleagues and Ministers. In particular it seeks to be relevant for farmers as well as gardeners and amenity managers etc by advising that control methods should be suitable to your circumstances and asks all to minimise use of pesticides; and it recognises that barrier pest control methods are applicable to all growing situations (conventional and organic).

If you have any significant/showstopper comments on the attached draft, please send to ■■■■ by close 30 June (with apologies for short notice).

#### Pesticides

You will probably have seen media reports that the Government is considering "emergency authorisation" of a neonicotinoid seed treatment for use on oilseed rape.

Emergency authorisation is written into the EU pesticides law – Regulation 1107/2009. The Regulation allows Member States to authorise, “for a period not exceeding 120 days, the placing on the market of plant protection products, for limited and controlled use, where such a measure appears necessary because of a danger which cannot be contained by any other reasonable means.”

An application for the use of thiamethoxam on winter oilseed rape has been received and is being processed.

thanks

■■■■ (Defra official)

To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra Official  
15/07/14 13:47

#### Terms of Reference and Case Studies

Hi

#### Terms of Reference

At the meeting on Friday, we asked for comments on the terms of reference and governance documents sent out on 4 July. If you would like me to resend these documents let me know. Please could you let me have comments by **the end of the month** (via the national pollinator mailbox (copied in to this email)).

#### Case Studies

At the meeting I also asked for case studies which we could add to the Bees' Needs website. We are looking for interesting projects which will give the public and land managers ideas about how to take action to support pollinators and what benefits this could provide for them. For the case studies, we would like them to cover: an outline of the project, any challenges and how they were overcome, what was learnt and what benefits resulted from the project (both in terms of pollinators and any other related benefits). Could you also send this information through **by the end of the month**. The FoE community project in Leighton Buzzard has agreed to be one of our cases studies and I could send out this when we have a final version.

You may recall that [REDACTED] also asked for case studies for her journal during the meeting.

[REDACTED] (Defra official)

To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra Official  
18/07/14 09:46

**Meeting Minutes 11 July**

Dear all,

The day has arrived! Our 'Call to Action' has had a number of press mentions, and we started early with Lord de Mauley's interview on 'Farming Today'.

The website and animation are now live. Please note that if you have trouble viewing the animation and have Internet Explorer, you need to click on the compatibility view button on the address bar.

I also attach the minutes from the meeting last Friday.

Please be tweeting and promoting our pollinator 'Call to Action' today and over the weekend!

Best Wishes,

[Redacted] (Defra Official)  
Attachment – 180714

**Document 180714**

**National Pollinator Strategy – core stakeholder group**

**Summary note of meeting on 11 July 2014**

Papers circulated: (Papers 1a,1b, 2 and 3)

**Welcome and Introductions**

Attendees: [Redacted]  
[Redacted]  
[Redacted]  
[Redacted]

Apologies: [Redacted]

Purpose: to update stakeholders on the launch of the 'Call to Action' on the 18<sup>th</sup> July and request their support in raising awareness, for further information on the National Pollinator and Pollination Service Monitoring Scheme (NPPMS), to look to October including governance, awareness raising and the second phase of the 'Call to Action'.

Points made during discussion: included 1) a desire for stakeholders to be acknowledged on Bees' Needs website to show partnership approach; 2) agreement to help promote the 'Call to Action' from 18<sup>th</sup> July; 3) the importance of the NPPMS and understanding the status of pollinators and reasons for decline; 4) to involve stakeholders in the next stage of the 'Call to Action'; 5) agreement that awareness raising such as through pollinator signs and apps is an area that should be scoped out as we move towards publication and implementation of the Strategy.

### **Actions from 4 June Meeting (Paper 3)**

Update on actions from the previous meeting. The summary of responses is to include analysis by sector and will be published in October. The delivery plan for the NPS will be drafted over the recess. The 'Status and Value of Pollinators' report is to be placed in the Library of the House. [redacted] distributed the simple actions on 26<sup>th</sup> June and has shared the URL for the 'Call to Action' website. [redacted] [redacted] sent out a summary of work on pesticides on 26<sup>th</sup> June. [redacted] circulated the membership of the Pollinator Programme Board and updated the governance structure to include the Bee Health Advisory Forum. An information note on the Asian hornet was circulated with the agenda (paper 3, authorship the National Bee Unit and the Non Native Species Secretariat).

Actions: Statement of collective intent to be covered at the next meeting.

### **Call to Action, plans for launch and roles**

Due to a delay in the publication of the Strategy (with the inquiry of the Environmental Audit Committee), the 'Call to Action' has been decoupled from the NPS. Launch of 'Bees' Needs: Food and a Home' on 18<sup>th</sup> July in speech by Lord de Mauley at the grasslands conference 'Reversing the Trend'. Defra press office working to promote through press notice; social, digital and print media; and radio. Due to government restrictions on setting up websites, a partnership approach is being taken and The Wildlife Trusts is hosting the 'Bees' Needs' website and accompanying animation. The website includes links to other websites such as LEAF and the Voluntary Initiative.

Points made during discussion. 1) Details need to be addressed on the website: it was pointed out that the subtitle 'Consider hibernation' did not make sense. Also the wording was too energy-focussed e.g. pollen provides protein. 2) General appetite expressed to demonstrate partnership approach on the website through inclusion of stakeholder logos. Academic partners to be referenced through text i.e. 'Academic partners include...' 3) The group agreed to re-tweet message of 'Call to Action' on the 18<sup>th</sup> and make supportive statements.

Actions: [redacted] to tweak website and send out link to final version.  
[redacted] to send press release to stakeholder on the day before launch.

### **Strategy update**

The Strategy is currently being tweaked and re-written. Defra is developing ideas for workshops on the themes of the new CAP and urban pollinators. Also on Integrated Pest Management, although there may be a need to consolidate recent research here before initiating workshops.

Points made during discussion: 1) Stakeholders agreed that CFE is already delivering on workshops for farmers, but there is currently insufficient follow up. 2) [redacted] [redacted] explained that her Conservation journal has scope for an issue which explores what works for pollinators. She is looking for potential case studies. 3) [redacted] [redacted] has data on looking at the impact of training on farming. She said that she is happy to pull this together in a portfolio.

Actions: [redacted] to follow up with the Soil Association on the IPM proposals for the Strategy.

### **Update on project to design and test a National Pollinator and Pollination service Monitoring Scheme (NPPMS)**

20 months design and test of the NPPMS. Addressing the questions of how pollinator status will change over time and how pollination services to agricultural and horticultural crops will change over time. CEH leading

the project working with Defra, Leeds University (lead on broader questions), Reading University (lead on pollination services), Open University and others. Looking for wider involvement. This year will develop methods; next year pilot a national pollinator monitoring scheme. Overarching aim for a scheme at the GB level. Provide Defra with a framework; a set of costed and appraised options, whereby budgets will inform what option to go forward with. A costed framework and summary report will be produced in December 2015, with an aim to have a scheme up-and-running in 2016. Desire for much future involvement of volunteers; important therefore to develop effective citizen science. Two workshops will be run on effective citizens scientists and pollination services.

Points made during discussion: 1) Concern raised by group that the NPPMS would address the issue of pollinator abundance, and how this links to service provision. 2) Importance stressed of finding an effective methodology. 2) The Womens' Institute expressed an interest in involvement in Citizen Science. 3) Need to address not just how pollinator status is changing but why.

Actions: [redacted] to consults Bee Farmers' Association along with farmers and agronomists e.g. through workshops.

[redacted] to include W.I. in workshops.

#### **Governance for implementation and future of this group (Papers 1a and 1b)**

By the launch of the Strategy Defra would like to have formed a clear governance structure to ensure effective implementation. This will include a stakeholder group, the Pollinator Advisory Steering Group.

Actions: [redacted] to send out e-mail requesting feedback on PASG terms of reference and governance paper.

#### **Progress with initial detailed advice ready for October (Paper 2)**

In October alongside the National Pollinator Strategy, Defra is launching the second phase of its 'Call to Action'. This will comprise of initial detailed advice tailored to different land managers from farmers to gardeners to park managers. The advice will also sit on the 'Bees' Needs' website.

Points made during discussion: 1) Stakeholders emphasised that they wanted to be involved in development of advice. 2) Point made that Defra should consider format of worksheet once clear on the audience. 3) The view was expressed that all of the worksheets should be uniform in their format.

Actions: [redacted] to consult stakeholders in 3<sup>rd</sup> week of August.

#### **Pesticides Update**

Syngenta has withdrawn its application for emergency authorisation of thiamethoxam (Cruiser OSR) on oilseed rape. They have explained that this decision was taken because they felt no longer able to guarantee timely delivery of treated seeds to growers.

Helpful comments from this group and from the Pollinators Expert Advisory Group on the field study protocol are being fed back to the companies (Bayer and Syngenta). CRD have issued experimental permits for this study.

#### **Progress with concordat and additional signatories**

Defra is contacting additional groups to sign up to the Strategy including in the horticultural industry (such as the HTA), planners/developers, as well as the British Retail Consortium. Defra is also in contact with groups to develop some case studies for the Bees' Needs website, for example in farming, utilities, educational

projects, city projects, brownfield sites or new developments. Any suggestions from stakeholders for cast studies would be most welcome.

### **Raising Awareness**

Defra is exploring how awareness can be raised of pollinators, including pollinator signs and a pollinator app.

Points made during discussion: 1) The question was asked whether the NPS would have a logo. 2) The group responded positively to the idea of a sign, as a way of giving people permission to leave areas messy. Signs could be placed to be visible from motorways or railway lines. 3) The idea of a mapping app was also well received, although more in terms of telling a story of individual commitment, rather than leading to accurate, high-quality monitoring. Alternative suggestions were to archive tweets, use hashtags and feed into the Bees' Needs website. 4) All such ideas would need further scoping.

Actions: Defra to develop ideas of signs and apps in the move towards implementation.

### **AOB**

■■■■ informed that Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services (IPBES) will be specifically looking into the science of pollinators and pollination services, and reporting in January 2016.

Actions: Defra to send out final press release to stakeholders on the 17<sup>th</sup> July.

To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra Official  
22/07/14 14:16

#### Note on monitoring plan

Please find attached a note from [REDACTED] providing details of the project to design and test a National Pollinator and Pollination Monitoring Scheme (NPPMS) following on from her presentation at the meeting on 11 July.

I have created a new distribution list for the Stakeholder Group. If you would like me to an alternative contact in your organisation to those in the message header please let me know.

Thank you for all the tweets on Friday, we really appreciate your support.

[REDACTED] (Defra Official)  
Attachment – 220714

#### Document 220714

### Defra project WC1101: Design and Testing of a National Pollinator and Pollination Monitoring Scheme (NPPMS)

Pollination provides benefits to society by contributing to the production of many agricultural and horticultural crops, and to the maintenance of flower diversity in our natural environment. In Great Britain, many insect groups provide this pollination service, with bees and flies, such as hoverflies, playing the key roles. In recent years, substantial concern has been raised about the status and dynamics of insect pollinators and pollination services. Decision-makers in government and industry require scientific evidence to inform actions to help protect pollinators and manage the service they deliver; however, a major barrier to providing this is the limited data currently available to provide sufficiently sensitive and robust evidence. Consequently we have a limited understanding of the extent of changes in pollinator communities (especially population sizes of bee and fly species), and how these changes affect pollination services for British crops and wild flowers.

Our project aims to overcome data and knowledge barriers, by designing and testing a monitoring scheme to assess changes in the abundance, diversity and distribution of British pollinators and associated pollination services to crops. We will build on existing professional and volunteer survey activities to provide a coherent sampling framework with a fully tested and costed set of protocols. This will form the basis of a future National Pollinator and Pollination Monitoring Scheme (NPPMS). In developing the NPPMS we will address two related core questions:

- 1) How is the status of insect pollinator populations and communities changing over time in both agricultural landscapes and the wider environment?
- 2) How are pollination services in the cropped environment changing over time?

To answer these questions, our project will address five linked objectives:

- **Objective 1.** Semi-systematically **review existing schemes, datasets and methods** for measuring status and trends of British pollinators and pollination services to identify key strengths and limitations of each in terms of scientific robustness, statistical power, cost and appeal to volunteer recorders.
- **Objective 2.** Develop a variety of **robust and realistic survey methods**, specifically assessing their suitability for use by both professional and volunteer recorders.
- **Objective 3.** Identify appropriate **sample sizes and sampling locations** for methods selected from Objectives 1 and 2, to ensure that monitoring will be representative from regional to **GB scales** and capable of detecting changes of pollinators and pollination services in space and in time.



To Defra's National Pollinator Strategy group mailbox from Defra Official  
08/08/14 16:22

**Consultation on imports of bumble bees**

Please find attached a link to a Natural England consultation on imports of bumble bees. The draft National Pollinator Strategy refers to this NE review of its licensing arrangements for bumble bees.

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

You may wish to comment on the consultation.

 (Defra official)

**To Defra officials from NFU representative**  
09/09/14 13:48

**Bees' Needs Initial Detailed Advice**

Hi [REDACTED] (Defra official)  
Feedback attached.  
All the best  
[REDACTED] (NFU representative)  
Attachment – 090914

**To NFU representative from Defra official**  
05/09/14 11:50

Hi [REDACTED] (NFU representative)

Thank you for your observations, which we are taking into consideration.

We would really value your feedback on the agriculture sheet (attached)

I would be grateful for your comments asap but by next Wednesday 10<sup>th</sup>

Many thanks,  
[REDACTED] (Defra official)

**To Defra officials from NFU representative**  
05/09/14 11:33

Hi [REDACTED] (Defra official)

Apologies for not getting round to commenting on these papers before the deadline – for some security reason, my system will not allow me to access the link you set up to download the documents so I have not been able to view them. I have no doubt though that [REDACTED] is making very valid points below. From a crop pollination point of view, if we have pollination deficits that are having bottom-line impacts on growers businesses, while growers can look to increase populations of wild pollinators, the quickest way to combat the pollination deficit will be to use managed pollinators. This may also prove to be the best option for some insect-pollination-dependent annual crops, where production is not tied to a specific field for more than 1 year.

Thanks

[REDACTED] (NFU representative)

**To Defra official and BFA representative, from BBKA representative**  
01/09/14 18:57

Dear [REDACTED] (Defra official)



Please send any of your comments to this e-mail, or alternatively to:  
[pollinatorstrategy@defra.gsi.gov.uk](mailto:pollinatorstrategy@defra.gsi.gov.uk) by 2<sup>nd</sup> September.

Many thanks,

■■■■ (Defra official)

**To Members of the Pollinator Advisory Steering Group (including representative from National Farmers Union) from Defra Official**  
21/08/14 12:31

Dear members of the pollinator advisory group,

Please find attached a draft version of the tailored advice on managing land for pollinators, which we discussed at our July meeting. This has been produced with ■■■■ of the Food and Environment Research Agency.

It is evidence-based advice and covers the following areas: gardens, agricultural land, woodland, industrial areas, and transport corridors.

We will be launching the advice in the autumn on the Bees' Needs website, to coincide with the publication of the National Pollinator Strategy.

The core text is complete, but we have yet to add a number of photos and illustrative diagrams. Please let us know if you have anything suitable that we could use!

I would be grateful for your comments to this e-mail address by end of day **Tuesday 2<sup>nd</sup> September**. Please can you not share this any wider than your immediate team before publication on the Bees' Needs website.

Many thanks,

■■■■ (Defra official)



## Information sheet – Agriculture & horticulture

### Who is this information for?

Relevant for farmers, growers, landowners, estate managers and contractors

### Why are pollinators important?

Insect pollinators are important for agriculture, horticulture and food production, as well as maintaining biodiversity. Yield and quality of food produced by many crops worldwide is dependent on pollination by insects<sup>i</sup>. In the UK, the value of insect pollination has been estimated at several hundred million pounds<sup>ii</sup>. Insect pollination is also necessary for seed production by many wild plants.

Pollinating insects include not just honey bees, but also bumblebees, solitary bees, hoverflies, butterflies and moths. While honeybees have an important role in pollinating crops, they are not the most effective pollinators for certain crops and numbers are not sufficient to pollinate all crops, so healthy populations of wild pollinators are also needed to ensure high levels of crop pollination<sup>iii,iv,v</sup>. Since the 1950s, the distributions and diversity of some wild pollinator groups have changed in Britain, with certain species disappearing from large areas of the country<sup>vi</sup>. It is important to take action to maintain populations of insects pollinators into the future.

### What do pollinators need?

Different types of insects have different requirements. All of them feed on nectar as adults and many also feed on pollen. Bees also feed their larvae on pollen and nectar. Hoverflies vary in the food requirements of their larvae – some feed on crop pests, making these insects doubly useful.

In addition to their food requirements, pollinating insects need the right sort of habitat to complete their life cycle. Bees in particular need suitable places to make their nests, which may be below ground, in vegetation on the surface, or in holes in logs, plant stems, holes in walls etc.

### How important is farmland for pollinators?

Pollinators are important for agriculture, but agriculture is also important for pollinators. Farming is carried out on 71% of the UK land area<sup>vii</sup>, so the management of agricultural land is very important for maintaining pollinator populations. Crops provide food for pollinating insects, but only for a short period of time, so other food sources are needed to maintain them for the rest of the year. Nesting habitats in grassland, hedgebanks etc are also important for reproduction.

### What you can do

#### Growing flowers for pollinators

Societal demands for more food, safer food, more affordable and more reliable supplies of food have driven the agriculture to intensify production. Greater use of herbicides and artificial fertilisers to increase crop quality and yields, has decreased the abundance of wild flowers within crops and grasslands<sup>viii</sup>. Other pressures on land-use, such as urbanisation, have also resulted in the loss and fragmentation of habitats. Providing high density floral resources on a small area of land can help to offset the impact of these losses.

**Comment** [redacted] Two things I think should be made clear...

1) while there is a diverse range of pollinating insects out there, the reality is that the majority of pollination is done by honeybees, bumblebees, solitary bees and hoverflies. Relatively speaking the other groups do not make a substantial contribution.

As we heard at the Agriland day – we could get away with just a handful of species (less than 10) to do 95% of crop pollination.

2) Honeybees remain the main pollinator that we can quickly manage in high numbers to provide a pollination service in outdoor crops.

**Comment** [redacted] I would also quote Carvalho et al 2013 <http://onlinelibrary.wiley.com/doi/10.1111/ele.12121/abstract;jsessionid=A0CF9F75C4A463E79DE212D8C184FEEA.104t04> or only quote this paper. The Biesmeijer, J.C., et al. (2006) paper is the initial study identifying concerning declines – the Carvalho et al 2013 is the follow-up that is far more detailed and show when these declines and homogenisation occurred, and the fact they have slowed in the 20 years.

**Comment** [redacted] I've made this change because this could be read as saying it is important in future to maintain populations of the certain species that have disappeared in large parts of the country – which is not our aim.

**Comment** [redacted] My view would be not to mention butterflies, for the reason that relatively speaking they are not an important pollinator of agricultural crops. They certainly do not deserve a mention ahead of hoverflies.

There may already be areas of land on the farm, along tracksides and hedgerows, which have wildflowers present. These should be managed by cutting in autumn but not during the flowering season. Species-rich grasslands are now rare, but if they are present on the farm they should be recognised as a valuable habitat and managed to encourage the wildflowers. In particular, nitrogen fertiliser should be avoided as this stimulates competitive grasses which will soon exclude the wildflowers.

Floral resources can be enhanced by sowing flowers in small areas along the edges of fields or in field corners. These can increase the numbers of pollinators, such as bumblebees, in the landscape<sup>ix</sup>. Payments were available in England for establishing flower mixtures under Environmental Stewardship, but this is now closed and the new agri-environmental scheme does not open until 2015, with the first agreements starting in 2016. If you don't have an Environmental Stewardship agreement, you can still provide floral resources through voluntary management. Before putting measures in to help pollinators, it is strongly recommended to get advice to ensure the right measures are put in the right place and managed in the right way. Advice and support is available from the Campaign for the Farmed Environment, which gives details of several voluntary measures to benefit pollinators (<http://www.cfeonline.org.uk/campaign-themes/pollinators/>).

'Pollen and nectar' mixtures containing legumes (e.g. clovers) and other suitable plants can be particularly attractive to bumblebees<sup>9,x</sup>. Natural England recommend red clover, alsike clover, bird's-foot-trefoil, sainfoin, musk mallow, and common knapweed<sup>xi</sup>. Suitable mixtures can be obtained from several seed companies that specialise in mixtures for environmental purposes<sup>1</sup>. Once established, manage by cutting in September, ideally removing the cuttings to prevent smothering of the sward and to reduce fertility, which helps to maintain and enhance floral diversity. If possible, it is also beneficial to cut half the area in late June where red clover is dominant, to encourage fresh growth and new flowers. Where knapweeds are the main flowering species present, this should not be done as they don't respond so well to cutting. These mixtures often need replacing after around 3 years, as grasses come to dominate and the legume components decline<sup>xii</sup>.

An alternative approach is to sow longer term wild flower mixtures<sup>9,10</sup>. These are more expensive but, as they last longer, the cost evens out over time. They may not provide the same density of flowers as the 'pollen and nectar' mixtures, but they can provide it over the whole season if suitable species are included. They can be used in field margin strips or buffer strips along watercourses. Flower species recommended by Natural England include knapweed, bird's-foot trefoil, self-heal, oxeye daisy, yarrow, wild red clover and wild carrot<sup>11</sup>. Additional species with high nectar production per unit area include white dead-nettle, bugle, marjoram and field scabious. Inclusion of yellow rattle, which is parasitic on grasses, can help to reduce the vigour of the grass and make it less competitive with flowering herbs. If grasses are sown with the flowers, these should be fine leaved grasses such as red fescue, crested dogstail and common bent; avoid coarse grasses such as cocksfoot and timothy, which are competitive and will smother the flowering herbs.

On grassland farms, legume and herb-rich swards can be created and managed as temporary grassland by sowing the grasses with clovers, bird's-foot trefoil and herbs such as oxeye daisy, yarrow, forage burnet, and knapweed<sup>xiii</sup>. The swards can be

<sup>1</sup> Further information on companies <http://www.floralocale.org/British+and+Irish>

**Comment** [redacted] If you give examples, I would give a few at least.

**Comment** [redacted] Not necessarily the case, you may want to cut part of strip before flowering to knock-back flowering and hereby extend the period over which flower resources are available across the whole strip.

**Comment** [redacted] Cf comment above

#### Case study: Upton Estate Farm

Upton Estate sits on the Oxfordshire/Warwickshire border between Banbury and Stratford Upon Avon. It covers 2,000 acres and has a working farm. The Estate has recently dedicated a large acreage to the propagation of wildlife. Many of these habitats deliver specific gains for pollinators including: flower rich habitats, tussocky grass and legume mix. In addition, in the borders of the estate's woodland, 'scallops' have been cleared, providing patches of bare soil for butterflies moths and solitary bees. Two new species were recorded on the legume mix; the rare bumblebee *Bombus ruderatus* and the Marbled White butterfly.



managed by cutting or grazing, but management should allow flowering of the legumes and herbs to provide forage for the pollinators.

It is important to provide flowers early and late in the year as well as in midsummer. Early flowers provide food for bumblebee queens after they emerge from hibernation, when they need to build a nest and lay their eggs. They will also provide forage for early flying solitary bees. Hedgerow shrubs such as blackthorn, hawthorn and trees such as crab apple and willows are valuable sources of nectar and pollen at this time of year. Managing hedgerows on rotation to allow flowering can increase the amount of forage available. In late summer and autumn, bramble and ivy can be valuable sources in addition to late flowering herbs such as knapweed. These will provide forage for queen bumblebees preparing for hibernation.

#### **Providing nesting and hibernating sites for bees**

Bumblebees will nest in dense vegetation or underground, often in disused mouse holes. Tussocky grass banks in field margins or next to hedgerows can provide good nesting and hibernating habitat. Avoid 'over tidyness' in managing such habitats, and leave them uncut or cut in rotation so that some vegetation is left overwinter. Some solitary bees nest in hollow stems or in holes in wood. Leaving dead stems of bramble and dead tree branches etc. where possible can provide nest sites for these species. Other species use bare ground, e.g. sandy banks. Creating such areas, or leaving them undisturbed where they already exist, will benefit these species.

#### **Managing crops**

There is currently much controversy about the impacts of pesticides on pollinators, especially the systemic neonicotinoids<sup>xiv</sup>. Studies are ongoing to help us better understand the effects of pesticides on wild and managed pollinators, but as it stands the evidence base is unclear on this issue.

It is always important to think carefully before applying insecticides and spraying should be avoided at times of the day when bees and other insect pollinators are flying and active within crops. Wherever possible, the principles of integrated pest management should be applied. In particular, pests should be monitored, and the results should be used to decide whether and when to use insecticides. If application is unavoidable, consider alternative products if they provide satisfactory pest control, and use the least persistent and most specific product available.

Encouraging natural enemies of pest species e.g. by the presence of grass margins around fields, can help reduce the need for insecticide application<sup>xv</sup>.

#### **Conclusion**

It is vital that insect pollinator populations are healthy to ensure good pollination of crops to maximise crop yield and quality. By following the advice in this information sheet, you will be doing your bit to help maintain numbers of pollinators in the countryside, thus ensuring a sustainable insect pollination for agriculture and horticulture into the future.

**Comment** [redacted] I would cite someone less contentious than Dave Goulson.

The obvious and more current choice would be the Oxford Martin School restatement of evidence <http://rspb.royalsocietypublishing.org/content/281/1786/20140558>.

**Comment** [redacted] This is summarising what Annex III of Directive 2009/128/EC says

**Comment** [redacted] I have deleted this because 'prophylactic' is a contentious term, much used and demonised by the environmental NGOs. But there is no common agreement of what it means.

If you define it as an NGO would – it would mean you can only use insecticides in response to a pest threshold currently being exceeded. It does not account for risk and history of pest pressure at site. Such a definition would prevent the use of an entire technology – seed treatment.

It's a bit like saying don't take a prophylactic anti-malarial treatment if you are travelling to an area where you know malaria is present. Wait til you get here, and do some monitoring to see if it's necessary on this occasion.

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## References

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- <sup>ii</sup> Smith, P.E. *et al.* (2011) Regulating Services. *UK National Ecosystem Assessment Technical Report*. UNEP-WCMC Cambridge, pp. 535-597.
- <sup>iii</sup> Garibaldi, L.A. *et al.* (2013). Wild pollinators enhance fruit set of crops regardless of honeybee abundance. *Science* **339**, 1608-1611.
- <sup>iv</sup> Breeze, T. *et al.* (2011). Pollination services in the UK: how important are honeybees? *Agriculture, ecosystems and environment* **142**, 137-143
- <sup>v</sup> Garratt *et al.* (2014). The identity of crop pollinators helps target conservation for improved ecosystem services. *Biological Conservation* **169**, 128-135.
- <sup>vi</sup> Biesmejer, J.C., *et al.* (2006). Parallel declines in pollinators and insect-pollinated plants in Britain and the Netherlands. *Science*, **313**, 351-354.
- <sup>vii</sup> Defra, DARDNI, Welsh Assembly Government, the Scottish Government (2013) Agriculture in the United Kingdom.
- <sup>viii</sup> Carvell, C. *et al.* (2006). Declines in forage availability for bumblebees at a national scale. *Biological Conservation* **132**, 481-489.
- <sup>ix</sup> Pywell, R.F. *et al.* (2006). Effectiveness of new agri-environment schemes in providing foraging resources for bumblebees in intensively farmed landscapes. *Biological Conservation* **129**, 192-206.
- <sup>x</sup> Carvell, C. *et al.* (2007). Comparing the efficacy of agri-environment schemes to enhance bumble bee abundance and diversity on arable field margins. *Journal of Applied Ecology* **44**, 29-40.
- <sup>xi</sup> Natural England (2013). Entry Level Stewardship Handbook, 4<sup>th</sup> edition.
- <sup>xii</sup> Gardiner, T. *et al.* (2008). Establishment of clover-rich field margins as a forage resource for bumblebees *Bombus* spp. on Romney Marsh, Kent, England. *Conservation Evidence* **5**, 51-57.
- <sup>xiii</sup> Woodcock, B.A. *et al.* (2014). Enhancing floral resources for pollinators in productive agricultural grasslands. *Biological Conservation* **171**, 44-51
- <sup>xiv</sup> Goulson, D. (2013). An overview of the environmental risks posed by neonicotinoid insecticides. *Journal of Applied Ecology* **50**, 977-987.
- <sup>xv</sup> Holland, J.M. *et al.* (2012). Agri-environment scheme enhancing ecosystem services: a demonstration of improved biological control in cereal crops. *Agriculture, Ecosystems and Environment* **155**, 147-152.