



Comments on January 16, 2016 Draft – Ontario’s Pollinator Health Action Plan

SUMMARY OF RECOMMENDATIONS

The Province should:

1. Make an explicit commitment to agricultural biodiversity and develop policies and programs to support a shift from industrial farming practices to agricultural biodiversity both within farms and across farming regions.
2. Support biodiversity not only at the edge of farm fields but within farms themselves. Environmental Farm Plans should use the biodiverse farm as an organizing framework. Environmental Farm Plans should include the restoration of pollinator forage and habitat as an explicit part of those plans.
3. Ensure that the creation of buffer strips or hedgerows on farms does not make them potential “kill zones” due to pesticide exposures rather than a safe harbour for pollinators. Incentivize the creation of pesticide-free pollinator habitat.
4. Require the 70% of municipalities which have not yet mapped their natural heritage systems to do so by 2018, require municipalities to develop policies to protect these systems, and also require them to explicitly include pollinator health as part of this process.
5. Commit financial and regulatory support to establish Greenway corridors that connect natural heritage systems from municipality to municipality; the use of pesticides should be prohibited in these corridors.
6. Not just “consider”, but commit to review OPS policies and programs to enhance pollinator health/habitat; similarly, it should commit to increasing pollinator habitat on MTO lands.
7. Ensure that any “strategic partnerships” invited to work on pollinator habitats across the province include organizations which are very knowledgeable about pollinators, pollinator habitat and biodiversity, such as beekeepers’ associations, university researchers, and conservation organizations; we would also urge the inclusion of representatives of the National Farmers Union and the Ecological Farming Association of Ontario, who have demonstrated considerable knowledge and concern about pollinators.

SUMMARY OF RECOMMENDATIONS CONTINUED

The Province should:

8. Work to define wild pollinator habitat; assess land cover data to identify and map probable pollinator habitat and develop options for an aspirational habitat target to measure and report progress, as the draft Action Plan suggests. “Aspirational” targets should give way to more concrete and specific targets as the government gains a clearer picture of pollinator habitat or the lack of it in the province. This work should be overseen by an Ontario Pollinator Health Advisory Group.
9. Commit to substantially increasing financial resources so that IPM training can be offered to farmers and to beekeepers at a lower cost.
10. Regulate the use of neonicotinoids in **all** crops and horticultural products with the aim of eliminating them from use in Ontario within the next two to three years.
11. Ensure that no new systemic pesticides be approved for use in this jurisdiction.
12. Investigate the array of pesticides used in the province, their concentrations in the environment, and the exposure of pollinators to them.
13. Collect and regularly review all available international reports about the impacts of individual pesticides on pollinators and on additive and synergistic effects of multiple products. The Province should use these reviews to identify individual pesticides and combinations that are especially problematic, with a view to phasing out the use of these products over a short timescale perhaps using a similar process to the one recently established for corn and soybean growers who wish to continue using neonicotinoids.
14. Restrict the sale of pesticide products intended for cosmetic use. Consumers who wish to use pesticides on their lawns and gardens should have to apply for a permit first and demonstrate that they have tried IPM methods to tackle pest problems.
15. Investigate and implement ways to provide beekeepers with information about the application of pesticides near their apiaries.
16. Provide much more financial and logistical support to improve access to and participation in technical training for beekeepers across the province.
17. Support the development and promotion of Best Management Practices and Integrated Pest Management strategies appropriate for beekeepers with different needs (e.g. large-scale commercial beekeepers, hobbyists, novices, etc.).
18. Explore alternative treatments to existing acaricides and antibiotics used to treat mites and diseases in hives.
19. Incorporate pollinator health explicitly in the forthcoming Ontario Climate Change Action Plan and consult beekeepers and conservationists about specific initiatives to include in the plan.
20. Conduct climate change vulnerability assessments for select wild pollinator species.
21. Provide significant new funds for research related to pollinator health.
22. Conduct robust monitoring programs to track and measure results from the Action Plan.

About the Urban Toronto Beekeepers Association

The Urban Toronto Beekeepers Association brings together several hundred beekeepers who live in the Toronto area. Some of us are hobbyists and others have commercial beekeeping operations, selling honey and other products of the hive. Many of us keep bees in the city, but a number of our members also keep bees in rural areas. Some of us farm at least part-time.

Comments on the Vision, Strategic Outcomes and Goals Described in the Pollinator Health Action Plan

The Urban Toronto Beekeepers' Association supports the vision, strategic outcomes and goals outlined in Ontario's draft Pollinator Action Plan. Like the Province, we understand that pollinators are vital components of our ecosystems and are essential to maintaining a sustainable agriculture sector and food supply in Ontario. We too want to see abundant and healthy pollinator habitats; plentiful wild pollination in natural ecosystems and planted crops; a thriving honeybee sector; reduction in acute poisonings and overwinter colony losses; improved genetics for honeybees; reduced pesticide exposure; and increased resilience for pollinators faced with unavoidable climate change and associated extreme weather.

Laudable as they are, however, these goals remain vague and unquantifiable. What does it mean to create "resilient, abundant and diverse populations of pollinators"? How many wild pollinator species exist in the Province and how many of these are under threat? What efforts have been made to determine the current state of pollinator health in Ontario so as to have a baseline from which to create measureable goals for improvements? What would constitute "adequate habitat" to support vibrant populations of pollinators and what would these habitats look like? What is the current level of pesticide exposure to wild as well as managed pollinators and what reduced level would be acceptable? How would agriculture have to change in the Province (and major changes are essential) if the pollinator decline is to be reversed? These questions and others are not addressed in the report.

Despite the lack of concrete information in the Plan, there is no doubt that the threat to pollinators is real. Many prominent Canadian and international researchers have documented the serious worldwide decline in both wild and managed pollinators and the reasons for it, most especially the industrialized system of agriculture and the concomitant use of pesticides (e.g. Chagnon 2008; van der Sluijs, Amaral-Rogers, Belzunces et al 2014). Yet there is little

reference to this literature in the draft Action Plan and essentially no analysis of the drivers. As a result, the actions proposed by the plan consist mainly in feel-good awareness-raising, rather than incentives or regulatory requirements that could drive positive changes. All too many of the proposed actions are prefaced with weasel words or phrases such as: “explore”, “consider”, “investigate options”, “work with” and “facilitate”. We hope that the final action plan will contain much stronger and more specific language and commitments.

Another concern is that the Province proposes to work on aspects of the Action Plan with some organizations that are beholden to or captured by multi-national corporations less interested in enhancing pollinator health than in forestalling government policies they perceive to be contrary to their interests.

GENERAL COMMENTS ON REDUCED HABITAT AND POOR NUTRITION

The draft Action Plan correctly identifies intensive farming and conversion of land to urban and industrial use as major causes in the disappearance, degradation and fragmentation of pollinator habitats. A more in-depth analysis would have been welcome and may have led to stronger proposals for action.

Current agro-industrial practices, especially in the production of commodity crops such as corn, soybeans, wheat and canola, are particularly problematic for pollinators (Kremen, Williams & Thorp 2002; European Academies Science Advisory Council 2015). Monocultural production of these crops on 70-75% of Ontario's farmland creates a massive agricultural desert for pollinators. Even the minority of commodity crops that provide some forage for pollinators do so for only a few short weeks, and because they dominate the landscape, leave pollinators without alternative sources of nutrition for most of the year. Hedgerows and semi-natural sites can provide diverse forage for many kinds of pollinators and nesting sites for ground-dwelling species. Canadian studies show that the existence of hedgerows increases plant diversity in agricultural landscapes (Boutin et al 2002), and also that natural and semi-natural habitat is a key predictor of the abundance of native bees (James 2011). Unfortunately, as Ontario farming has come to be dominated by commodity crop production and corporate ownership of farms has expanded (National Farmers Union 2011), hedgerows and semi-natural sites continue to be eliminated. “Border-to-border” cropping is now commonplace. Voluntary programs such as Environmental Farm Plans and educational resources on the value of these sites for pollinators do not appear to make much difference in the overall level of destruction of these pollinator habitats. Even where semi-natural sites remain in the rural

landscape, there is concern about pesticide and herbicide contamination of the plants, soils and water found in them.

Monocultures are also a problem in urban, suburban, commercial and industrial landscapes where lawns are the dominant green feature on the land that remains unpaved. This is gradually changing, especially in older towns and cities where many homeowners are replacing their lawns with gardens that flower from spring to fall. Many municipalities have also begun to create more parks and butterfly gardens, and to use more native plant varieties in ornamental plantings. However, fragmentation of natural and semi-natural habitats where pollinators could live and forage, removal of flowering “weeds”, soil compaction and other factors common to urban landscapes remain problematic for pollinators.

GENERAL COMMENTS ON EXPOSURE TO PESTICIDES

Poor nutrition is not just a problem of habitat destruction and fragmentation. Farming monocultures are very susceptible to insect pests, which leads to the almost ubiquitous use of insecticides that kill not only target pests but also poison beneficial insects such as pollinators. Neonicotinoids are certainly of great concern, but are not the only pesticides that are toxic to bees. The Purdue Department of Entomology lists almost 100 pesticides in use today that are acutely toxic to bees and another 50 that are moderately toxic (Purdue Extension n.d.). Most of the listed pesticides are permitted for use in Canada. A recent risk assessment of international data on honeybee and bumblebee exposures to pesticides identified 161 different insecticides, herbicides, fungicides and acaricides (to combat mites) that have been found in bee hives, along with 124 in pollen, 95 in wax and 77 in honey or nectar (Sanchez-Bayo & Goka 2014). While neonicotinoids were the most commonly found toxins, mixed exposures to many other pesticides were common. The authors argue that the synergistic and additive impacts on bees exposed to multiple pesticides are underestimated. Given the widespread use of neonicotinoids in corn and soybean production it is appropriate that the province has developed regulations to reduce these uses, but it is clear that many other pesticides individually and in combination can harm pollinators and these should not be ignored by Ontario regulators.

Monocultural crop production also involves an ongoing battle to eliminate weeds. On agricultural lands, the introduction of genetically modified commodity crops resistant to glyphosate herbicide (Roundup) kills off flowering

weeds that could provide forage for wild and managed pollinators. Glyphosate herbicides are so widely used that a recent study found that the compounds and their metabolites have contaminated almost 40% of water and sediment samples from 38 U.S. states, and that levels of contamination are rising (Battaglin et al 2014). We fully expect that a similar situation exists in Ontario. Recent studies have linked field-realistic glyphosate exposures to impaired learning in honeybees (Sol Balbuena et al 2015), demonstrating another way in which current forms of industrial agriculture can harm pollinators.

Although the cosmetic use of many insecticides and herbicides on lawns and gardens is restricted in Ontario, the continued high turnover of these products in hardware and big box stores all over the province suggests that this regulation is ignored by pesticide companies, retailers and consumers alike and that the use of these products persists in urban environments as well as rural ones. Moreover, neonicotinoid treatments continue to be widely used on seeds, bulbs and foliage of flowering plants and shrubs sold for home gardens in the province. Some of these plants are marketed as “pollinator friendly”. Because of more continuous availability of flowering plants, urban environments are thought to be healthier places for many pollinators in the province, but these are still far from ideal habitats.

There is mounting evidence about the impacts of multiple insecticide, herbicide and fungicide exposures for pollinators and ecosystems and growing concern about how pesticides get approved for use. The provinces depend on the federal Pest Management Regulatory Agency to screen and register pesticides that may be sold and used in the country. Although the PMRA provides the initial approvals, the Provinces may prohibit the sale of some of these pesticides or put more restrictions on their use, as Ontario has done with respect to neonicotinoids. In practise, however, Ontario and most of the other provinces adopt the recommendations of the PMRA and allow the use of most of the pesticides registered by the Agency.

In the fall of 2015, the federal Commissioner of the Environment and Sustainable Development released an audit on the practices of the PMRA which demonstrated that the regulatory process that allows widespread use of these chemicals is seriously flawed. The mandate of the PMRA is to “prevent unacceptable risks to people and the environment from the use of pesticides”. However, as the audit found, the PMRA has given many pesticides conditional registrations allowing them to be sold and used even though required evidence on the safety and efficacy of the product had not been provided by the

registrant. At the time of the audit, 80 pesticides had a conditional registration, 29 of these for more than 5 years. Of the 29, 19 are neonicotinoids. Here's one example the audit provided:

In 2003, the Pest Management Regulatory Agency determined that studies of the chronic toxicity of clothianidin (a neonicotinoid) to honeybee hives were required by 2008 as a condition of registration. The Agency later identified the absence of these studies as a "critical data gap." More than a decade after granting the conditional registration, the Agency had still not confirmed its risk assessment. Despite this, the Agency continued to grant conditional registrations for clothianidin and other neonicotinoid products.

The PMRA is also unacceptably slow in re-evaluating older pesticides using updated information and current scientific standards. Many pesticides have been registered for use in Canada for decades without re-evaluation. The audit noted that of those pesticides that **had** been re-evaluated, 95% needed additional precautions to protect human health and the environment. One pesticide, chlorpyrifos – extremely toxic to honeybees as well as to mammals, birds, fish, and aquatic invertebrates – is still permitted for use on a number of crops, including: corn, filberts, lentils, oats, peppers, sugar beets, tobacco, peaches, and nectarines.

Even where the PMRA deemed the risks of individual registered pesticides as unacceptable, it failed to cancel their registrations promptly, allowing suppliers and pesticide applicators to use up their stocks first, in one case for more than 10 years.

The PMRA also fails to assess the cumulative effects of pesticide exposures on human health, though it is required to do so by the Pest Control Products Act of 2006. Cumulative exposure occurs when humans (or other organisms) are exposed to individual pesticides by multiple pathways (e.g. inhalation, ingestion and skin contact) or to multiple pesticides whose toxic action is similar. The PMRA still has no methodology for assessing cumulative exposure to humans, although the PMRA has registered 7,000 pesticides with more than 600 active ingredients for use in the country. And as the audit points out, the total use of herbicides, insecticides and fungicides has expanded rapidly in Canada since 2001, which increases the likelihood of pollinator (and human) exposure to multiple pesticides. Assessing the risk of cumulative exposure to multiple pesticides is very difficult. There are many ways in which an organism may be

exposed to a variety of insecticides, herbicides and fungicides and many potential mixed exposures. The synergistic or additive effects of these exposures are not often predictable. Consequently, governments should take a much more precautionary approach to the registration of substances which, after all, are intended to kill living organisms.

COMMENTS ON POTENTIAL ACTIONS SUGGESTED TO TACKLE THE PROBLEM OF REDUCED POLLINATOR HABITAT AND NUTRITION

The potential actions proposed in the draft Plan don't really address what is perhaps the central problem – namely the continuing destruction of habitat by industrial farms and farming practices. It is notable that although the draft Plan acknowledges that buffer strips and hedgerows can improve pollination services, there is no mention of these ideas in the draft's specific lists of potential new actions! Admittedly, industrial farming is not an easy problem to tackle, and would require taking on powerful lobbies and vested interests. **But if the Province is serious about developing a Pollinator Health Action Plan, it has to focus on supporting farming practices that would dramatically increase biodiversity and recreate healthy pollinator habitat in rural environments.**

The Province should make an explicit commitment to agricultural biodiversity and develop policies and programs to support a shift from industrial farming to practices that increase biodiversity both within farms and across farming regions. The urgent need for agricultural biodiversity is increasingly recognized by international bodies such as the European Union and the UN's Food and Agricultural Organization and is supported by the International Convention on Biological Diversity. It is also supported by the just-released assessment by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Greater biodiversity on farms is not only good for pollinators; it provides many other benefits, as outlined by a report from a workshop sponsored by the EU:

Benefits to agricultural productivity can include improved pollination, natural pest control, nutrient cycling, soil and water conservation and, as a consequence, a decreased demand for external inputs and the production of higher quality and value-added products as well as increased resilience and adaptive capacity of agricultural production systems against the disturbances or climate change.

Benefits to society as a whole include reduced environmental impacts, conservation of wild biodiversity, landscape aesthetics and mitigation of greenhouse gas emissions.

Experience and research have shown that agro-biodiversity can:

- Increase productivity, food security, and economic returns*
- Reduce the pressure of agriculture on fragile areas, forests and endangered species*
- Make farming systems more stable, robust, and sustainable*
- Contribute to sound pest and disease management*
- Conserve soil and increase natural soil fertility and health*
- Contribute to sustainable intensification*
- Diversify products and income opportunities*
- Reduce or spread risks to individuals and countries*
- Help maximize effective use of resources and the environment*
- Reduce dependency on external inputs*
- Improve human nutrition and provide sources of medicines and vitamins*
- Conserve ecosystems' structure and stability of species' diversity. (EU Business@Biodiversity n.d.)*

Without a strong commitment to agricultural biodiversity, pollinator habitats and pollinator health are unlikely to improve substantially. The Farmland Health Incentive Program, which provides financial support for farmers who plant cover crops, buffer strips and field windbreaks, or who retire fragile land, is a step in the right direction. **The Province should go further though, and support biodiversity not only at the edge of farm fields but within farms themselves. Environmental Farm Plans should use the biodiverse farm as an organizing framework. Environmental Farm Plans should include the restoration of pollinator forage and habitat as an explicit part of those plans.**

As the Ontario Beekeepers Association has argued, however, **the creation of buffer strips and windbreaks that are contaminated with an array of pesticides currently used in farming makes them potential “kill zones” rather than a safe harbour for pollinators.** The problem of sufficient pollinator forage and habitat cannot be separated from exposure to pesticides.

The draft Action Plan argues that the Province is already leading efforts to “restore, create, protect and promote pollinator habitat across Ontario”, citing the 2011 Ontario Biodiversity Strategy. However, the 2015 report on the State of Ontario’s Biodiversity demonstrates that, despite increased awareness of biodiversity issues across the province, little progress has been made in actually

safeguarding and expanding habitat for species at risk. The Biodiversity Strategy depends heavily on awareness/education and voluntary activities that so far do not appear to be bearing fruit. Linking pollinator health to this strategy does not necessarily bode well for bees and other pollinators unless the Province bolsters regulatory requirements and stronger financial incentives as a key element of the strategy.

The draft Action Plan also cites the work done to “strengthen planning policies around natural heritage protection” and to “promote development of robust, well-connected Natural Heritage Systems.” **A more concrete commitment would be to require the 70% of municipalities which have not yet mapped their natural heritage systems to do so by 2018, to require municipalities to develop policies to protect these systems (less than 50% have done so), and also require them to explicitly include pollinator health as part of this process.**

The Province also needs to commit financial and regulatory support to establish Greenway corridors that connect natural heritage systems from municipality to municipality. The use of pesticides should be prohibited in these corridors.

The Province should not just “consider” opportunities to review OPS policies and programs to enhance pollinator health/habitat, it should commit to doing so. Similarly, it should commit to increasing pollinator habitat on MTO lands by a specified percentage and with a target date. In addition to a specific commitment to plant and nurture pollinator friendly flowering trees and shrubs along MTO corridors, the Province should prohibit the use of pesticides and other chemicals toxic to pollinators in these zones.

One potential action in the draft plan is the proposal to establish and implement “strategic partnerships with different levels of government, agencies and industry” to enhance pollinator habitat across Ontario. We are concerned by how vague this wording is and would like to **ensure that organizations which are very knowledgeable about pollinators, pollinator habitat and biodiversity, such as beekeepers’ associations, university researchers investigating these issues, and conservation organizations are major players in such partnerships. If farmers’ organizations are included, we would urge that the Province involve representatives of the National Farmers Union and the Ecological Farming Association of Ontario, who have demonstrated knowledge and concern about pollinators.** We oppose the participation of pesticide companies and their agents.

We concur with the proposal to define wild pollinator habitat; assess land cover data to identify and map probably pollinator habitat and develop options for an aspirational habitat target to measure and report progress. However, an “aspirational” target for pollinator habitat should be joined within a year or two by more concrete and specific targets as the government gains a clearer picture of pollinator habitat or the lack of it in the province. Some of the work to assess and map pollinator habitat can be done by teams of knowledgeable researchers at Ontario universities if the Province commits adequate funds for the purpose. **This work should be overseen by an Ontario Pollinator Health Advisory Group** (rather than a more narrowly defined Ontario Bee Health Advisory Group).

The draft Action Plan also suggests a number of potential actions geared towards education and awareness including: a central pollinator webpage; inclusion of pollinator health education in landscape design and property management programs; launching a “Pollinator Week” and/or a “Pollinator Garden Challenge”; and so on. We do not object to these programs, but they should not be the central focus of an ambitious Pollinator Health Action Plan and should not take up the most of the funds allocated to the plan by the Province. As we know from obesity statistics in the province, education and awareness do not by themselves create change, certainly not on the scale that change is needed.

Similarly, guidance documents for large-scale land managers on creating pollinator habitat are welcome. However, there are many guidance documents currently available for praiseworthy activities such as buffer zones alongside streams and watercourses in rural landscapes, and green roofs and green parking lots in urban environments, but there is relatively little implementation of these projects without incentives and regulatory requirements in place.

COMMENTS ON THE POTENTIAL ACTIONS SUGGESTED TO TACKLE THE PROBLEM OF EXPOSURE TO PESTICIDES

This section of the draft Action Plan focuses on neonicotinoids, and on the regulation already enacted by the Province to control the use of these insecticides in corn and soybean production. Although the Plan also includes a paragraph about pesticides used by beekeepers to control mites and fungal infections, no mention is made of the toxic stew of other insecticides, herbicides and fungicides to which pollinators are exposed. This is a major shortcoming in the Plan and needs to be addressed.

The draft Plan also states that farmers have made significant contributions to support pollinator health. It is certainly true that some farmers are very concerned about ecosystem health in general and pollinator health in particular. However, the opposition of many organizations representing farmers and related agri-businesses to restrictions on the use of pesticides currently in use has been vociferous. It seems unlikely that these organizations and individuals would voluntarily change farming practices that incorporate large amounts of pesticides.

Nevertheless, the draft Plan again emphasises education and outreach activities as the main actions it proposes. We are not arguing against increased support by the Province for training on integrated pest management for growers and for beekeepers. There are good resources available for IPM training in both sectors. Certainly the OBA's Tech Transfer Program provides good training for beekeepers. **The Province should commit to substantially increasing financial resources so that IPM training can be offered to farmers and to beekeepers at a lower cost.**

However, at the risk of belabouring the point, smoking in workplaces, restaurants and public indoor spaces stopped when it was outlawed and also then decreased relatively rapidly in the population as a whole; drunk driving dramatically decreased when the police began enforcement campaigns and drunk drivers were charged. In order to avoid driving pollinators to extinction in the next few decades, the Province needs to enact regulations and enforce them. We recommend the following:

First, the Province should regulate the use of neonicotinoids in all crops and horticultural products with the aim of eliminating them from use in Ontario within the next two to three years.

Second, the Province should ensure that no new systemic pesticides be approved for use in this jurisdiction.

Third, the Province should investigate the array of pesticides used in Ontario, their concentrations in the environment, and the exposure of pollinators to them. This information should be made public, with regional and local breakdowns. Simultaneously, the Province should collect and review on a regular basis all available international reports about the impacts of individual pesticides on pollinators and on the additive and synergistic effects of multiple products on pollinators. The Province should use these reviews to identify individual

pesticides and combinations that are especially problematic, with a view to phasing out the use of these products over a short timescale, perhaps using a similar process as the one set up for corn and soybean growers who wish to use neonicotinoids.

Fourth, the Province should restrict the sale of pesticide products intended for cosmetic use. Consumers who wish to use pesticides on their lawns and gardens should have to apply for a permit first and demonstrate that they have tried IPM methods to tackle pest problems.

The draft Action Plan suggests an e-tool to alert pesticide applicators to nearby beehives for the purpose of reducing bee exposures. We are not optimistic that many farmers planning to apply pesticides would change their minds if they knew that hives were in the area or that they would routinely warn nearby beekeepers beforehand. However, **an e-tool that alerts beekeepers to the intentions of farmers or other large-scale landowners planning to apply pesticides in, say, a two-kilometre radius of their apiaries could be interesting.** Few beekeepers would be able to move their hives or otherwise protect their bees as a result of this knowledge. And the e-tool would do nothing to prevent harm to wild pollinators. However, beekeepers might be able to use the information to monitor the impacts on their hives of the nearby use of pesticides. Of course, pesticide applicators would then have to notify the e-tool managers about their plans, which is probably unrealistic.

What this potential action raises, however, is the **beekeeper's right-to-know about the use of pesticides near their apiaries.** In a previous comment on the Province's proposal to regulate neonicotinoids on corn and soybean production, we suggested that **the Province require farmers using neonicotinoids post this information in a publically visible location, such as on the roads near their farms.** We reiterate that recommendation. Given the recent studies linking glyphosate exposures to bee health problems, **we also recommend that the province require farmers using Round-up or other glyphosate formulations to post this information in a publically visible location for the information of beekeepers and other citizens.**

DISEASES, PESTS AND GENETICS

There is no doubt that viral, bacterial and fungal diseases as well as parasites plague managed pollinators and that some of these cross over into wild pollinators as well. It is worth pointing out, however, that like any organism,

pollinators that are well-nourished and not exposed to toxic compounds are much more able to fight off infections and deal with parasites. So while we agree that more can be done to protect pollinators from diseases and pests, the most important actions the province must take are to expand healthy habitat and reduce pesticide exposures.

It is notable that relatively little is said in the draft Action plan about diseases, pests and genetic issues for wild pollinators. This is an important omission. It is clear that the provincial government has all too little information on the status of wild pollinators in the province. This should be rectified.

COMMENTS ON THE POTENTIAL ACTIONS SUGGESTED TO TACKLE THE PROBLEM OF DISEASES AND PESTS, AND TO IMPROVE GENETICS TO MAKE MANAGED POLLINATORS LESS SUSCEPTIBLE

The draft Action Plan indirectly acknowledges that the OBA's Technology Transfer programs increase the adoption of best practices in managing infections and parasites in honeybee hives. These programs should serve as the basis for further development of best management practices (BMPs) and integrated pest management (IPM) for beekeepers. Similarly, the existing Ontario Resistant Honey Bee Selections Program establishes a base for genetic selection of bees resistant to mites. **Rather than reinventing these programs, the Province should provide much more financial and logistical support to continue improving training materials and other resources, as well as to expand the reach of these activities. Reducing the cost of participation in tech transfer activities for participants, and offering programs in more locations across the province will increase participation and improve beekeeping practices.**

There is some emphasis in the actions proposed in the draft Plan on "standardized Best Management Practices" for beekeepers. It is important to point out that beekeepers in the province range from novices and hobbyists with a few hives to commercial beekeepers with hundreds or even thousands of hives. Similarly, a growing number of beekeepers are committed to organic methods of managing their bees (though most cannot be certified organic because of pesticide use by farmers or householders in the vicinity of their hives). **While we support efforts to improve the content and the reach of BMPs for monitoring and treating bees for pests and diseases, one set of standardized BMPs will not serve this variety of practitioners well. Also, BMPs should recommend the use of pesticides and antibiotics as a very last choice for managing pests and diseases in the hive.**

It is interesting that the draft Action Plan suggests the possibility of mandatory training for registered beekeepers, though no mention is made of mandatory training for farmers with other kinds of livestock or who use an array of pesticides. If the Province invests in expanding and improving technical transfer programs for Ontario beekeepers, ensuring that they are available in different parts of the province and subsidizing the cost, then we expect that most beekeepers would be very happy to participate without being required to do so.

The idea of traceability requirements for moving colonies is impractical. Whenever a beekeeper splits their hives in spring – which happens more and more frequently as overwintering hive losses increase – he or she usually moves the new hives some distance from the initial apiary so that foraging bees don't drift back to their home hives. If beekeepers had to notify the government each time they moved a hive for this purpose, they would be hard pressed to get any other work done.

The UTBA has no problem with the proposal to require BMP training for beekeepers to qualify for funding assistance programs, as long as a suite of BMPs is available for organic beekeeping.

Given the problems identified in PMRA processes, we are sceptical about the value of working with the Agency to approve new Varroa treatments for bees. Similarly, we can't imagine coordinating Varroa management nationally with the National Bee Health Roundtable, which currently excludes the Ontario Beekeepers' Association from its leadership, yet includes pesticide companies and their lobbying partners.

CLIMATE CHANGE AND WEATHER

The draft Action Plan provides a good summary of the challenges that climate change and extreme weather pose for pollinators. Pollinators that are dependent on a single plant species that could be affected by weather-related changes in emergence and flowering are likely to be most susceptible to climate impacts. However, the extreme and unpredictable weather that increasingly accompanies climate change can negatively affect all pollinators. It is important for the province and the country as a whole to decrease greenhouse gas emissions as rapidly as possible to prevent these impacts.

Given that we have almost doubled greenhouse gases in the atmosphere already, the globe is committed to several more decades of greater warming

and weather turbulence. Bees and other pollinators are more likely to be resilient in the face of these changes if their general environment provides sufficient forage and doesn't poison them.

We concur with the recommendation that the forthcoming Ontario Climate Change Action Plan incorporate pollinator health into the plan. The Province should consult beekeepers and conservationists about specific initiatives to include in the plan.

We also agree with the proposal to conduct climate change vulnerability assessments for select wild pollinator species.

RESEARCH AND MONITORING

As the draft Action Plan notes, there are large gaps in our knowledge, especially about wild pollinators. The Plan talks about aligning and leveraging existing research programs and launching a "Call for Proposals" to fill knowledge gaps.

We would like to see significant new research funds made available for these programs. It is particularly important to give researchers independence from vested interests.

We agree with the intention of the government to conduct "robust monitoring programs to track and measure results from the Action Plan". All too often this kind of monitoring is missing. However, the absence of measurable goals in the current draft of the Plan will make it difficult to determine if actions taken are successful or not.

Respectfully submitted on behalf of the Urban Toronto Beekeepers' Association,

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REFERENCES

Battaglin WA, Meyer MT, Kuivila KM, and Dietze JE. (2014) Glyphosate and its degradation product AMPA occur frequently and widely in U.S. soils, surface water, groundwater, and precipitation. *Journal of the American Water Resources Association* 50: 275-290

Boutin C, Jobin B, Bélanger L, Choinière L (2002) Plant diversity in three types of hedgerows adjacent to cropfields. *Biodivers Conserv* 11: 1–25

Business@Biodiversity (n.d.) Agricultural Sector and Biodiversity Conservation: Best Practice Benchmarking. Outcome of a workshop by the European Union Business and Biodiversity Platform.

http://ec.europa.eu/environment/archives/business/assets/pdf/sectors/FINAL_Agriculture.pdf 35 pp

Chagnon M (2008) Causes and effects of the worldwide decline in pollinators and corrective measures. Canadian Wildlife Federation Quebec Regional Offices. 70 pp

Commissioner of the Environment and Sustainable Development (2015) Report 1: Pesticide Safety. Office of the Auditor General. http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201601_01_e_41015.html 35 pp

European Academies Science Advisory Council (2015) Ecosystem services, agriculture and neonicotinoids. EASAC Policy Report 26. April.

http://www.easac.eu/fileadmin/Reports/Easac_15_ES_web_complete_01.pdf 70 pp

Goulson D et al. (2008) Decline and conservation of bumble bees. *Annual Review of Entomology* 53: 191-208

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2016) Pollinators Vital to Our Food Supply Under Threat (Press Release).

<http://www.ipbes.net/article/press-release-pollinators-vital-our-food-supply-under-threat>

James J. (2011) Native bee diversity in conventional and organic hedgerows in Eastern Ontario. Library and Archives Canada.

<http://www.collectionscanada.gc.ca/obj/thesescanada/vol2/002/MR81701.PDF> 139 pp

Kremen C, Williams NM, and Thorp RW (2002) Crop pollination from native bees at risk from agricultural intensification. *PNAS* 99: 16812–16816

Krupke CH, Hunt G, and Foster RE (n.d.) Protecting honeybees from pesticides – E-53-W. Purdue Extension, Department of Entomology.

<https://extension.entm.purdue.edu/publications/E-53.pdf>

National Farmers Union (2011) Farms, farmers and agriculture in Ontario: An overview of the situation in 2011.

http://www.nfu.ca/sites/www.nfu.ca/files/farm_ontario.pdf 16 pp

Ontario Biodiversity Council (2011) State of Ontario's Biodiversity Summary.

http://sobr.ca/biosite/wp-content/uploads/SOBR-2015-Summary-Report_E.pdf

12 pp

Platform for Biodiversity Research, Food and Agriculture Organization (2014) Biodiversity for Food and Agriculture. Outcomes of an Expert Workshop held by FAO and the Platform on Agrobiodiversity Research from 14–16 April 2010, Rome, Italy 78 pp

Sanchez-Bayo F, Koichi G (2014) Pesticide residues and bees. PLOS ONE 9: e94482

Sol Balbuena M, Tison L, Hahn ML, Greggers U, Menzel R. and Farina WM (2015) Effects of sublethal doses of glyphosate on honeybee navigation. J Experimental Biology 218: 2799-2805

van der Sluijs & V. Amaral-Rogers & L. P. Belzunces et al (2014) Conclusions of the Worldwide Integrated Assessment on the risks of neonicotinoids and fipronil to biodiversity and ecosystem functioning. Environ Sci Pollut Res. pp 11356-014-3229-5