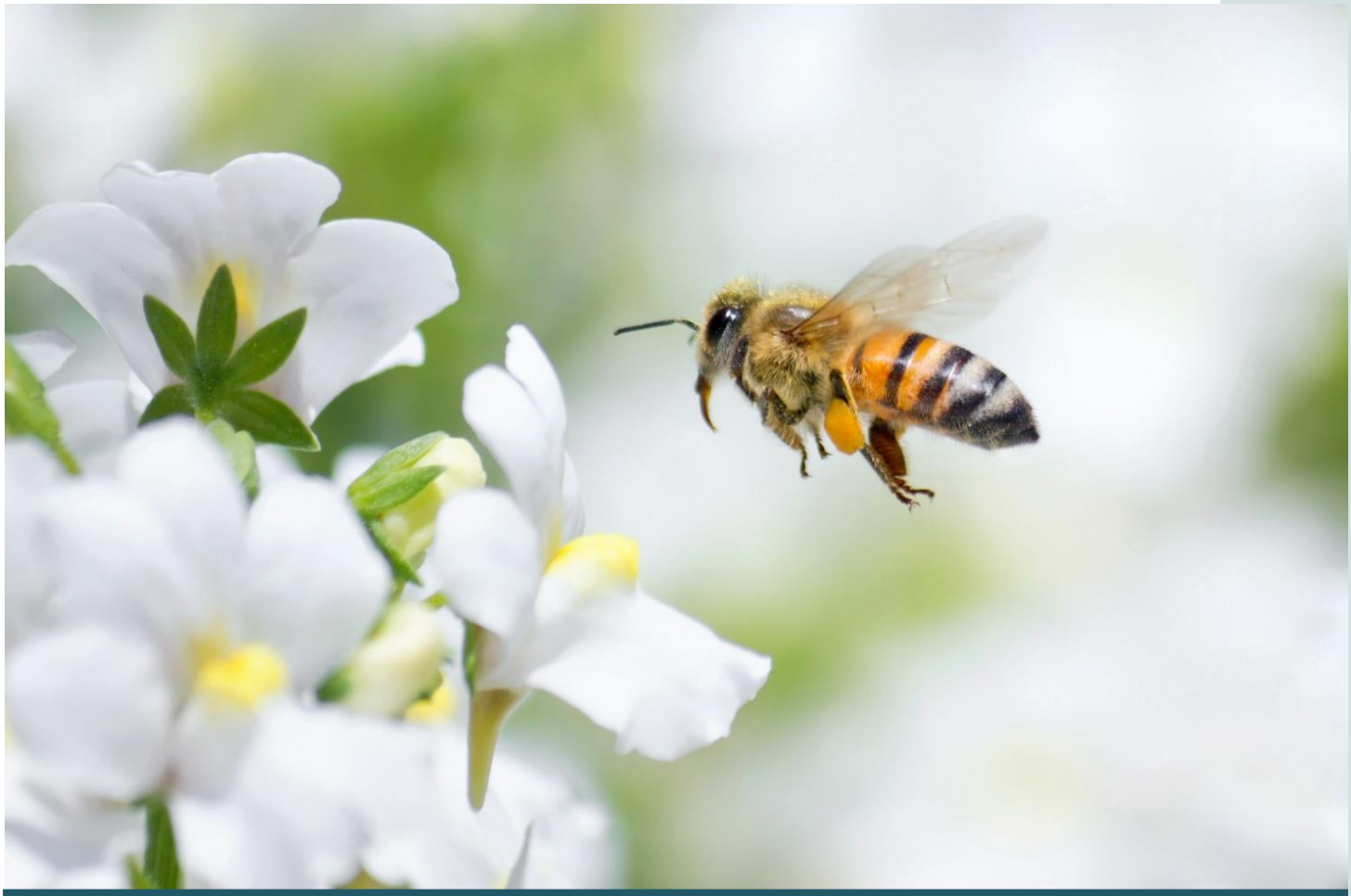

Maryland Managed Pollinator Protection Plan Stakeholder Summit Final Report

Submitted to the Maryland Department of Agriculture
by the Keystone Policy Center

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Executive Summary

Pollinator health is declining across the country, putting the nation's food supply — about one-third of which depends upon pollinators — at risk. Maryland is no different. At the President's request, the Environmental Protection Agency (EPA) has engaged state agencies in developing Managed Pollinator Protection Plans (MP3s or Plans) to mitigate risk to honey bees and other managed pollinators.

Hosted by the Maryland Department of Agriculture (MDA), University of Maryland (UMD), and the Keystone Policy Center (Keystone), the Maryland MP3 Summit (Summit) convened 70 stakeholders, including state agencies, beekeepers, growers, pesticide applicators, landowners, and land managers to discuss and identify opportunities to promote managed pollinator health in Maryland. The solutions generated during the January 20, 2016 Summit will provide a foundation as MDA drafts Maryland's MP3. The event also established a framework for future communication and collaboration among stakeholders.

This report summarizes the feedback received during the Summit, including breakout session feedback on the concerns, solutions/opportunities, and barriers related to improving pollinator health in Maryland. It also includes as appendices information from the meeting, including data from the breakout discussion sessions and an electronic polling session conducted at the end of the Summit.

As was the Summit, this report[1] is organized around three topics: agricultural and non-agricultural pest control; forage and nutrition; and pollinator pests, disease, and genetics. These topics were identified as top priorities for Summit discussion through surveys and stakeholder interviews that MDA, UMD, and Keystone conducted between September and December 2015. Within each category, Summit attendees discussed possible solutions that MDA should consider as it develops the MP3.

- **Agricultural and Non-Agricultural Pest Control:** In this category, participants most commonly discussed concerns about the impact of pesticide application (by homeowners, farmers, other landowners and land managers, and pesticide professionals) on honey bees, the need for additional research, ineffective labels, mosquito spraying, and overregulation. Participants focused on education and dissemination of best management practices and better communication among beekeepers, farmers, and pesticide applicators as the solutions that could best address these issues.
- **Forage and Nutrition:** In this category, participants most commonly cited as concerns the need for more forage availability, education and programs relating to forage, communication and coordination among state agencies, research and data on forage, and nutritious supplements, as well as a different culture that values meadows over neat lawns. To address these concerns, they suggested better educating the public, businesses, state agencies, and farmers on how to best use their land to promote pollinator habitat through dissemination of best practices, technical notes, and other resources. They also encouraged statewide education and programming to improve general knowledge and awareness of pollinator health issues.
- **Pollinator Pests, Disease, and Genetics:** Attendees most frequently identified Varroa mites, other pests and disease, and weak genetics as concerns in this category. They encouraged better education of beekeepers on treating for pests, as well as improved funding for miticides and state inspection to

[1] This report has been developed independently by the Keystone Policy Center.

better track and understand the impact of Varroa mites statewide. They also encouraged improving local queen raising and breeding and increasing research and funding on genetics.

Across all topic areas, stakeholder participants identified solutions related to education and communication/collaboration and challenges related to funding. Participants also expressed interest in remaining engaged with MDA's work on the MP3 and with one another.

MDA will review this report, share it with stakeholders, and consider the feedback contained within as it develops the MP3. Stakeholders will be asked to comment on a draft of the Plan, which is currently anticipated to be released in April 2016.

Background and Purpose of the Summit

Honey bees support more than $15 billion in U.S. agriculture annually. Along with other pollinators, they are critical in maintaining diverse ecosystems and are "responsible for one in every three bites of food" taken in this country.[2] Because of the recent decline in honey bee health and significant colony losses, pollinator health has become a high-profile, high-priority issue nationwide. In June 2014, President Obama issued a memo, *"Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators,"* and launched a federal effort to address pollinator health through research, expanded public education and outreach, increased and improved pollinator habitat, and public-private partnerships across all activities.

Among other pollinator health-related activities, the memo directed the EPA to engage state agencies in developing MP3s to mitigate risk to honey bees and other managed pollinators. The purpose of the Maryland MP3 Summit was to enable MDA, other state agencies, and key stakeholders — including beekeepers, growers, pesticide applicators, land managers, and landowners — to discuss and identify significant opportunities to promote managed pollinator health, particularly as it relates to sustainable food production. The Summit was designed to encourage participating stakeholders to focus on possible solutions across a range of topics — agricultural and non-agricultural pest control; forage and nutrition; and pollinator pests, disease, and genetics — to encourage creative thinking across all possible drivers of pollinator health decline. The solutions discussed during the Summit are intended to provide MDA with a foundation of actionable ideas as it drafts the Maryland MP3. The event was also designed to establish a framework for open communication and collaboration among stakeholders as MDA finalizes and implements that MP3.

[2] White House's Pollinator Health Task Force, "National Strategy to Promote the Health of Honey Bees and Other Pollinators," May 19, 2015.

Methodology

Jointly hosted by MDA, UMD, and Keystone,[3] the Maryland MP3 Summit was an all-day event held at UMD on January 20, 2016. Using input about concerns and solutions related to pollinator health from a September 2015 UMD survey of 146 beekeepers, along with input from 14 phone interviews that Keystone conducted with stakeholders in December 2015, the planning team designed a Summit focused on information sharing and collaborative, research-based, solution-focused discussions among diverse groups of attendees.

Summit attendance was by invitation only, and MDA endeavored to convene a diverse and balanced group of attendees representing beekeepers, crop producers, pesticide applicators, universities/extension, state agencies, nongovernmental/conservation organizations, land managers, and more. Approximately 70 stakeholders participated in the event.

The Summit began with a welcome and introduction from MDA staff and a review of the agenda and key meeting protocols from Keystone staff. The first morning presentation from MDA staff grounded participants in the background of the MP3 process and the EPA's guidance surrounding it. The second and third presentations provided a research- and data-driven foundation on the drivers of pollinator health decline and the relationship between pollinators and biodiversity. Attendees were given the opportunity to ask questions of all presenters.

Following the presentations, attendees participated in several hours of breakout sessions that were facilitated by 17 volunteer facilitators.[4] The breakout sessions were designed to encourage a series of conversations about pollinator health focused on concerns, solutions, and barriers (including ways to overcome those barriers) in three pre-assigned categories: agricultural and non-agricultural pest control; forage and nutrition; and pollinator pests, disease, and genetics. Attendees remained at the same table throughout the breakout sessions, while the volunteer facilitators rotated among three tables and remained focused on one topic. This setup allowed the facilitators to share ideas among the tables, facilitating conversations that both built on previous sessions and allowed space for each table of participants to brainstorm new ideas.

The breakout sessions encouraged the sharing of multiple perspectives, with an emphasis on realistic solutions likely to earn broad-based stakeholder support. The sessions were also intended to help all participants gain a better understanding of pollinator health. In addition to 45-minute sessions on the three

[3] The Keystone Policy Center, founded in 1975, is a nonprofit organization that drives actionable, shared solutions to sometimes contentious agricultural, environmental, energy, education, and public health issues. Keystone was contracted by MDA to prepare for, facilitate, and produce a report on the MP3 Summit between October 2015 and March 2016. The contract fell within a larger grant for the MP3 Summit that MDA received from the United States Department of Agriculture.

[4] Facilitators were volunteers from UMD, MDA, Keystone, and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service's Professional Development Center.

pre-assigned topics, the breakout sessions ended with a fourth 15-minute session designed to capture any other concerns or solutions not addressed during the first three breakout sessions.

Following the breakout sessions, the volunteer facilitators gave brief presentations to the plenary group on each topic, summarizing the concerns and solutions generated during the discussions they facilitated.

All stakeholder attendees then participated in an electronic polling activity, during which they answered 12 questions focused on their biggest concerns about pollinator health, the solutions that they believe could be most effective and feasible in the three topic areas discussed, the best tools for implementing those solutions, and how their perspective or knowledge on pollinator health changed over the course of the Summit. The polling activity enabled participants to see the anonymous feedback of all attendees in real time.

The Summit ended with a discussion of next steps and a final plenary comment and question and answer session.

Summit Discussions and Findings by Topic

The Summit began with a welcome from Keystone and MDA staff. MDA staff noted that beekeeping is strong in Maryland and expressed an interest in fostering partnerships and collaborations at the Summit. MDA staff then delivered a presentation that provided context for the development of an MP3, including EPA guidance and some discussion of MP3 development in other states. MDA staff noted that states were given flexibility to create plans that work for their constituents, employing regulatory mechanisms, voluntary mechanisms, or both. As defined by the State Federal Insecticide, Fungicide, and Rodenticide Act Issues Research and Evaluation Group's guidance, the critical elements of an MP3 are:

- A stakeholder participation process, including opportunities for input from a balanced cross-section
- A method for growers/applicators to know if there are managed pollinators near pesticide treatment
- Recommendations on how to minimize risk of pesticides to bees
- Public outreach
- A mechanism to measure the effectiveness of an MP3 and a process for periodic evaluation

MDA staff cited examples of MP3s and stakeholder participation processes from other states, but noted that the goal of the Summit was to get feedback from Maryland stakeholders about the key issues that need to be addressed in their state. MDA staff emphasized their interest in transparency both with the Summit and future MP3-related work; the goals of the Summit included fostering productive conversation, avoiding large whole-audience discussion in favor of more intimate and productive small-group discussions, and including the perspectives of multiple stakeholder groups. Staff emphasized that while all information gathered from the meeting will be considered in the development of the MP3, not everything can be implemented. Most importantly, the Summit was intended to inspire communication and collaboration that continues throughout the development of the MP3 and beyond.

During the Q&A session, attendees asked about funding, and MDA staff noted that they do have to operate within their budget, though there are creative ways to supplement the budget, including crowd-sourced funding and seeking help from volunteers.

Dr. Dennis vanEngelsdorp of UMD and the Bee Informed Partnership then presented on the drivers of pollinator health decline. Dr. vanEngelsdorp and his bee lab at UMD collect epidemiological data across the country to look at colony losses and explore the cause of those losses. He noted that when you ask beekeepers about the cause of the decline of pollinator health, they respond with different answers. He discussed a number of drivers of health decline: disease, starvation, nutrition, Varroa mites, pesticides (including neonicotinoids), and fungicides. Attendees then asked questions clarifying some of Dr. vanEngelsdorp's findings.

The final presenter, Sam Droege of the U.S. Geological Survey's Patuxent Wildlife Research Center, presented on the relationship between managed pollinators and native pollinators, addressing how an MP3 can benefit biodiversity.[5] Droege discussed how certain strategies can augment both managed and native pollinators, and emphasized the importance of framing the conversation about pollinators in a broader way to incorporate more than just honey bees. He highlighted five steps that can benefit both native bees and honey bees (and in turn biodiversity):

- Mow once a year in March
- Shift rights-of-way/roadsides from cool season grasses to forb-dominated native landscapes
- Plant meadows, not trees
- Replace landscapes; mow the edges of lawnscapes once a year
- Meet each year to share ideas and experiences

Attendees asked Droege a few clarifying questions at the conclusion of his presentation.

Following the presentations, the group transitioned to breakout sessions, during which they were asked to discuss concerns, solutions/opportunities, and barriers within three pre-assigned topics: agricultural and non-agricultural pest control; forage and nutrition; and pollinator pests, disease, and genetics. Each table for the breakout discussions held six to eight stakeholders with one or two volunteer facilitators/note-takers. Both the facilitators and the attendees were asked to take notes on their ideas on worksheets, and at the end of each breakout session, facilitators summarized their group's discussion on a flip chart.[6] Each table of stakeholders stayed together through the sessions, and the facilitators rotated among three tables, focusing on the same topic throughout. The first three breakout sessions, which focused on one of the three pre-assigned topics, were 45 minutes long (with an extra 15 minutes for one session that included a working lunch), and a fourth and final 15-minute session captured other ideas that were not discussed previously.

Agricultural and Non-Agricultural Pest Control

During the breakout discussions on agricultural and non-agricultural pest control, participants most commonly discussed the following concerns: the impact of pesticide application (by homeowners, farmers, other landowners, and pesticide professionals) on honey bees; the need for additional research; ineffective labels; mosquito spraying; and overregulation.

The Impact of Pesticide Application on Honey Bees

All of the stakeholder breakout groups[7] discussed solutions to address concern about the impact that pesticides applied by homeowners or pesticide companies have on honey bees — especially the impact of the improper use of pesticides (which can be exacerbated by certain kinds of pesticides or certain methods

[5] Presentations from MDA staff and Droege are available on the Maryland MP3 web page: http://mda.maryland.gov/plants-pests/Pages/pollinator_protection_plan.aspx. Because Dr. vanEngelsdorp's presentation contained unpublished data, it cannot be publicly posted.

[6] A copy of the breakout session worksheet provided to facilitators and attendees, the facilitators' high-level flip chart notes and worksheet notes, and attendees' notes are included in the appendices.

[7] Where *all* breakout groups discussed a certain concern, solution, or barrier, it has been noted in the report. Otherwise, this summary section reflects those ideas that were discussed by the plenary group or reflected in facilitator notes (though they may not have been addressed by all breakout groups). Ideas that were written by individuals on their worksheets but may not have been discussed by the full breakout discussion group are captured in the appendices.

of application). Again and again, stakeholders pointed to education and public awareness of the impact of pesticides on bees and the proper use of pesticides as solutions.

Participants talked about educating consumers about the relationship between pesticides and honey bees by disseminating information through master gardener groups or local beekeeping associations; at points of sale through nurseries or large stores like Home Depot and Lowe's; or by partnering with homeowners' associations to share educational materials. Pesticide applicators and other landowners could be targeted through industry and trade association meetings. These groups should also be educated on industry best practices and the newest technologies for pesticide application.

In all cases, education should include scientifically-based best management practices — for homeowners, farmers, other landowners, and pesticide applicators — that address inadvertent contamination of hives, the best time to spray, and the importance of following labels when treating for pests. For professionals, these best practices about pesticide application could be incorporated into their licensing and certification process.

In addition to encouraging landowners and pesticide applicators to apply pesticides properly, one of the goals of education would be to change the culture around how and when to use pesticides, and to encourage a shift back to integrated pest management (IPM). With IPM, landowners could be encouraged to consider solutions that are proactive rather than reactive. Stakeholder participants encouraged a practical re-definition of IPM to rework it for modern use and modern technology, and to emphasize flexible and simple guidelines for non-agricultural uses.

In addition to education and best management practices, stakeholders suggested strategies to better facilitate communication among beekeepers, farmers, and pesticide applicators: They supported a voluntary registration of hive locations to facilitate communication among these groups (e.g., through FieldWatch), possibly including a required or recommended 48-hour notice before application so that beekeepers have the chance to move or cover their bees. Stakeholders acknowledged that some beekeepers would likely be wary of listing their hives publicly, and that education to beekeepers about how to best protect their bees would also be important.

In addition to these more commonly discussed voluntary solutions, stakeholders suggested improved state monitoring and enforcement of compliance to labels, pesticide restrictions near apiaries, and restrictions on spraying at certain times. They also suggested that MDA consider prioritizing and first focusing on improving certain areas that have experienced more pesticide exposure than other areas.

Participants worried that consumer behavior would be hard to shift and that some large-scale pesticide application techniques, like aerial application on the Eastern Shore, would be more challenging to modify. Participants also acknowledged as barriers the fear of bees, the influence of the chemical industry, and public perception of commercial application. Some take it as a given that farms and lawns will be treated with pesticides because we have collectively grown to expect "perfect" crops and lawns. A cultural shift is needed, as well as a shift from discussions of control (which focus on pesticides as the only option) to management (which focuses on treating pest problems before pesticides are needed).

Need for Additional Research

Stakeholders called for additional research on the impact of pesticides and wondered if there are other stressors affecting bees that some beekeepers are attributing to pesticide use. Others called for more research on the synergistic effects of pesticides.

Ineffective Labels

Attendees noted that ineffective labeling of pesticides leads to misuse and overuse, as many labels bury useful information. This represents two significant opportunities: (1) homeowners (and other pesticide applicators) could be trained to better follow labels and identify exactly how the products are supposed to be used, and (2) the EPA should be encouraged to improve pollinator-related pesticide labels by simplifying them and making use of pictures. Some participants also recommended that chemical companies consider packaging changes to limit misuse and overuse, for instance by selling smaller containers.

Mosquito Spraying

Some breakout groups discussed the impact of mosquito spraying in particular, highlighting the importance of better educating consumers about treating for mosquitos — for instance, using a non-chemical solution like removing standing water. Like many of the opportunities discussed with respect to this topic, homeowner education was flagged as an important solution. Participants identified mosquito control professionals as presenting a barrier: The more times they spray, the more money they make, so there is not necessarily incentive for these professionals to adjust their strategies. Additionally, some attendees noted that many homeowners could be opposed to removing standing water from their yards, pointing out that removing standing water is not the only non-chemical solution to mosquito spraying.

Overregulation

A few stakeholders expressed concern about overregulation, noting that regulations like the cosmetic pesticide ban in Montgomery Country misunderstand the impact of pesticides, and illustrate the need for better, science-based training and discussion of pesticide-related issues.

Forage and Nutrition

During the forage and nutrition breakout sessions, attendees most commonly cited as concerns the need for: more forage availability; education and programs relating to forage; communication and coordination among state agencies; research and data on forage; more nutritious supplements; and a different culture that values meadows over neat lawns.

Forage Availability

All groups spent time during these breakout sessions discussing the lack of availability of forage, citing the need for both more forage in general and better diversity in forage options to counter the prevalence of monoculture. Stakeholders suggested a variety of solutions and opportunities to tease out land for forage across all land-owning categories:

- **Homeowners/the Public:** Stakeholders focused on opportunities to promote pollinator-friendly habitat in residential landscaping through outreach to garden clubs and homeowners' associations. Changes to homeowner association rules (e.g., eliminating penalties to homeowners for practices that are pro-pollinator but frowned upon at the community level, like maintaining more meadow than lawn) could significantly reduce barriers for interested homeowners.
- **Businesses/Utilities/State Agencies:** MDA could promote the planting of pollinator-friendly landscapes on land owned by businesses and state agencies. Utilities, in particular, have significant acreage available for pollinator-friendly meadows on their rights-of-way.

- **Farmers:** Farmers could be encouraged to promote pollinator habitat on non-production farmland. Attendees noted that crop producers would be willing to make changes to their practices if only they knew what they should do.

Stakeholders suggested that MDA produce best management practices, technical notes, and other resources for each of these groups that include lists of the right plants to use (including native plants that could benefit both honey bees and native bees) and recommended changes to mowing practices to increase forage availability.

Stakeholders cited lack of interest as a possible barrier to these identified solutions and suggested overcoming it by creating incentives for pollinator planting, possibly with forage credits similar to carbon credits or property tax credits for meadows. There also may be significant fear about the other organisms that can be found in meadows, such as ticks, other insects, and snakes.

Education and Programs

Attendees pointed to improved education and programming about pollinators and pollinator-friendly forage as a foundation for improving and increasing forage. For the general public, stakeholders suggested a variety of solutions:

- Initiate a state or national ad campaign emphasizing key messages like:
    - A little goes a long way
    - "Plant a meadow," similar to the "plant a tree" campaign
    - Meadows don't block views
    - If you are going to plant something anyway, it does not cost more to plant something pollinator-friendly
- Develop a unified logo that can be associated with pollinator efforts statewide to draw the public's attention
- Work with big box stores and nurseries to educate the public about pollinators
    - Label plants in nurseries as pollinator-friendly
    - Train staff at nurseries and home improvement stores to educate customers on pollinators; even if the public is not seeking out information about pollinators, they may interact with representatives who could educate them
- Educate children on the importance of pollinators (e.g., get counties to incorporate education about pollinator health into the third grade curriculum, call bees "tickle bees" to dispel fear)
- Use a university roadshow in different counties to educate the public
- Encourage state agencies and the organizations represented at the Summit to make one-minute videos promoting pollinator-friendly plants and meadows
- Create easy-to-access resources with a local focus
- Act now: With pollinators in the news, it is a good time to disseminate information about their health

Legislatures, too, could benefit from this kind of education. Lawmakers resistant to changing regulations to improve pollinator forage could also be reminded that mowing is very expensive; a reduction in mowing could both benefit bees and cut costs.

Finally, beekeepers could benefit from additional education on the difference between poor nutrition and starvation.

Communication and Coordination among State Agencies

Because the state is the largest landowner in Maryland, state agencies have the opportunity to make a great impact on the availability of pollinator forage. Summit participants noted that state agencies can coordinate to change practices on state land, set an example for other landowners, and educate citizens. They encouraged the state to modify planting and mowing practices on county lands, and state agency representatives in attendance expressed interest in educating their staff/colleagues and changing practices where possible. The state is often in a position to reforest land or plant after an area is cleared for weed control, and these instances provide easy opportunities for the state to plant meadow for forage, rather than trees or plants that are not beneficial to honey bees or native bees. Because state land is so visible to the citizens of Maryland, the state can lead by example if it focuses on planting forage and draws attention to its pollinator-friendly efforts (e.g., with demonstration gardens on state land or at the Government House). Finally, citizens regularly engage with state agencies (e.g., at state parks), and the state can use this contact and already existing educational programs to teach the public about pollinator health.

Research and Data on Forage

Stakeholders identified a need for more information about forage availability in Maryland: What plants are available where? Are there areas where more forage is especially needed? What plants are best? If this information is available, stakeholders would like to see it disseminated and if it is not, UMD should compile the information. Stakeholders cited funding for new research as a possible barrier.

Supplements

Some stakeholders raised concerns about the lack of availability of nutritionally complete supplements and substitute diets, along with the lack of knowledge about the content of pollen patties. Stakeholders requested improved access to supplements and better education about their content.

Culture Shift

Stakeholders frequently cited the need for a culture shift when it comes to how lawns and landscapes should look. Most people are still fixed on the English garden mindset and believe that a beautiful lawn is a perfectly mowed lawn, but if pollinator forage availability is to increase, this attitude needs to change. Perceptions of beautiful landscapes must shift through education and with state agencies and businesses leading by example.

Pollinator Pests, Disease, and Genetics

Attendees most frequently discussed the following concerns related to pollinator pests, disease, and genetics: Varroa mites (which includes a variety of related concerns); other pests and disease; and weak genetics.

Varroa Mites

All groups discussed Varroa mites in these breakout sessions, especially acknowledging the outsized impact of Varroa mite infestations on small-scale beekeepers. Concerns related to Varroa mites include:

- Impact of Varroa mites (generally)
- Lack of education for small-scale beekeepers
    - Many small-scale beekeepers are not aware of the thresholds for Varroa mite infestations or the proper ways to treat them
    - Some beekeepers do not even know that they should treat for Varroa mites
- Fear of chemicals: Some beekeepers are not interested in using chemicals (including miticides) in their hives
- Expense or unavailability of miticides
- Lack of state inspectors

Because so many small-scale beekeepers are not treating for Varroa mites or not treating properly for Varroa mites, stakeholders emphasized education as a key solution to address the mites' impact. Educational opportunities include offering more classes for small-scale beekeepers on treating for Varroa mites and using IPM, perhaps at beekeeper association meetings. This education could be complemented by public outreach on Varroa treatment, including coordinating treatment across the state and the state hosting a Varroa Treatment Day. Some beekeepers are simply not interested in using chemicals to treat for Varroa mites in their hives, and education could help convince these beekeepers of the importance of treating. Better research could also improve the quality of education: Stakeholders pushed for more research on the best ways to treat for Varroa mites, including alternative chemical and non-chemical approaches.

For beekeepers who want to treat for Varroa but find miticides to be too expensive or hard to access, stakeholders suggested that MDA offer a subsidy for miticides and make oxalic acid more widely available through UMD.

Stakeholders also recommended increasing funding to increase the presence of state inspectors so that MDA can better understand the impact of Varroa mites across the state. This solution could include deputizing associations and extension agents to act as inspectors.

Barriers to implementing these solutions include sources for funding for education and miticides, as well as a culture among some beekeepers that discourages the use of chemicals. Several attendees suggested creative funding solutions like a pollinator license plate similar to the Maryland Bay Plate, which directs proceeds to a nonprofit organization that helps improve the Chesapeake Bay and other local waterways. Attendees also suggested taking advantage of multi-state funding to increase funding opportunities.

Other Pests and Disease

To a lesser extent, stakeholders discussed the impact of other pests like small hive beetles and diseases like American foulbrood and nosema. Similar to the solutions presented for Varroa mites, stakeholders encouraged improving and better disseminating education and increasing research, coordination, and funding for treating for these pests and diseases.

Weak Genetics

Stakeholders highlighted the challenge of weak genetics, due to monoculture used in pollination, inbreeding, genetic bottlenecks, the absence of local breeders, and expensive queens. For solutions, they encouraged disseminating hygienic bees, promoting local queen raising, using genetically modified queens, increasing the number of local breeders, improving government regulation and quality control, and promoting the

exchange of bees among bee clubs. Attendees also pushed for promoting the need for increased research, coordination, and funding on genetics.

Other

During the brief breakout session on other topics, some discussions revisited topics already addressed under the topic-focused discussions. Others raised new concerns:

- Helping beekeepers who lost colonies to disease, pesticides, weather, or a bad year
- States restricting importation of bees
- Pesticide content in honey
- Protecting hives from bear predation
- Drift issues, specifically how to know whether pesticide drift actually is an issue in the state of Maryland
- Pesticide disposal
- Networking and how to stay in contact with fellow stakeholders

While groups did not generally have time to discuss solutions for these other concerns, some groups used this session to address solutions that could address a variety of concerns. One group revisited the importance of education with a focus on how education is funded. They suggested a number of creative funding solutions: a license plate, crowd funding, a viral video, or an herbicide/insecticide tax.

Cross-Cutting Themes

Throughout the Summit and across all topic areas, participants talked about opportunities related to education and communication and collaboration. Stakeholders were commonly concerned with funding as a barrier to implementing the solutions they discussed. And encouragingly, many were eager for more information about what to do next.

Education

Education emerged as a solution in all three topic areas. This includes both education of professionals working in pollinator-related fields and education of the public about pollinator issues. Beekeeping associations, for instance, are an excellent vehicle for educating new beekeepers, but participants raised concerns about ensuring the consistency and quality of the education beekeepers receive at various county events. Many stakeholders indicated that farmers are interested in modifying their practices to help honey bees, but they are hungry for guidance and best practices. Nurseries, landscapers, pollinator pest professionals, state agencies, and more interface directly with homeowners and thus are in a position to educate them about pollinator forage and the impact of pesticides. Participants encouraged MDA to develop flexible, easy-to-use, audience-specific best management practices for the three topic areas.

But education is about more than MDA working with various groups to disseminate information; it is also about ensuring that the information disseminated is scientifically-based and incorporates information and recommendations that reflect current research on pollinator health. Misinformation can perpetuate many of the issues that have been identified.

Communication and Collaboration

Stakeholders were excited about the Summit because it provided them the chance to talk through challenges in a constructive way in a room full of people facing the same or related challenges. Providing mechanisms for formal communication to address pollinator health issues — for instance, with registries that allow beekeepers and crop producers to communicate about pesticide application — is just as important as providing mechanisms for informal communication that will allow the groups represented at the Summit to remain in contact. This informal communication can provide the foundation for future collaboration among Summit participants for continued brainstorming of solutions and formalizing of partnerships across organizations and agencies.

Funding

Stakeholders recognized that funding the solutions identified in the Summit could be a challenge. Many suggested creative funding ideas like a pollinator license plate, crowd funding, or pollinator-related taxes, and others suggested making good use of volunteers, public-private partnerships, and multi-state collaboration where traditional funding sources are unavailable.

Keeping the Conversation Going

As evidenced by the Summit, relationships among the industries that work with and impact the health of managed pollinators need not be adversarial; in fact, participants expressed interest in taking advantage of the symbiotic nature of these relationships. To be sure, the stakeholders in attendance wanted MDA to keep them involved in the development of the Maryland MP3, but they were also interested in MDA (or UMD) facilitating future conversations among the participants, whether in the form of another Summit, in smaller working groups, or by some other mechanism.

Summary of Participant Polling on Identified Topics

After the breakout sessions, Keystone staff led Summit participants in an electronic polling session. Participants were asked 12 questions and saw the anonymous responses of their peers in real time. To begin, they were asked to identify the group that best describes them or their organization and the topics they believe to be most important to address in improving pollinator health. They were then asked a series of questions about solutions they find to be best and most feasible within the three topic categories: agricultural and non-agricultural pest control; forage and nutrition; and pollinator pests, disease, and genetics. The polling session concluded with questions about the kinds of actions and tools that participants were interested in seeing in the MP3 and questions about how their knowledge and understanding changed over the course of the Summit.[8] In addition to reviewing the simple responses in real time, after the Summit, Keystone staff reviewed the responses to Questions 2-12 as they correlated to the demographic assignments selected in Question 1.[9]

Respondents selected **bee pests (Varroa mites)**, **bee pests and disease (other),** and **starvation/lack of forage** as the top three topics they believe are most important to address in improving pollinator health.

When asked about solutions to address the availability of pollinator **forage and nutrition**, participants responded that **modifying planting and mowing practices on state and county land** and **providing best management practices, technical notes, and other educational resources for establishing and managing forage** are both the best and the most feasible solutions.

When asked about solutions to address concerns about **pollinator pests, disease, and genetics**, participants responded that **better educating beekeepers on effectively controlling for Varroa mites** and **promoting the need for increased research, coordination, and funding on pests, disease, and genetics** are both the best and the most feasible solutions. However, responses by demographic group about the best solutions varied. When it came to the most *feasible* solutions, all demographic groups selected education and increased research, coordination, and funding as the most important.

When asked about solutions to address concerns about **agricultural and non-agricultural pest control**, participants responded that **voluntary registration of hive locations to facilitate communication among beekeepers, farmers, and applicators** and **dissemination of scientifically-based pesticide education and best management practices to farmers and homeowners** are both the best and the most feasible solutions. However, responses by demographic group about the best solutions varied. When it came to the most *feasible* solutions, all demographic groups selected voluntary registration and dissemination of best practices as the most important.

Encouragingly, across all three topic categories, participants selected the same two solutions as both the best and the most feasible.

When asked about **solutions** that could be in an MP3, the majority of participants responded that they envisioned **both public and private sector action**. When asked about the **tools** to implement the

[8] Appendix E includes the text of all questions asked during the electronic polling session, including data about responses from the plenary group and responses by demographic group.
[9] By the time the electronic polling was conducted, 64 stakeholder participants were present. Appendix E provides the detailed responses to the electronic polling questions.

identified solutions, respondents encouraged MDA to prioritize **improving partnerships among state agencies, beekeepers, crop producers, pesticide applicators, conservation organizations, etc.** and **improving public outreach and education about pollinator health and the importance of pollinators**. These responses also held true within most demographic categories.

Finally, the majority of participants responded that both their knowledge of the issues facing honey bees and other managed pollinators in Maryland and their understanding of the challenges facing other stakeholders increased somewhat or significantly over the course of the Summit.

While the electronic polling could not capture all possible concerns or solutions related to pollinator health in Maryland, the responses collected were reflective of the content of the breakout discussions and point to interest in addressing a variety of concerns using a variety of creative solutions. In discussion that followed the polling sessions, stakeholders encouraged MDA to incorporate both flexibility and recommendations or requirements for specific action into the MP3.

Next Steps

MDA will share this report with the stakeholders who attended the MP3 Summit and post the report on the Maryland MP3 web page. MDA will use the report to draft the Maryland MP3 and will continue to keep stakeholders informed of the status of the Plan and offer opportunities for stakeholder involvement and feedback, including posting the MP3 for public comment around April 2016.

Appendix A: Summit Agenda

Maryland Managed Pollinator Protection Plan Summit

Wednesday, January 20, 2016
9 a.m. – 4 p.m.

Adele H. Stamp Student Union
The Atrium (Room 1107)
University of Maryland
3972 Campus Drive
College Park, MD 20742

Purpose

The President has directed the Environmental Protection Agency to engage state agencies in developing Managed Pollinator Protection Plans (MP3s) to mitigate risk to honey bees and other managed pollinators. The purpose of the Maryland MP3 Summit is to enable state agencies and key stakeholders to discuss and identify significant opportunities to promote managed pollinator health, particularly as it relates to sustainable food production. The Summit will establish a framework for open communication and collaboration as Maryland develops and implements its MP3.

Agenda

All times are approximate.

9:00 a.m. Welcome and Introductions

- Purpose and objectives of the statewide summit – *Ashley Jones or Carol Holko, Maryland Department of Agriculture*
- Agenda review and key meeting protocols – *Julie Shapiro, Keystone Policy Center*
- Participant introductions

9:30 a.m. Context for the Development of a Managed Pollinator Protection Plan: Presentations and Q&A

- EPA guidance, the Maryland MP3 Process, and other state activities – *Ashley Jones, Maryland Department of Agriculture*
- Drivers of pollinator health decline — *Dennis van Engelsdorp, University of Maryland*
- The relationship between managed pollinators and native pollinators: How an MP3 can benefit biodiversity — *Sam Droege, U.S. Geological Survey Patuxent Wildlife Research Center*

11:15 a.m. Introduction to breakout discussions

- Overview of breakout topics and instructions — *Julie Shapiro, Keystone Policy Center*

During the first three breakout sessions, participants at each table will rotate through discussion of three topics representing major drivers of pollinator health: Agricultural and non-agricultural pest control; forage and nutrition; and pollinator pests, disease, and genetics. For each topic, tables will discuss the following questions: What are your concerns? What solutions do you suggest? What barriers and opportunities do you see to implementing solutions? *During the fourth and final session, participants will brainstorm concerns, solutions, barriers, and/or opportunities regarding any other topics not discussed in the three pre-assigned categories.*

11:30 a.m. Breakout Session 1

12:15 p.m.	Breakout Session 2 (longer session to allow time for lunch)
1:15 p.m.	Breakout Session 3
2:00 p.m.	Breakout Session 4
2:15 p.m.	Break
2:30 p.m.	Plenary Report Outs – *Topic Facilitators and Participants*
3:00 p.m.	Polling Session *Q&A/Discussion to follow*
3:45 p.m.	Next Steps – *Maryland Department of Agriculture*
4:00 p.m.	Adjourn

Ground Rules for Participants

1. Respect time commitments in the agenda; maintain focus on the issues and objectives.
2. Participate actively and in good faith; take ownership in and be open to the outcomes.
3. Participate in a manner that promotes joint problem solving and collaboration.
4. Be respectful of differing points of view: assume good intentions and do not engage in personal attacks.
5. Be considerate of the need to incorporate multiple and differing perspectives into the Maryland MP3.
6. Be mindful of the presence of multiple backgrounds; watch the use of acronyms from your field.
7. Be fair, speak briefly, and allow everyone to participate.
8. Be respectful regarding use of smart phones and other technologies.
9. Do not make personal attributions of discussion comments outside of the meetings.
10. Let the facilitators facilitate.

Appendix B: Breakout Session Worksheets

Maryland MP3 Summit: Breakout Session Worksheets

Breakout Session Agenda

11:00 a.m.	Introduction to Breakout Discussions
11:30 a.m.	Breakout Session 1
12:15 p.m.	Breakout Session 2 (includes a working lunch)
1:15 p.m.	Breakout Session 3
2:00 p.m.	Breakout Session 4
2:15 p.m.	Break

Use these worksheets to take notes during the breakout discussions. At the end of the day, volunteers will collect the worksheets and provide them to the Maryland Department of Agriculture.

During the first three breakout sessions, participants at each table will rotate through discussion of three topics representing major drivers of pollinator health*: Agricultural and non-agricultural pest control; forage and nutrition; and pollinator pests, disease, and genetics.* For each topic, tables will discuss the following questions: What are your concerns? What solutions do you suggest? What barriers and opportunities do you see to implementing solutions? During the fourth and final session, participants will brainstorm concerns, solutions, barriers, and/or opportunities regarding any other topics not discussed in the three pre-assigned categories.

Note: Your table may not discuss the topics in the order reflected in this packet.

Agricultural and Non-Agricultural Pest Control		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Agricultural and Non-Agricultural Pest Control (cont.)		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Forage and Nutrition		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Forage and Nutrition (cont.)		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Pollinator Pests, Disease, and Genetics		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Pollinator Pests, Disease, and Genetics (cont.)		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Other		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Other (cont.)		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Appendix C: Breakout Session Comments (Facilitator Notes)

The following tables include the content of the flip charts and worksheets that volunteer facilitators used to transcribe notes from the breakout session discussions that they facilitated. The first three tables are the aggregate summary notes from all the facilitators within each topic category; these were the notes used to capture themes across the facilitators' groups to conduct the plenary report-outs. Following those summary tables, the tables are broken up by category (agricultural and non-agricultural pest control; forage and nutrition; and pollinator pests, disease, and genetics), and then further separated by rotation (which represents three sessions[10] with three separate tables of stakeholders who discussed the same topic). In other words, each of the topic-focused tables below represents one rotation. Each rotation represents one facilitator's or team of facilitators' discussions with three different tables of stakeholders.

Within those rotation notes, most of the facilitators provided both high-level summary notes for each of the three sessions in their rotation, along with more detailed notes for each of the three sessions.[11] The final table aggregates all of the facilitators' notes from the 15-minute "other" breakout session.

[10] Rotation 4 only included two tables, so those rotations only include notes from two sessions.

[11] Facilitators were given some leeway in how to best take notes for their groups, and thus some have handled the summary notes and detailed notes differently. These differences are noted in the tables below. Some of the notes track concern → solution/opportunity → barriers/ways to overcome neatly, but some do not.

Topic Summary Notes

SUMMARY NOTES: AGRICULTURAL AND NON-AGRICULTURAL PEST CONTROL		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Homeowner education (address consumer behavior; manage expectations)	Public awareness/education at big box stores	Consumer behavior hard to shift
Pesticide applicator training	Educate when to spray	Competing interests for growers
	IPM: Encourage non-pesticide solutions; make IPMs flexible; simplify IPM for non-ag use; base IPM on modern technology	Different methods can be time consuming
	Industry best practices, new technology	
	Target industry, trade associations	
	Register hives (FieldWatch?)	Concern about sharing information
There is so much focus on pesticides, but are there other stressors? Mosquito spray?	Increase extension staff/educators	Coordination/leadership
Use of labels	Train users to actually follow labels; simplify labeling	
Public perception of commercial application	Shift conversation from control to management	Demonstration of success – how to measure success
	Better regulatory training on pollinators	Funding
	Private-public partnerships: use land for research	

SUMMARY NOTES: FORAGE AND NUTRITION		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Lack of education and programs	Local agriculture groups	Implementing programs raises other problems; creates other pest issues
	BMPs for homeowners	
Lack of funding for research		
Lack of communication between agencies	Designated conservation issues	
	Utilize existing programs	
	Education for government programs – what not to touch	
	Needs more research for management	
Lack of forage availability	Local codes for yard agriculture need to change	Creates other pest issues
	Utility lines – meadow management	
	Changes to cover crop policies	
Ineffective wildlife planning – trees, not meadows being planted	Changes to RFP – 10-year contract	
	Midterm option of more flowers	
	Right kind of flowers	
	Year-round availability	
In Maryland, there's not enough land for commercial bees		

More nutritious supplements		
Culture: How do you change perceptions of beauty from neat lawn to meadow?		
Data sharing: Who has what?		

SUMMARY NOTES: POLLINATOR PESTS, DISEASE, AND GENETICS		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa mites: impact on small scale beekeepers; expense of products (not accessible)	Education: More classes to meet demand; coordinated treatment and count days; focus on small scale	Funding for education. Use joint state approach?
	Research needed on: Alternative chemical and non-chemical approaches; predators	Incentives for education; new "messengers"
	Provide subsidies for miticides	Concern about overuse of chemicals
Research	Diagnostic Bee Lab	Multi-state funding
Not enough state inspectors; hives not inspected enough	Increase funding for inspectors: Deputize associations and extension agents to act as inspectors	Funding – pollinator license plate?
Genetics: Is there a bottleneck?	More research	Feasibility
	Incentives to buy local queens vs. bring in genetics from other places	Unintended consequences
Culture of beekeeping	"Shame": Remind/explain consequences of not treating; share what treatments were used	
Communication across parties	1 on 1 vs. summit	
Legislature not using peer reviewed sciences	Need layman terms	
High turnover rate for beekeepers		
What will the next issue be?		

Table-Specific Notes: Agricultural and Non-Agricultural Pest Control

ROTATION 1: AGRICULTURAL AND NON-AGRICULTURAL PEST CONTROL		
SESSION 1		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Pesticide applications; drift timing; following labels	Education of pesticide applicators and homeowners	Reaching the public – social media, grower associations
	Notification of hive locations via a state registry/48-hour notice of application	
	Crop locator	
Need for more research		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Drifting/misuse/applicators on bees	*Application – notification – flags?*	*MDA testing expense*
	Follow particular dosage	
	No application while bees are foraging	
	Eastern Shore – aerial application	
	Education – funding/licensing	*Reliance on growers*
	Growers at time/knowledge	
	Sensitive crop locator	
	Call MDA/targeted enforcement	
Application times – when?	*State registry – use it (voluntary)*	
Label management – rate/too much	*Labeling – get information to general public*	
Toxicity of sprays – more are spraying	*Communication/contracting timing; can notify beekeepers to close/cover hives; better relationships between beekeepers and farmers*	*Education in social media; education of growers, homeowners, social media, associations of pesticide applicators*
Education of beekeeper	*Social media/education/outreach cooperation – focal point for information/champion*	*Busy/ignorance/cost and time*
	Reach out to nurseries and associations	
	Local organizations	
Mosquito spraying		
Inadvertent contamination – breaking of law; bees in area	*Association education/foundation/master gardeners*	*Enforceability*
	Partnership with schools (IPM)	
	Point of sale education	
Sensitive crop locator doesn't include dynamic data	*Add commercial beekeepers to crop locator*	*Handling moving parts – changing data*
Using too much – homeowners		
If you follow labels correctly and apply correctly, are you still affecting pollinators?		

SESSION 2		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Education and outreach	Extension agents; organized meetings; communication	
Pesticide use/education	Need better labels on pesticides	
	IPM – not just pesticides	
	Crop rotation	
	Hives and pesticide applicator database (Field Watch, Bee Check)	
	Influence pesticide applicators to treat differently	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Application timing/threshold application	*Threshold/timing – more timing of pesticides*	*Overcoming habitual practice – local ordinance?*
	Education – outreach/share results	
	Include stakeholders	*Barriers – money*
	Decrease frequency/change timing	
Private mosquito spray companies – private homes	*Homeowners can eliminate habitat; remove standing water*	*Tiger mosquitos*
	Stronger labeling	*Higher up*
	Education for mosquito companies and general public	
	Include education in pesticide licensing curriculum	
	Create demonstration projects	
Labeling	*Enforcement/education; consumer to know not necessary*	*Regulation level; meeting label – not clear*
Fear of bees	*Educate*	*Knowledge source?*
Control vs. management – prevent the problem	*IPM (crop rotation); extension personnel/agents*	
Influence by chemical industry	*Education/outreach*	*Numbers of people*
Bee location service	*Bee Watch/DriftWatch/Delaware/Purdue – restricted – hide bees*	*Competition/robberies; expensive*
		Not tech savvy
		Large set up cost for government
Collaborative knowledge (beekeepers and growers)	*Encourage research into pesticide interactions*	*Preventative v. treatment*
Fungicides		

SESSION 3		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Education	Mosquito pesticide companies – non-pesticide solutions	
	Consumers – more pesticides isn't always better	
	Pesticide sellers	

Pesticides	Hive/field location database	
	More visible info on pesticide labels, summary	
	Create demonstration projects – private/public, ROWs	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Communication between growers/beekeepers; application timing is more harmful than needed	*DriftWatch – set up account for folks*	*Must be account holder*
	Education and outreach – organized meetings, easily accessible	*Amish/do not want to use*
		State costs
		Commercial/sells honey
		Some large crop producers spray without scouting
	Defining commercial	
Mosquito control – beekeepers (backyard operations)	*Supply/demand*	*Supply/demand: mosquito spray companies benefit ($$) by extra sprays*
	Homeowner education – change spray times to when pollinators aren't flying, treat standing water; probiotic treatments	
	Licensing/inclusion	*Combat misperception*
	Pollinator education	
Timing of spray	*Communication*	
Knowledge of applicators	*License and certification process*	
Consumer knowledge	*Consumer outreach – point of sale at nurseries*	*Funding cooperative extension*
Perceptions about insects	*Association nursery inspections; education of sellers*	*Funding/manpower; Maryland level funding*
Homeowners spraying while bees are foraging	*Labeling buries usable information, so need better labels on backyard pesticides – wording is too vague*	
Broadleaf	*Decrease location of pesticides*	
	Demonstration project of less pesticides on ROW	
Funding issues	*Specialty license plate – innovative fundraising*	
Difference between control (pesticide only option) and management (treat pest problem before chemical needed)	*IPM – no pesticide needed*	*A lot of big corporations have a lot of influence on growers*
	Crop rotation – extension agents need to talk about this	
	Purdue Bee Watch – beekeepers tag hive locations; pesticide applicators can view; 25k to buy in + maintenance fees	

ROTATION 2: AGRICULTURAL AND NON-AGRICULTURAL PEST CONTROL		
SESSION 1, 2, 3		
FACILITATOR SUMMARY NOTES (SUMMARY APPLIES FOR ALL THREE SESSIONS)		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Education	More important for homeowners than for ag.	
	Non-commercial applicators	

	Public perception	
	More education/research/info from chemical companies/extension on pesticides rotation, general uses of pesticides	
	More with children in elementary schools	
Other opportunities for bees	Habitat and resources for bees	
Chemical companies	Developing homeowner products in such a way to limit misuse and overuse (smaller containers)	
Labeling	Improve for homeowners	
	Visual	
	More specifics, enforceable language	
	Improve chemical applicator technology	
Training	Update regulatory training to add pollinator requirement	
Pesticide applicator law	More training for all applicators in-house	
Beekeeper knowledge	Beekeeper education on pesticide use	
SESSION 1		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Homeowner use: green lawn, no forage; backyard beekeepers' problem	*Education: working with homeowners, educating HOA*	
Labeling: pesticides – homeowners v. commercial	*Homeowner pesticide use: labeling restrictions; homeowner restrictions*	
	State restrictions – labeling	
Hives – contact with pesticides	*DriftWatch – beekeepers registered with location info; high risk crops; not a requirement; only available to specific people; point of purchase – list when purchasing; voluntary registration of hive locations*	
	Rotation of pesticides with low impact on pollinators	
	Education – timing of spraying	
Elimination of products	*Improving technology in the use of products*	
Bee stress	*Mechanical pollination – movement stresses bees; should promote this to reduce stress on bees*	
SESSION 2		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Spraying and public perception	*More education – news release, website, social media*	
Education – need more for everyone	*Homeowner (non-commercial applicator)/large pesticide applicator; non-ag uses – structural pest control*	

Fungicides	*More research, data, labeling*	
How to find unregistered beekeepers		
Applicator training	*Certify applicators – better testing and recertification; add pollinator info to all classes; more restrictions on certification; incorporate new info into trainings*	
SESSION 3		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Pesticide use	*More oversight – pest control*	
	Make training clearer	
	Pest definition – how to make clearer	
	Education – more presentations (approved/save messaging)	
	Labeling – clearer understanding for homeowners; enforceable labeling	
	Commercial applicators should follow labels	
	Beekeeper locator with notification	
	Increase regulations for certain types of treatments – notification to beekeepers	

ROTATION 3: AGRICULTURAL AND NON-AGRICULTURAL PEST CONTROL		
SESSION 1		
FACILITATOR SUMMARY NOTES (FACILITATOR DID NOT PROVIDE DETAILED NOTES FOR THESE SESSIONS)		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Homeowner pesticide use	25% of homeowners self-manage; 25% contract out land/yard management	Commercial beekeepers with moving hives?
Regulation		Whom do people trust? Whom do people listen to?
Education (or lack of)		Public health – stinging pests; concerned about pest control regulations
Pesticide application/formulation; hive location; how do farmers know?		
City ordinances and responsible management		
	SESSION 2	
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Pesticide use – responding to invasive plants	New application methods	How to avoid harming nearby hives
IPM being thrown out the window to protect plants	Tree injection for systemic pesticides	Fungicide – dependent on the weather; no time to warm nearby beekeepers
Hive location near farms	In season management – scouting	Consumer expectations of a pristine garden with zero pests

	Managing expectations through education	Bringing together people with differing opinions on acaricide/treatment (connectivity of adjacents also a weakness)
	Beekeepers operating together to fight Varroa	Human nature
	IPM flexible	Evolution – counter evolution
	New IPM development → extension consumer education	
	Neighborhood beekeeping affinity groups	
	Directives to schools as part of IPM	
	SESSION 3	
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
IPM falling by the wayside	Pest control companies – training, materials/use, enforcement	Inconsistencies in definition of IPM
Untrained and unlicensed individuals	Development of flexible, smart IPM guidelines	Regulations sometimes/often impractical for pest control companies
IPM out-of-date, not flexible enough	Application, planting technology	
Native bees not included in testing	Communication	
	More research	
	Redefining IPM	
	Simplification for homeowners	
	Simplification of pest control labels	
	Beekeeping registry and map accessible to pest control companies and farmers – voluntary?	Want control directory resource for nearby apiaries

ROTATION 4: AGRICULTURAL AND NON-AGRICULTURAL PEST CONTROL		
SESSION 1		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
	Public outreach to homeowners and schools	
	Pollinator education to pesticide applicators	
	Increase IPM practices	
	Info to industries/businesses that affect (directly/indirectly) pollinators	
	Government subsidies for homeowner hive kits, tax break	
	Database for applicators to ID hives (voluntary)	
	More R&D on synergistic effects of pesticides	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Crop yields	*Pollinator Research Action Plan*	
	Public/private partnerships	
	Improve pollinator habitat	
Too engineered – "perfections" "too much pesticide" "perfect fruit"	*Education and outreach*	*Public outreach to homeowners: Proper pesticide use; native flora/landscape management. How do you measure success?*
Weed control, pesticides banned from Montgomery County as a group (over-regulation)	*Increase science-based decisions*	
	Research on fungicides and synergy of pesticides	
	Education of applicators - include a chapter on pollinators in pesticide application license; education	
Need to be able to offer some degree of pest control for homeowners while being friendly to the environment		
Unnecessary seed treatments on corn and other groups of neonics; cannot justify target pests. Concern about new labels. More exposure in foliar treatments.	*Yet, levels still very low…go back to IPM practices in nurseries and greenhouses; schedule treatments within guidelines*	*MDA doesn't have manpower to monitor pesticide application rules*
	Prioritize risk-based areas of increased exposure	
	Database for licensed applicators showing locations of hives (voluntary)	
SESSION 2		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
	More education: • Non-regulated community/homeowners • Applicators – pollinator chapter in applicator training • Encourage industry outreach	
	Technology: • Database for applicators w/hive locations • 48-hour notice required within a two-mile radius • Database (~real time) on where/what pesticides are sprayed in area	
	User-friendly pesticide labels with pictures	
	Application laws (no spray between 8 a.m. and 6 p.m.)	
	More research on other stressors and synergistic effects	
	Transparent enforcement of FIFRA	
	Risk-based pesticide application	

FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Lack of education/awareness among non-professional applicators (homeowner use)	*Educational program with Home Depot and Lowe's to promote awareness*	*How do you reach a broad group? How to measure success?*
Data gaps	*Educational program to professional applicators (pollinator chapter in Pesticide Applicator Handbook)*	*Legal/competition concerns; concerns about stolen hives*
Coordination with applicators and beekeepers		*Help EPA studies*
	Database on pesticides sprayed and where (central repository)	*Non representative of all applicators*
	Database on pesticide registries for sensitive individuals	*MDA limitations/tech*
Lack of attention to other stressors, emphasis on pesticides	*More research on other stressors, big picture understanding*	
Beekeeper education	*BMPs/education for beekeepers on miticide use*	
Beekeepers not using miticides, leading to increased mite populations		
Climate change/habitat loss		
Ag dust – pretreated corn and soy (addressed at industry level w/BMPs)	*48 hours notification to beekeepers in MD*	
	User friendly pesticide labels with pictures	
Synergistic effects need more study		
Untrained/unlicensed industry applicators	*Education*	*Best ways to use products; "pesticides last resort" does not make sense*
	Enforcement	
	Re-emphasize IPM/managing interests	
	Easier to read labels	
Chemical testing done on honey bees, not native bee species	*"Chemically-sensitive people" list → develop similar programs for beekeeping*	
Practical re-definition of IPM (modernize; what does it look like today)		

Table-Specific Notes: Forage and Nutrition

ROTATION 1: FORAGE AND NUTRITION		
SESSION 1		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Lack of habitat	Converting fed/state land	$$$
Monoculture: need diversity (increase forage, decrease farmland)		
Lack of education/training		
Difference between poor nutrition and starvation		
Plant changes – early bloom		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Loss of pollinator habitat, lack of forage due to development, farming practices	*Roadsides, utilities, parks should increase pollinator friendly plants*	*Farmers not leaving any edges*
	Encourage businesses to plant pollinator plants; people want to plant what they see other people planting	*"English garden mindset" – neat, tidy, lawns to the edges of everything*
	Educate kids on value of pollinator plants – opens their minds up to other improvements and solutions	*Lack of meadow – bee forage for corn and soy – changes in crop patterns*
	State agencies can lead by example	*Communication*
	Governor executive order	
	Demonstration gardens	
Tease out land for pollinators: large scale → small scale; situational recommendations and plants	*Utility ROWs/unmanaged*	*(Sub)urban deserts*
	Very managed backyards, tease out situations, provide suggestions for each type/size of location	
	Guidelines for pollinator friendly plants with enough ornamental value that people will plant them in yards – a little bit goes a long way	*Getting the commercial side on board, consumer on board for "bee-friendly" plants*
	Labeling on plants in nurseries	
	Spokesperson – Oprah?!	*Not native-only plants, must also fulfill a lot of ornamental, desirable qualities*
	Easy recommendations/guidelines for encouraging pollinator plantings	
	Edges on farms – pollinator habitat	
	Small scale – personal yards: reach out to HOA, garden clubs to improve efforts, change plants in cities to be more pollinator friendly	
Culture shift to promote pollinators	*National ad campaign for pollinators – start at state level*	*$$$$$*
	Include pollinator section in curriculum in schools	
	Endangered species	

	Promote "a little goes a long way"	
	Meadows don't block views like trees do	
	Create one unified logo – put them all over, tailored to each situation to better communicate with general public	
SESSION 2		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Monocultures: Follow the science		
Timing of flowers		
Education and research: What to plant where? How? Good for bees?		
Make sure there are no disincentives (farmers)		
Funding		
Engage non-traditional sources in creating habitat		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Lack of area of forage, habitat	*Change management practices – 1 mower deck width in recreational, public lands*	*How to utilize small areas to be beneficial for pollinators*
	Mow less → decrease carbon footprint, costs less (FL)	*Turn lawns to meadows*
	Landscape design → sod to plantings	*Meadows promote animals – mice coming into the house in the winter*
	Saves on water, lawns use lots of water	*Meadow lawns not pretty – HOA pushback*
	Fewer chemicals, too	
Monoculture, heed for diversity	*Intercropping*	*Overcoming nice, neat lawns*
	Cover crops – winter – mixtures of crops like clover	*Crop production necessary, hard to lose ag area for forage*
	Living mulch – narrow rows doesn't interfere with crop, no loss of lands → increases natural enemies, decreases greenhouse gases, weeds	*Each farmer has different feelings and opinions about ways to solve this, one way may not work for all of the farmers; there are many solutions available*
	Increase forage and decrease ag land	*Revenue – farmers lose money when farmland becomes meadow/forage*
Lack of education for general public, beekeepers	*Create easy to access resources with a local focus*	*Resources not well broadcasted, good resources available, not always easy to find. Need to find resources for local problems/solutions*
		You can buy anything online – not always good
		"Solutions" passed on by word of mouth
State/fed land can but hasn't been converted	*Re-allocate resources*	*Resource issue – land currently in sod, needs to be converted, but this costs money*
	Demonstration sites of pollinator forage around the state, how to plant in what area/soil, cost, etc. Show people how to make this forage.	*Needs to be a priority to turn this into forage*

Poor nutrition v. starvation	*Education, outreach – MD specific; for beekeepers; specifically, small-scale beekeepers*	*Lack of forage in fall in MD*
	BMPs (local)	*Small-scale beekeepers using the internet for solutions, not specific to locality*
	Weather changing – how to manage bees	
Plant changes leading to changes in bloom times; climate change alters forage available for bees	*Increase overall forage*	*Climate change*
SESSION 3		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Loss of habitat		
Situational recommendations: 3 examples		
Culture shift/education		
Funding $$$		
Communication – simple messaging		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Monoculture – follow the science; think in terms of each different monoculture	*Offer incentives for pollinator plantings*	*Monoculture → crops, turf*
	Educate consumers – regional and local	*Residential settings – HOA; lawns can only be so tall; doesn't jive with meadow*
	Limited pollen and nectar, low diet diversity	*"Weed" – bad connotation*
	Non-traditional places for habitat; i.e., roadways, utilities	
	Encourage people, companies with certifications	
Timing of flowers – plants needed throughout the season	*Find and promote plants that area pretty and bloom all season to replace things like impatiens*	*Plants need to be easy to grow*
	Herbs – deer resistant, culinary uses	*Cultivars – still as valuable as original species?*
	Annuals	
	Education	
	Native plants – native cultivars/parent plants	
What to plant? When? What are good bee mixes?	*Resources compiled*	
	Nursery plants with grown with neonics – use tags for neonics and on pollinator friendly plants – marketing strategy. American Beauty/Beauties Program	*Commercial availability*
	Bees very attracted to flowering trees	*Affordability – plugs versus seeds, etc.*
Plants coming from nurseries are grown with neonics. How do we know they're pollinator friendly?	*Commercial growers use labels to promote pollinator/bee friendly plants*	*People don't know how to protect bees/pollinators*
		People/general public may need education to value 'bee-friendly'
Making sure no disincentives in programs/policies		
Where is forage needed the most?		*Do all beekeepers report their bees? How to determine this.*

Plants for pollinators AND beneficial insects/natural enemies	*IPM education*	*"Parasitoids" sounds bad…people need to understand lots of benefits out there*
Funding for forage	*Incentives for farmers*	
	State lands	
	Right-of-ways	

ROTATION 2: FORAGE AND NUTRITION		
SESSION 1		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Education	Public, ag., state agencies, legislatures, clubs, groups	
	Perception (pests, weeds, beauty)	
	Effort on maintenance of natural habitat	
	Native/nutritional planting	
	Need recommendations made available to public for meadows	
Increase forage	Incentives: credits for meadow planting	
	BMPs for homeowners, beekeepers, highways (transportation)	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Lack of forage and nutrition; lack of meadows. Beekeepers alone can't plant enough in their backyard, so they need public help outside their backyards.	*Wants meadows on barriers (re-meadow)*	*Need to change perception of "perfection" – public education. Mowing doesn't have a negative connotation yet.*
	Small step: education of the public. Start small with turning a percentage of landscapes into gardens. This could be one of the only zero cost plans, as it doesn't cost more than current methods.	
	There is a lot of acreage available.	
	For federal, state, and county lands: It should be regulatory. The state is the largest landowner in MD.	*Do it, and maintain it. It's not more energy than to mow, it's just more knowledge.*
	For other people: There should be recommendations for what to plant, lists, and education. Would be a waste of time and money to make it regulatory for homeowners.	*People are afraid of snakes and tics and bugs, so we need education and outreach to show that not every bug is a bad one. Maybe from extension or MDA?*
	BMPs for landowners, private, and public land	
	Help spread public land as demonstration sites.	*Can there be forage credits similar to carbon credits to offset costs? That's the carrot.*
	Need to educate legislatures. Money spent on mowing is huge!	
	Work with landscape architects.	
	Plant a tree campaigns exist – how about plant a meadow?	
Need to increase nutrition, improve diversity/quantity	*Need recommendations from experts.*	
	Reach out to clubs (master gardener clubs, beekeeping clubs)	*Needs to be zero cost for people to do it*

Lack of public education on meadows (people want to kill snakes and bugs)		*Ugly meadows – ticks, snakes. How to balance pests and disease in meadows.*
	Educate legislature?	*Eliminating weeds from meadow can be a hassle. Not immediate gratification*
	Go after public and large business such as power companies for management	*Waste of time for private homeowners*
	Don't plant and not maintain (state highways), also don't remove native foliage for wildflowers	*Disconnect on what and who takes care of meadows*
Mowing instead of using pesticides destroys habitats	*Need to choose difference plants*	
	Landscape architects invited to attract people and designate areas for meadow and list as natural habitat, education	
Takes too long to get education going to public, not even in county curriculum, just counties	*Get counties to put in education system as requirement*	*Department of Ag should educate the public.*
		All educational institutions should make public aware on websites – one-minute video from all organizations present today! Pollinators are in the news, so it's a good time to strike.
		Make BMPs available to public and have them endorsed by county, public, state, etc.
For ag producers, need non crop areas. Some rules are not great for pollinators…it's a limitation of current policies. How can you implement something without a farmer uprising?	*Farmers are actually willing to make changes if they know what they should do…it's about education.*	*Switch regulations that are limiting such as forests instead of meadows. Farmers trying to plant to the edge because of max production.*
	Look at regulations on mixes	*Money for planting trees but no money for planting meadows – bay restoration*
	May be willing if receive scientific backed research that they will get only in non-crop areas	*Educate big ag and make resources available*
Beekeepers not educated to reduce loss	*BMPs for small scale beekeepers. Beekeepers also need to know about nutrition, esp. supplement feeding.*	*Educate beekeepers on BMPs*
Public doesn't know much about bee nutrition	*Educate on flight radius, foraging for clovers for food*	*High school students could plant a yard for pollinators at school*
Not enough nectar so have to feed		
	Pesticide companies – give them incentives to distribute bee information with pamphlets	*Property tax credit for meadows*
		Diverse pesticide free forage reduces effects of pesticide

SESSION 2		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Education	Vocational – technical programs via county, state	
	Groups, such as 4H, science departments in schools	
	Industries (pest, etc.) to create and develop education on native pollinators' forage areas	
Increase forage	Property credit for meadows	
	State solutions:	

	• Set example by not destroying forest/foliage strips with replanting	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Lack of forage	*List of acceptable plants*	
	Modify city ordinances to allow	
	HOAs need education on meadows	
Education	*Reach out to 4H*	*Educate public using tools differently*
	Do tech schools teach beekeeping? Could they raise bees to rent to farmers?	*State ag*
	Don't discourage clover in public	*"Bee safe tips"*
	Not enough public education on pesticides for public to make own decisions	*Lead by example…seeing native plants foliage with signage, other may start to see it as commonplace*
		Parks and rec to not kill food sources (clover)
Pollinator companies	*Where are they?*	*Need to develop and maintain viable areas for pollinators*
Maintained of non-mowed areas and meadows	*Need ease of use*	*Better wildflower mixes to minimize or reduce weeds*
	Contract 10-15 years to take care of plots	
SESSION 3		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Increase forage	Contract out maintenance of strips	
	CREP needs to be added to MD	
	Large plots of land to be added to meadow/pollinator along with equipment for use to cover large areas	
	Plants for dirth on plots such as ROWs and private agencies	
	Consultation (assessment on property) for habitat	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
CRP add pollinator programs	*NRCS to add CREP ground for conversation (trees, foliage)*	*Adds acreage to pollinators*
		Puts pollinators in CRP program; this could also provide incentives to homeowners
	Maintenance is a big issue, so pay people to take care of them	
	Reach out to timber companies to add strips for pollinators, otherwise a food desert…"power to bees"	*If equipment access, some people could put in pollinator plants down along powerline acreage*
	Provide info on plants for planting during dearth acreage – large acreage like on rights-of-way	
	How many acres needed to support X number of hives?	
	No monoculture – no unbroken acreages of one crop	

Need available state acres to plant to dirth for diverse diet		
Consultation for beekeepers (habitat assessment), add beekeepers as ag – need research to do so		
How to deal with public complaints on not mowing and pests, such as ticks and snakes		
Testing on native bees for pesticides – not only honey bees		
Not reaching all beekeepers	*University roadshow to different counties as an outreach, alternate counties*	*Offered by extension*
	Training course/certification for beekeepers for pesticides	

ROTATION 3: FORAGE AND NUTRITION		
SESSION 1, 2, 3		
FACILITATOR SUMMARY NOTES (SUMMARY APPLIES FOR ALL THREE SESSIONS)		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Land – rights-of-way/utilities: • Who owns it? • How can we (bee clubs) volunteer?	Work with plan; give utility mitigation credits; convince them it's cheaper MOW LESS	Who owns the land? How to contact?
Highways administration used to plant meadow; Bay needs woods	Get a list of good woody; master plan of which plants to use	
Suburban/urban: How to establish areas	Green roofs	
	Stormwater areas	
	Nursery – companion plants	
	Give out seeds	
	HOA incentives	
	Provide linear park	
What plant are best for bees?	Education: 10 best plants	Big box stores – get them engaged; pollinator friendly-plants
	Social media	
	Agencies	
	Master gardeners	
Kids – how to get them?	Parks: info boards	Pretty not as important; "idea of pretty;" i.e. water gardens – gardens can be functional and managed
	Have bees in parks	
	Education	
	Naturally org. bees	
	Public access shows	
	YouTube	
	Change names "tickle bee"	
Bees have bad rap	Educate garden clubs	
People (homeowners) need to change landscape	Grants, tax breaks, HOAs	
Education	Study pollinators – find best plants	

	Share list of best	
Trees v. flowers because of bay	Area by area – mix of grasses and trees	
Feeding bees	Pollen sources – pollen substitutes	
	Starvation v. nutrition	
	High fructose corn syrup v. beet sugar	
SESSION 1		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Honey bees – augmenting feeding honey production and nutrition	*Planting for diversity – urban and suburban areas*	
	How to reach out – incentives	
	Aesthetic of consumers	
Planting to encourage bee diversity	*Fear of bees – uneducated about perception of risk; takes time and buy-in*	*Tax breaks – funds; grant money rainwater gardens*
Take care of "bees"	*Changing the name – tickle bee. Starts in the classroom…bring in more human pests; educate twentysomethings.*	*Hosting of bee centers: national groups that can bring a message to a school; encourage national advertising.*
	Teacher workshops	*Educating customers is tough*
Managing land spaces in the county; management of ROWs and land	*Working language*	*ROWs via Maryland and utilities; look at current management and introduce positive bee environments*
	Having a managed plan	
	Monitoring to show it's working	
	Establish foundation of measurement early	
Mowing and managing ROWs	*Cost savings to management of public land to mowing and conservation*	*Educate; introduce at a young age; volunteers to help engage the public*
The balance between native and "non-native" food	*Availability of forage sources*	*Start with education – homeowners; economic incentive to change*
Feeding for starvation v. nutrition	*Can make big difference for nutrition*	*Money – tax break, example…water gardens could help with pollinators*
	Incentives for people to change their landscape	*Grants*
	Aesthetics big problem	*Change overtime with education*
Bees have bad perception – public averse, uneducated with respect to risk	*Change name "tickle bee"*	*Public access shows*
	Start in the classroom – kids don't know how to identify bee	*YouTube, PSA*
	3rd grade pollination modules	*Social media*
	Garden Clubs share education	
	Teacher workshops	
Wood edges – fleas and ticks on borders, and people don't want that	*Bee centers or schools…start small; people can come*	
	Several agencies have programs	
	Reinforcement	
ROWs utilities	*Leave native; don't disturb ground*	*Depends on topography*
	"Operation Bee"	*Regional – needs to give leeway*
Educate	*No agriculture without honey bees*	*Box stores – can't get it. Don't know it.*
	Homeowner needs right site and it has to be client driven	*Turf – many benefits*

	Beekeeping class, county fairs	*Blending landscape design with education*
Beekeepers – lack of public lands	*Could promote pollinators*	*How do you get them into parks?*
		Case by case – left up to land managers
Reduction of mowing – needed	*Need more meadow plants*	*Landscapes, golf courses*
Allowing managed bees access to public lands	*Honey management*	*Who is responsible for deciding when to mow?*
	Money to gain access to manage land	
	A change to view the perspective of "lawns" to meadows	
SESSION 2		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Use of lands to plant pollinator plants – under power lines, ROWs – who does it?	*Bee club – Whom do we call? Where do we go first?*	*Soil conservation districts, local farmers – maybe not being tilled because it's utility. Contact them; could use their ROW. How do you know which land goes with which agency/company?*
	Because of liability, maybe influence utility/roads co. to do it themselves	
	For smaller scale (roundabouts) – may be more feasible to volunteer	
	These groups need specifics – have a plan to contact them	
	Ex: community organization in Bethesda; they do weed control; need to make a plan and commitment to keep them coming	
Highway used to do wildflowers	*Looking at turf mix – can they add clover? Others? They are looking into it.*	
Had a lot of meadows, but because of the bay, needed trees. Are there woody plants for pollinators?	*Maybe willows? Highway admin could come up with a master plan of what to plant where*	*Need one agency – whom do we contact?*
Suburban/urbanized areas…bee expanses. How do you establish these areas?	*Green roofs: maybe look for pollinator species*	*Find companion plants*
	Good honey production from Linden trees in DC area	
	Storm water management areas – provide money back to homeowners – can tweak recommendations for pollinators	*Buy an aster, get a small red clover (good pollinator) – bundle together*
	Problem: people want "pretty"	
What plants are best for bees?	*From nursery point of view – look at pollinator plants, but focus*	*Pollinator seed mix – not any for Maryland at this time*
		Would people buy Maryland mix? We think so.
Consumers – messages to them. They are turning to other things.	*Horticulture clubs, master gardeners – most counties have them*	*What to do at big box stores? How to spread the message?*
	Nurseries are the biggest driver; even when people don't care as much, if they go to a nursery they get info	
	Nurseries have native species displays	
	Social media, gardener bloggers	*Nursery numbers are increasing for pollinator plants – 20%. Native plants receive emphasis. Nursery needs to say "nictoid free."*
	National Parks, Department of Interior – native v. non-native	
	Keep bees in parks or near park – joint – county, state, MPS; keep informative pieces beside them	
	Social media – different topics	

	Verges – inform what's best for those	
How do you educate kids?	*Through social media*	*Gardening to make it pretty isn't important anymore; flower garden – managed v. functional*
	Educate farmers on the benefit to them	
Citizens contacting individuals responsible for unused land…borrowed landscapes.	*Groups or agencies to be contacted*	*Concerns about people on the land and liabilities*
	Soil conservation	*Proposed plan that details the project*
	Looking at meadow mixes to the median ecosystem	*Working to have long-term projects – consistency*
Lists of species that can utilize in unused areas; plants good for bee consideration	*Native versus non-native plants that will be good for pollinators*	*List of species – trees which is also for water control*
What about urban transformation?	*Urban water run off rain gardens*	
	Pretty plants for homeowners	
	Co-pollinator with pretty plant	
	Eastern pollinator seed mix	
	Message to consumers	
How to engage people into educating about pollinator options	*Extension services*	
	Horticulture	
	Master gardeners	
	Big box stores	
Information to consumer	*Educating consumers at nurseries*	*Social media*
	Park Service	*Mixing and combining resources*
	Tapping into consumers	*Getting the message out to the next generation*
Getting farmers information	*Crop diversity in monoculture*	*Pollen rich and nectar poor concepts; farmers to develop plans that can be good for pollinators*
	Combine a list of pollen to nectar with data to look at the best options for farmers	
SESSION 3		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
What beekeepers feed their bees	*Knowledge – type of food*	*Managing the public land with the suburbs and herb pants; native vegetation; selective management*
	Manage trees that stagger	
	Improve CRP	
Pollen and pollen substitutes		
Protein sources	*What's in the patty? Where is the source of the patty material?*	
Land use 30000/2 mil ag; the land of agriculture – working crops	*Educating farmers*	*Discover the areas that need to plant trees – utilize the zones*
	Utilize the data of scientists	
	Take advantage of unused land	
	Habitat inventory – look at buffer zones	
Increase forage availability	*Look at the state and federal programs and manage more selectively*	*Frustration – how to change the perspective and change the mowdown*

	Power line ROWs	*Being able to do a management plan – MDA to have a grant program that is sustainable?*
	Wildflower introduction of public road spaces	*Design program about installation and maintenance*
	Keep invasive plants down; selective herbicide treatment	
	Don't mow – let it grow	
	Utilize areas that farmers take out of production	
People don't know native	*Create a list of plants – what are the more suitable plants for the pollinator? Look at the cost to maintain.*	*Who has the lists?*
The cost of other insects in a bee friendly environment	*Working with associations and regulatory groups – right size the maintenance control*	*Water and mosquitos, deer, rodents, ticks*
		Educate homeowners – maintain the natural as a good place to enjoy nature
Trees as a buffer for bay – can't plant flowers	Convince state meadows; warm season grasses	Mandate to have trees: should be pollinator friendly and native; bugger of native vegetation not disturbed
	Let department do assessment of property – can do a mix, or trees, or flowers	
	Look at federal programs	Group trees closer together, leave open area
	Ditches, get rid of sweet gum, let it grow	
Used to have flowers along the road – where did they go?		
	Study on pollinators to see what plants are important	
	Ex. Maples, mustards, dandelion	
Need to mow less, but HOAs won't mow just once a year because of ticks, fleas, mosquitos	*Educate HOAs: show them they won't diminish property values, providing a linear park, kids going back to nature*	*Too much water attracts mosquitos*
	Take care of Western Maryland power lines	*Communities need to partner with utility*
		Education and funding: explain it doesn't cost more – would actually save money to mow less

ROTATION 4: FORAGE AND NUTRITION		
SESSION 1		
FACILITATOR SUMMARY NOTES (FACILITATOR DID NOT PROVIDE DETAILED NOTES FOR THESE SESSIONS)		
Lack of forage ability shrinking/loss of habitat	Continuing to expand relationships from a variety of fields	Lack of: • Education and programs • Funding for research, particularly for native pollinators • Communication between agencies and groups
	Utilizing existing programs	
		Funding

SESSION 2		
FACILITATOR SUMMARY NOTES		
Lack/loss of habitat	Changes to: • Local and fed codes for agriculture • Cover crop policies for growers • Meadow management for utility lines, rights-of-way, open spaces, etc.	Lack of: • Education on pollinators and existing programs • Datasharing: who has what?
	Development of nutritionally complete supplemental diets	
Ineffective wildlife planning		
More plants might not mean more nutrition		

Table-Specific Notes: Pollinator Pests, Disease, and Genetics

ROTATION 1: POLLINATOR PESTS, DISEASE, AND GENETICS		
SESSION 1		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa • Small scale producers not treating • Eliminate cycle	Education	Farmers: cost/benefit of weeds
Genetics of bees to resist pesticides	Native Plants – bees	When to mow
Legislative • Use peer-reviewed science-based research • EPA guidelines	Develop best management practices with different combinations of pesticides	Exploring potential industry/states (IA, FL, MN)
IPM for Bee Pests: very new	Quarries for bees	Weed problem/invasive plans
Monocultures used in pollination	Inter-mix bees, if possible	Cost and management
		Lack of education
Communication	Prioritize different commodity groups and beekeepers	
	Gain feedback from beekeepers	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa: small scale producers not treating	*Information and education*	*When to cut – Weed problem; invasive plants; no education about native plants and where to find; cost management; lack of education*
	Expertise to stakeholders, private and institutional, commercial, small bee farmers	
	Native plants = bees	
	Develop BMPs for pesticide and non-pesticide treatments.	
	Intermix bees is possible	
Varroa are developing resistance to pesticides (neonics)		
Monoculture used in pollination		
Legislation	*Use peer reviewed research. EPA guidelines. Not based on emotion…follow the science.*	
Need funding for broad scale education	*Educate public, beekeepers to keep health.*	
IPM for bee pests – very new		
Communication	*Facilitate communication – take message to farmers, get feedback and different perspectives*	
Pesticides	*Identify genetics of bees resistant to pesticides*	

SESSION 2		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa mites • Not only threat • Why is treatment not standardized? • Colony losses	Educating beekeepers	Immunity: Propose projects
Small hive beetle	Happier beekeepers	
Genetics: Funding, limited DNA pool, in-breeding, native bees do not mate	Continuous research: affirm discoveries	Bees/resistance: Introduce queens from other countries
	Policymakers – laymen terms	Unintended consequences
	Dispel myths and fears	Carefully review
Decision-making using science-based research	Communication	
Resistance management • Types of pesticides • Backyard versus commercial	Educate beekeepers	Beekeepers • Do not want to treat • Rotating group/high turnover rate • Beginning bee classes • Messenger is more important than the message
Culture management • Does not preclude treatment • IPM approach	Culture management practices – does not preclude treatment. IPM approach.	Survey management practices: Treatment vs. non-treatment
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa mites: treatment for mites		*Do not want it, rotating group/high turnover, beginning bee classes, treating bees/cannot force, $10 a year max, bust the myth, messenger more important than the message*
Colony losses		
Small hive beetle		
Genetics: funding, limited pool, fresh blood in breeding, is there nothing native?	*Queens from other countries*	*Bees building resistance*
Research needs	*Continuous research – affirm discoveries, communicate for policymakers, access to research in layman terms, dispel myths/fears*	*Survey management practices with treatment v. non-treatment*
SESSION 3		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**

Varroa • More of a vector • Virus – deformed by virus	Coordinated treatment time within an area to get entire population down	Unregistered beekeepers - 1:1 ratio
Lack of diversity of products…not as effective	Need more research on virus	No belief in treatment
Small hive beetles: traps not really effective	Education • Use product as intended • Treatment of mites • Treatment vs. non-treatment	Communication • Go to beekeeping meeting • MP3 for comment • Cross communication/resources among states • Follow technology trend
Genetics • Hygenic sensitive bees/queens • Examples/what to look out for	Improve resources	Joint task force of resources
Improper identification • Disease/pests • Pesticides • Beekeepers killing own bees	Improve best management practices: Communication with local beekeepers	Open communication between beekeeper and commercial
Laws not changing		
Unregistered products		
Misapplied products		
Distribution of resources		
Lack of education on pesticides; misinformation		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa	*Coordinate treatment…time to get the whole population down*	*No belief in treatment; into soft organic treatment; minimum amount of acid. Winter treatment. Not heavy numbers in spring.*
Viruses – need more research (e.g., teleformed wing viruses)		
Lack of diversity of products		
Education	*Use product as intended; treatment of mites – show treatment v. non-treatment*	
Small hive beetles – traps not really effective		
Genetics – hygenic sensitive bees/queens	*Examples of what to look out for*	
Improper identification of disease, pesticides, beekeepers killing own bees, using unregistered or misapplied products	*Improve BMPs*	

ROTATION 2: POLLINATOR PESTS, DISEASE, AND GENETICS		
SESSION 1		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Oxalic acid availability – not registered in every state	UMD/unis distribute?	
Small hive beetle – treating unnecessarily	Education at beekeepers' meetings	
Banning chemicals – leaves industry without effective solutions	Educate on following labels	
Resistance from hybrid/GMO bees		Beekeepers won't like
Varroa	Everyone in region should treat at the same time	$$, some don't like chemicals
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Funding for programs, i.e. reporting by municipalities	*Tax on hives…how do we ensure appropriate groups paying?*	*Taxes not popular and laws hard to pass*
Bees with resistance (hybrid/GMO bees)		*Beekeepers don't want to buy a patented bee; some universities working on hygenic bees (time and money intensive)*
Following instructions	*Education – Varroa Treatment Day; Everyone treat at the same time*	*DC tried a one-day event…heat caused problems*
Trymolated sugar syrup used in EU; thymol only from Canada	*UMD offer at cost with instructions*	
Oxalic acid hard to come by	*Approved in which states; Make available by UMD*	*Home brews can be dangerous and illegal; just approved via Brushy Mountain State Registry; state registry can be costly depending on policy*
Small hive beetle – usually benign, so pesticides unnecessary	*Outreach/education*	*Talks at beekeeper meetings*
Banning/removing chemicals from market	*Removal leaves industry without effective solutions*	*Training, timing of spray/night; advance notification to beekeepers*
SESSION 2		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Fungicides – how do they affect honey bees and wild bees?		
Varroa	Programs and counties to help bee keepers manage Varroa	$$ - license plate pollinators? State provided miticides?
Research	Diagnostic bee lab – unite MD/VA/DC	Apply for a grant; more interns? Money from chemical companies?
	More basic research on native bees	
	More studies on gut biome	
Poor genetics		
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Mite control/treatment	*Need to diagnose, test, and treat start to finish. Get a quick test kit. Need a centralized diagnostic lab that is funded.*	*Understaffed lab*
	National Mite Treatment Day or National Mite Count Day	*Could lead to unnecessary miticide treatment*

	State funded miticides	*Pollinator license plate to establish funding (similar to the Bay plates)*
Poor genetics		
Programs in counties to help beekeepers	*Use extensions to help with outreach*	*Consistent education programs – all clubs currently have a short course, beekeepers are not required to treat. Many beekeepers want to be natural.*
Agricultural regulations to prohibit international imports of bees		
More research on native bees	*Native bee health surveys*	
Alternatives treatments for mites that are non-chemical		
SESSION 3		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Upcoming new diseases – what's next?	Monitoring at ports	
Weakness in registration – beekeepers who don't register		
BMPs for HBs and wild bees		
Increase habitat	Set goals for MD (i.e., forage acreage)	
Varroa control	Education	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
BMPs for ground bees/ native bees	*Focus on native plants and you can help both native and honey bees*	*Short window for wildflowers blooming*
	Focus on habitat protection	*Utah has a great flier for BMPs for the general public on what they can do as landowners*
	Public is not properly educated; especially on honey bees	*Sprinklers can interfere with native bees since they do not receive their natural cues to seek shelter*
How much do we need to increase forage habitat? 2%? 5%? 10%? – should set goals…otherwise it's hard to measure success. Much better to have 10 acres of contiguous.		
How do we kill mites?	*Education is huge*	*Too many "green" people*
	Question from beekeepers on how to get oxalic acid for bees that are labeled for bees	
Misuse of miticides	*Fluvalinate and coumphas are very prevalent in colonies*	*Not being used currently but found because lipophilic*
Weakness in registration in beekeepers who are not treating	*Pollination is the product for commercial beekeepers not honey*	*Getting small-scale beekeepers to treat; most of Maryland beekeepers are small scale*
What is next after Varroa mites?	*Tropilaelaps would be the next potentially dangerous mite*	

ROTATION 3: POLLINATOR PESTS, DISEASE, AND GENETICS		
SESSION 1		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa	Agreeing on and disseminating best management practices	
Disease introductions	Greater vigilance in inspecting, evaluating, and quarantine	
Inbreeding/lack of diversity	Promotion of local queens; germ plasma; importation	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Unwillingness to treat among small-scale beekeepers	*Educating small-scale beekeepers; information needs to be disseminated*	*Find a way to package the information all together*
Nosema, foul brood		
Introduction of further disease from abroad	*Could bumble bees help solve the problem?*	*Introducing bumblebees could bring further disease*
SESSION 2		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa	Helping small scale beekeepers	
	Monitoring for mite-vectored viruses	
	Breed for resistance	
Queen failure/genetics	GMO queens	
	Government regulation/quality control	
	Inspection bill	
Educating beekeepers	Work through the beekeeping associations	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa	*Fund APHIS better*	*Staffing*
Small hive beetle	*Scientific method*	*Scientific trust*
American Foul Brood		*Better checks and balances for shopping bee packages*
Disease introduction		*Better system of registry (more questions)*
Inbred queens	*Locally raised queens*	
Educating beekeepers	*Fund a system of better education*	*They don't always listen to or believe scientists*
SESSION 3		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa	Use judgmental beekeepers to your advantage to force behavioral modification	
	Convince small-scale beekeepers to treat	
Education	More things like university sanctioned short course	

Upsetting natural ecosystem balance	Return the system to being more natural	
	Give up on the idea that you will necessarily get a return on your investment	
	More research – have it better explained	
FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Varroa	*IPM approaches*	*Using judgmental beekeepers to overcome resistance; personal bias*
Inbreeding	*Education*	*Create a culture of reporting what you're doing and how well it's working at Beekeeping Associations*
		Let people know which products, how to rotate, and relative toxicity
		Some beekeepers are afraid of the chemicals
		A beekeeper university – beekeeping minor or associate degree
Nosema	*Hygenic strains*	*Package/informative sources*
The unknown: Do we know what's on the horizon in terms of potential introduction?	*Communication and understanding*	*Better dissemination of information; better research*
Spreading disease because of migrating bees		
A gap in knowledge and training		
Disease introductions	*Species local, viral/disease screening*	*Funding*
Genetic diversity	*Immune test strips, nutrition-rich pollen sources*	*Nectar flow past June, economics*
Small hive beetles	*Quarantine*	*Registration questionnaire; pesticide service approved*

ROTATION 4: POLLINATOR PESTS, DISEASE, AND GENETICS		
SESSION 1		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Mites – products and IPM methods	Focus on small scale beekeepers (most of them); some are reservoir of disease; address misconceptions	
	Incentives to become more educated and to monitor and control	
Registration		
Inspection (# of inspectors) – coordinators (not police)	Deputize inspections to local associations	
Genetic bottleneck – need more breeders		
Need: research and education	R&D from companies for alternative products and universities	

FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Mites	*Some mechanical approaches to IPM work on small scale because of labor but not large scale*	
	Some soft chemicals	
	Commercials don't want the products because they're too costly	
How much science is available on Varroa control besides miticide?	*More research, but RFD requires a lot of investment not only from companies but from universities.*	*Not much money for innovation. Seems to always hit a wall. Need funding. Some believe there is enough research already, but it's more about getting the word out.*
Need products that are less toxic to bees		
Old products are less effective		
Varroas spread from one yard and collapse others	*IPM: Monitor and react. Need education. Large commercial beekeepers know it but not small scale. They want to "save the bees."*	*A lot of small scale beekeepers are reservoirs of disease.* *Education is important through the state and local organizations, but what are the incentives to becoming more educated? Tax breaks for honey products?*
Registration: But in practice many are not being inspected	*Need more presence of people. Crosstrain inspectors from other departments? If AFB, can kill, but with Varroa, can only recommend. Needs enforcement. Maybe deputize someone from MD state beekeeping association or roster beekeepers?*	*Doesn't seem feasible because of the different backgrounds. And you don't want the inspectors to be the bee police – it's a fine line. Need regular contact, but people resist regulation and it eats up a lot of time.*
		Education: believe people want to do the right thing
Small scale beekeepers have increased…how do you get to those people?		*The internet makes people think they're automatic experts, but you need education from the university*
No progress on improving stock; it's a genetic bottle neck -> deterioration -> need to increase breeders -> how?		
Varroa treatment – how to make it systematic	*Community coordination*	*Herd immunity; questions about products; can't control within a radius; "what is the pest;" agreement – education*

SESSION 2		
FACILITATOR SUMMARY NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Mites	R&D	
	Education – funded	
	Alternative methods/products	
Genetic research	Research; incentives on local queens	
MD inspectors	Great resource but need more money	
Registration	Need revamp	
Pollination inside and outside MD	Migratory – quarantine and examination	

FACILITATOR DETAILED NOTES		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Can't develop legislation for good behavior		
Impact of Varroa mites	*BMPs for in hive controls*	*Chemicals lead to resistance from other methods. Registration of hives…access to state apiarist but demotivation because there's not enough time.* *Why not register? People will know locations (in DC), laziness, people don't know they have to. Registration fee – okay if benefits them. Not enforced.*
	Combination of tools	
	Good news – oxalic registered! Not likely to evolve resistance	
	Need to find more methods	
	Need more research – universities bee programs, bee clubs, companies	
	With local breed resistance, could do exchange among bee clubs	
Local needs: early spring, too few local breeders, very expensive queens	*Should encourage the local breeders*	*Incentive program from MD Ag if buy MD queens…deduction in tax*
VSH breeding		
Packages < Southern States		
Loose genetic diversity		
Queen failures		
Viruses (other than Varroa)	*Product rotation to avoid decreased resistance.*	*Lack of information…don't know better?* *Oxalic is cheap, already available* *Nobody wanted to register it, EPA had to step in…good job!*
Need BMPs – How to? Do they already exist?	*Information for public who want to start beekeeping…need to set real expectations. First couple of years are going to be losses. Numbers only won't solve it; there's a lot that beekeepers can't control.*	*Beekeeping associations already try to do this…why not used more? Lots of courses are overwhelmed! Tremendous interest, room for more. Could government provide funds for more education/beekeeping?*
MD beekeepers depend on inspectors, but it's only one person half time. They're not paid well. Beekeepers are asked to contribute…shame! Great resource but overworked	*MDA needs to step up*	
Migratory beekeepers that come back to MD need inspection (quarantine)?		
Not a lot known on how diseases affect wild bees		

Table-Specific Notes: Other

SESSION 4: OTHER		
SUMMARY NOTES FROM ALL FACILITATORS FOR ALL ROTATIONS		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Educating public in importance of pollinators	Community outreach in urban areas – urban beekeeping	
No registration of colonies: • Spray notification • Can't get them educated • Not enough top-down enforcement	Beekeepers should know their neighbors	No government in my hives
	Notification from organizations	Small scale changes are too costly for organizations so doesn't get done
	Changes on the small scale	
Helping commercial beekeepers who lost colonies to disease, pesticides, weather, bad year		
States restricting importation of bees		
Education	How? Who? Who pays for it?	License plate that helps fund programs
		Crowd funding
		Viral video
		Herbicide/insecticide tax
Maryland bee inspectors		
Pesticide content in honey (food safety for consumer)		
	Promoting management upwards; all industries together (farmers/bees, landscapers, industry…)	
	Electric fence (subsidies/grants to defray costs)	
	Leverage partnerships	
	Prioritize projects – specific, measurable, obtainable	
	Education campaign with buy in/support from wide variety of groups	
Urban beekeeping – Maryland comparison? How much impact? There's interest but no expertise/time. Master gardeners, not honey bee experts.	Apprenticeships	
	How to become a beekeeper?	
	Impact of urban beekeeping	
	How to get the generational info (young/youth outreach)	
Bear predation – how to protect hives		
Drift issues in the state of Maryland: Does this actually happen here? How do we know?	Make guidelines relevant to Maryland	
Pesticide disposal		
Networking: How to stay in contact and continue the momentum of the meeting. Need specific, measurable, relevant goals.		

Education	Companies, federal/state/local agencies, and associations can educate.	How do you measure the success of education/IPMs? Pre/post surveys.
How does all of this information get synthesized?		
Who are the messengers?	Big government, regulators, industry, other beekeepers	
Hive identification	Maryland using Mississippi model; computerized model better	
Effective communication		Measuring effectiveness/success; performance measures
Losses		How do you manage/measure them?
EPA		What measures? Unknown/uncertainty

Appendix D: Breakout Session Comments (Attendee Notes)

The following tables include the content of the worksheets that attendees completed during the breakout sessions. The tables are broken up by category: agricultural and non-agricultural pest control; forage and nutrition; and pollinator pests, disease, and genetics; and other. Within each category, notes from different attendees are separated by blank gray rows.

AGRICULTURAL AND NON-AGRICULTURAL PEST CONTROL		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Use of neonicotinoids in suburban & urban areas by homeowners (non-ag)		
Lack of effort in enforcing FIPRA + violation of the label		
Inadequate testing of pesticide impacts esp. at sublethal + synergistic use		
Pesticide poisoning, no pesticide database		
Overuse of prophylactic systemic insecticides i.e. in seed treatments	BMPs that evaluate level of pest + treat proscriptively i.e. 10% of corn affected by corn borer yet 98% of corn pre-treated	
Over 300 products for consumers include systemics and are often applied incorrectly at as much as 10x rec. strengths	Limit consumer access	
Alternatives that are less toxic – over 240 – are not well known or publicized but requires awareness +education	Pesticide use database for research and ability track, registry for both applicators + beekeepers like chemically sensitive	48 hr notification
What is being used where? Around 3 miles of hives coordination to protect impossible, use of herbicides, not tested for sublethal effects + synergistic effects, tank mixes	1PM methods so not needed	
Regulation	Educate about use – stop chicken little	Panic among gov. reps
		App. list of bee
Toxicity/ non-lethal effects to bees		
Homeowner use/ not trained personnel	More info needed	
Coordination b/w applicators and beekeepers → no use for wild bees		
Less effectiveness of pesticides		
Non-ag "bans" on all pesticides, agency interaction, lack of education	Identify how to use pesticides with controls/ assistance + cooperation, assist/work with community/beekeepers to identify BMP's	Communication, funding, higher powers/politics

Over-application of pesticides, herbicides, and other chemical agents that may affect hive health, pollinator health, and honey products	Risk-based application amounts and methods	Research
Wide use of pesticides and other chemical agents by individuals & communities that impact the environment & pollinators	Broad groups, work with establishments setup, registry for sensitive agents or people in the area to prevent exposure (beekeepers registry) w/in specific area	48 hr notification (MD doesn't have this rule), move the colony, can cover them for 2 days
Wide use of herbicides in commercial agriculture that strips beneficial edge plants in fields & rural areas		
Pesticide use in colonies for mite control 7 other diseases, climate change?	Education	
Lack of education/ awareness by non-professions on labeled use	Working with the stores selling products, educating through master gardeners	Broad group to reach
Coordination between applicators and beekeepers	Database	Funding, privacy
Reducing exposure to pollinators	Seed lubricants, limited application windows	Education, enforcement
Focus on pesticides and lack of concern for other stressors		
Private mosquito companies, spraying every couple of weeks all times of days/pyrethroids	Homeowner should lower habitat standing water, stronger labeling from Feds, flowering plants	Backyard boutique make money, Mosquito-borne diseases + ticks etc., frequency of spray pest threshold based
Preventative pesticide use/overuse	Change practices, later time ~ 7PM, reduction in production costs, changes in practices + procedures	Habitual practices, time constraints, acreage to cover, outreach to growers, scheduled sprayers/grower demands
General public pesticide use, advertising		Public fear of insects/bees, ease of use, controlling vs. management, schedule vs. threshold?
Pesticide/fungicide interaction on pollinators, hive + pesticide application database (field watch, bee check, drift check), meetings w/ beekeepers + growers, IPM shouldn't center on pesticide use	Increase research	
Scheduled spraying, unnecessary seed treatment	Crop rotation	Not enough extension agents to reach all growers, increase Maryland state promotion of BPM
		Resources out there but people don't know who to what to access, know who to talk to, increase biological controls, spray border vs. whole field
Drift from applicators, poorly timed sprays, label violations, unclear labels, poorly trained applicators,	Educate & regulate	

field scout communication to applicators, Are they actually measuring pest-thresholds?		
Poor communication between applicator/farmer/beekeeper, Non-Ag	Educate/better labels with enforceable language	
Human health vectors for non-ag - mosquito/ticks – lyme, backyard boutique sprays – needed, homeowner education – do you really have to spray for that pest?		
Pesticide application (timing, threshold)	Education +communication	
	IPM, cultural/biological controls	
Pollinator restrictions; in general homeowners use pesticides incorrectly – selection of products		
Pesticide drift watch	Help keep beekeepers and farmers aware of one	Need to subscribe to service, not everyone able to use technology
Mosquito control		
Pollinator pesticides	Allow for strong plants	Stopping the stripping of road and fields
Forage + nutrition	Use areas in flood coastal	
Pollinator pest diseases & genetics	Diversity	Education
Do herbicides have a negative impact on pollinators		
Are there bio-controls for bee pests?		
Is Canadian bull thistle still an economic weed problem and do they need to be classified as a noxious weed?		State listed noxious weed
Ensuring that farmers and producers feel that they are heard		
Raising awareness that pest control can have detrimental effects on bees		
How to make bee keeper notification processes work		
Are there pesticides that are less harmful and how can they be marketed effectively?		

Loss of products, good valid research, is the issue honey bees or pollinators? Clearly defining problem/goals	Meetings like this, high quality long term research, continued educational programs for interested parties	Public opinion (knee jerk TX), looking for easy solution
Home owner use for lawns & gardens	Educate, dandelions are better than green lawns	Everybody wants a green garden, educate H.O.A.
Applying during bloom		
homeowner use of pesticides and measuring impact vs. commercial company use of products	could we chemically "tag" homeowner products so that testing could differentiate	liability, development of safe product to use, must be easy to test
Liquid pesticide application is known to be highly inefficient, we need a way to improve this process	Better application technology: • (true) electrostatic spraying technology • Improved formulation (i.e. bee repellents added, low drift, better adjuvants) • pesticide	Cost of technology; differentiating good/true equipment from sham
Stress of shipping commercial bees for pollination + their exposure to pesticides in crop (i.e. almonds)	Mechanical pollination • there have been successful pollination trials w/ electrostatic spraying in almonds, cherries, etc.	Needs more research + trials; incentives
Homeowner over use + misuse	Put a visual dye/chemical in a product such that, if overused, it would look bad (but not be damaging)	Getting chemical company buy in
Effect that mosquito abatement programs (private + government) may be having on pollinators		
all chemical use- restrictions on use, who can, when, where, how	driftwatch	
Overuse of controls in bee hive	Education for beekeepers about the how, when, why of mite treatments and proper use	
spray rotations for success without bee kills	recommendations from chemical reps for safe programs	confidentiality
Inexpensive deterrents prior to spray application	Reduce bee kill with deterrents	
	Professionals can set an example on BMPs	
Overuse of pesticides		Limit when high risk pesticides can be sold retail.
For-hire mosquito spraying services killed my bees! What can we do?	require these services, mosquito Joe, mosquito squad, to train their personnel in pollinator friendly methods. Monitor their work.	
Public is not aware of harm they cause when they use insecticides	Educate on and/or regulate use of pesticides. Especially for non-agricultural use.	

Off target movement of pesticides		
Non-trained applicators		
Online snake oils		
Not enough flowering plants	Use right of ways to plant a variety of flowering plants	Lawn care companies
Too low of a variety of flowering plants	Use federal county and local government property and building to plant from a selected list of approved items avoiding wind pollinated items like grass	Zero cost as you are already planting and maintaining this area
Too much grass		
Using neonics on more crops can be avoided		
We do not have adequate informals about how products (fungicides) affect bees	Expand evolution study	Cost
Increased regulation creating issues for what I do		
Poor public perception + education		
Not enough forage	Identify low use areas to promote	Communication, planting techniques (mowing), weed control
Extreme weather trends	Identify BMPs for combating cold winters	Identify proper plants for optimal nutrition
How much does non-Ag really detriment?		
Knowing beekeeper locations	Registration	
Educating non-ag on detrimental pesticides & negative -	Pollinator – of Pesticide Certification, more stringent state regulated certifications	
Test study, bad private & public	Education	Education, IPM programs
Cost to farmers	Education	IPM
PPM and vector control	Educate that it's not a factor	
Turf is safe		Education
Identify what's low risk	Rational management is key	Education, plant tags
Ag uses – following what's in other state MP3s		
Mosquito control spraying & the perception in the public	Public education – talks to beekeepers, work w/ beekeeper groups	Unregistered beekeepers – we don't know where they are, public knowledge/lack of knowledge of public health/mosquito/disease issues
"Misting" used by PCOs		Homeowners want "pristine" (i.e. deserted wasteland) for their yards

Pesticide/fungicide and adverse impact on pollinators, to include "native" bees	BMP for Ag and non-ag uses of pesticides/fungicides	Fact that many non-compliant uses of pesticides are carried out by homeowners/public
Redefinition and re-emphasis on integration pest management	Education	Unwillingness of public to self-educate using available educational/labor materials
Inadvertent distribution of pesticide "cloud" by seed planters	Research into seed coating and planting techniques	Research to practice
Paucity of information		
Agricultural treated seed dispersion formulation and off-target -	Better techniques, improved formulation	Has the damage already been done?, time needed to implement
Public awareness	Homeowners, how to use pesticides appropriately, better labels	Cost – grants, corp partners donations, federal regulation
Application BMPs	Better enforcement, improved training to small businesses	Training sessions
Impact of fungicides, pesticides, herbicides on all pollinators		
More targeted mosquito control	More education about physical control	Education
Drift application, non-target	Drift watch, find sensitive info	Database of apiaries
IPM modernized, education of homeowners, funding for ext. master gardeners		
Controlling pests in the landscape while being a good steward for bee	Education for public (list of beekeepers locations provided to applicators) education for applicators (additional license of part of pest app license)	
Foliar sprays – w/respect to the new label restrictions, fungicide effects – need nose mask	Grower/applicator, education, could be more compliance to label – specifically applications during day	Use new wax frames on a rotation & decrease miticide exposure
Bedding plant treatments, greenhouse, lawn care treatments	Stop 3-4 several beta retail marketing, need to return to some form of IPM, away from preventative control	Homeowner education, know what lawn/landscape services are treating in routine scheduled applications
Lack of complete registration of HB colonies in the state w/GPS coordinates	With the new label restrictions, applicators can apply pesticides to flowering crops if they notify beekeepers	Without a database of colonies and location, proper notice is not possible
Knee jerk reaction to pesticides, limiting research	Education & research	Regulatory solution
Bees being affected by producer's actions, lack of producer knowledge		

Regulations as done by Mont. Co. MD., foliar treatments	Use a coordinator not an inspector	
	Promote beekeepers to contact neighboring farms for on- on-one relations, self-govern – if you see an unregistered hive contact owner and/or report to coordinator	
Agriculture: clean disease & pest free food, maintain crop yields, profitability	Use of pesticides, crop rotations	Public concern, poor yields
Turf grass: difficulty to harvest, safety – allergies	Promote healthy turf through maintenance	Public perception
Direct effects of pest control (types of effects, additive, synergistic, cascades, etc.)	Many of these treatments need to happen, but yet, must take care not to get so stuck in past, you fail to adapt for future	
Drift from other places/uses	How to effectively encourage people to comply?	
Crop yield, "engineered" nature, overuse of pesticides by homeowners in quest for perfect lawn, non-BMP shift in cultural thought		Education to public
"Engineered" nature	Using proven practices overtime i.e. mowing schedules, let natives populate	Removing invasives & let nature heal itself
Crop yield, "perfect" product, $ profit for companies	Shift in cultural thought, non-perfect produce, etc.	Education outreach
Food – quality nutrition	Education to use public or tree space for planting large & small	Subsidized planting of valuable food source to bees
Non-target species exposure to pesticides	Dosage > restrictions, timing, application -, IPM application, encourage presence of beneficial insects	
Lots of fungicide & pesticide use + herbicide	Educate homeowner	
Identify unintended consequences when properly applied		
Mosquito spray – permethrin, sensitive crop locator – need		
No Product bans	Refine IPM application	New R+D
Systematic carryover	A pre Harvest Tutorial for ornamentals	More Research
Drift Distance?	Sensitive Crop DB	R+D
Focus on pesticides at the expense of other substitutes	Education-clear and focused-simple	Social Media

Pesticide drift/measure	Report to MDA	UM extension, MAEF, Master Gardener, Social Media
Beekeepers on sensitive crop locater	For commercial growers in general	App? Ability to keep up with commercial bees as they move for pollination
IPM	IPM	IPM
Applications that can end up on bees. (drift). Application Times, label, following	Some form of notification, Education	Funding, use state registry or be creative
Pesticide BMPs timing and communicate hive locations	Division/ segregation of crop orchards vs alp alfa/ cloves. Different species/ different times	
Lack of Communication for application of pesticides. Understanding of what is there and seeds soaked.	Lessen the toxicity of sprays	Again, communication.
Follow labels, don't double dose.		
Lack of Habitat	Landscape design: neighborhood lawns, change MNOT practices, lower deck, lowering carbon footprint, think spring/summer/fall	less fertilizers, weed killers, perfect lawn, mice in neighborhood, must have solution, change the culture.
If they create forage areas, forage areas take away from farmers. More forage land, less farm land.		
Lack of education and training.	Create local database	Register internet may not be reliable due to location. Beekeepers are unregulated, more awareness.
How do you convert federal, state land	Open land for bloom, one mower deck around forest, less money cost	Living document- lack of info and focus on failures and learn from the resource issue. Lack of budget salesmen.
Non-ag pest control, use of – by homeowners (overuse), ornamental plants vs. bee friendly		
Ag, seed coatings, proph. use – are 100% coatings needed?		
Amt. of time, pest #s are detected, time of pest application, fruits vs. crops		
Limited to 48 hr notice, provision for BK		
Mandated grass – ordinance in urban areas routine mowing	Main if managed using best practices	
	Voluntary hive receptions, disseminate science-based education on BMPs	US Geo grass
	Miticide – hive, hybrid bee resistance	

FORAGE AND NUTRITION		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Loss of nectar + pollen sources summer-fall	Encourage habitat enhancement on state + private lands, save money on mowing	NRCS + Ag Reserve, stop mowing roadside + right of ways by state + country roads
Changes in nectar phenology due to land care & climate change	GIS + satellite observations technology exists, data are free, MD/MDA needs to take advantage	Lack of species abundance + distribution of nectar sources for Maryland
Not all pollinator friendly seed mixes are adequate may need tailoring to MD		
Absence of the fall nectar flow aster/ goldenrod has failed in > 80% of years since 1992		
Lack of contamination of crop field buffers by pesticide dust, home landscape, non-ag landscape contamination by symptoms; 2 studies show 50% loss of native foragers (Danish & US studies), mosquito control – contracts in 3 week intervals	More funding for CRP, CSP, EQUIP for pollinator plantings (SCD), info on climate warning effect on floral sources + changes in land use to coordinate better planting of trees at state level	Money
In 3 tested plants for big box stores of bee friendly plants contain 1+ more neonics so kill bees – consumer right to know how we can implement forage plant areas such as right-of-ways, state municipal land	National Dep't PEPCP holdings + BGE utility rights-of-ways	
How do I encourage native plants that help foragers?	Fertility & mowing patterns? Whole year feeding? High quality nutrition? Deer issues?	
Impact of vegetative growth on pollinators		
Is my property sustainable?		
Public image of golf courses	Educate public on what we do, vegetative not reproductive	Anti-pesticide groups
Amount of area planted	Reach out to bee keepers and landowners	No clear answers – have the experts less firm on process
Types of pants		
Not enough funding for evaluating current efforts and pollinator-friendly plantings, "high quality" nutrition not exactly same for honeybees and wild bees	Diversity of floral resources	
Floral resources throughout year		
Monocultures (honeybees can be moved, native bees not)		

High quality floral resources vs. native, lack of forage, pesticides, smaller areas in larger areas		
As the manager of a state pesticide regulatory program, I do not have knowledge of this subject matter	Learn more about this topic and how it relates to my role	Time and support
Supplemental feeding programs, education, and research	Provide different flowering plants throughout the year, find a good mix for honeybees and other native pollinators	Non-native plants vs. native plants, provide funding for regional land grant universities to study native plant mixes and bee/pollinator health and quality (particularly Nicola Seitz from UMD)
How do we provide sustainable sources of high quality forage for honeybees & native pollinators?	Create educational programs for private owners, possibly target homeowners' associations & educate on habitat transition + how to do it, make the change a community at a time	"the lawn communities may not be willing to transition," money to implement programs to provide better yearly forage, sugarloaf community associations
I am intrigued by the finding of fungicides playing a role in the prevention of colony access to "bee bread," how can we find out more about that?	Provide more funding for research in these areas, explore more epidemiological data to identify more factors that work synergistically to impact bee health	Scientific advisory personnel to Congress, reduction of academic researchers in the scientific debate at a national level
Lack of funding for efforts to evaluate the current efforts and effectiveness of current programs	Create methods to evaluate current programs and require measurement metrics for future funded projects	Who regulates who gets the funds, what is the measurement matrix – how do you effectively measure it?
Influx of neonics in home gardening products, permethrins to prevent mosquitoes	Use alternative management methods to combat unwanted plants & pests	Miscommunication between agencies barriers between folks, engage DNR – no DNR folks at meeting missed opportunity
Not a lot of research; urban, suburban encroachment	Rights-of-way, power lines, field/lawn edges; less mowing; CRP, EQIP funding	Funding for research and habitat if each home/landowner did a little
Urban suburban encroachment	Engage w/ HOAs and civic associations	"Perfect lawn" perception: educate about bees/pollinators
Weather variability	More education on preparedness	
Need to spread out habitats		
% landscape in grass	Meadows around grass field areas, mowing limited to once/yr, increase meadows, lower water usage + fertilizers + maintain lawn	
Lawncare now single species vs. mixed wildflowers		Weedkiller
Lower native flowers in favor of ornimentals by homeowners	Community education	
Lower farmland → suburbs/lawns perk land state/local, poor nutrition vs. starvation	Example, forage areas for soil types/study years to establish, education, BMP	Cost – no money budgeted

Mowing alfalfa + other blooming crops to increase protein for animals		
Change in climate, seasonal flowers blooming, and of bees temp. range		Climate
Monocultures lack of area for forage	Winter cover crops allow to flower, mower deck perimeter, save on mower costs, equipment costs, decrease water use on lawns, living mulch mixed	Mice/rodents in meadows
Lack of education for growers, beekeepers management, feeding, beekeeping classes	No drill planters – would not need special equipment, local focus for education	
Lack of acres, monoculture	Intercropping	
Cost to implement new forage acres	Cost share programs/incentives	Cost-want
Loss of productive lands for farmers if they plant pollination strips	Study to show while loss of acres decreases cropland, increase in pollinators can increase yield, therefore cancelling out loss of productive farmland	Cost
Lack of education for growers, what do I plant/when/how much is ok, ROW + state/Fed land opportunities	Outreach, use of mapping tools	
Loss of habitat/foraging areas	Establishment of feeding areas (meadows, field edges), change of management practices, landscape design	Development – how to utilize what area is left available?
Lack of education	Community outreach	How to find correct resources (local focus)
Difference between feeding and nutrition, poor nutrition vs. starvation		
Monocultures – need diversity in forage		
What to plant, how to manage		
How to incentivize (ag, non-ag, non-traditional)		
Analyze programs so there are not disincentives	Analyze fed + state programs	
Where is forage needed	Where are apiaries	
Monocultures + govt lack of habitats	Engaging non-traditional sources for providing habitats – season round, educating beekeepers & farmers, forage opportunities	Education
Inadequate nectar + pollen for summer→ fall	More native plants!	Habitats & aesthetic choices of land managers, limited choices + supplies of native seeds + plants especially pegged to eco-regions

Need more information on relative value or problems with named cultivars of native plants as relate to bee health → ecosystem health		
Not enough native flowers	Create awareness for native plants	Difficult to get everyone the information
More nutrition needed before winter		
Lack of understanding of best seed mixes, lack of funding to install forage, county-monocultures		
Native vs. Non-native plants (is one better than the other?)	Increase planting & flowering plants	
Is there a time when forage is more critical/less abundant/over-abundant (spring till the end of May)	Increase planting & flowering plants that flower at critical times	Install plants that flower in summer & fall
What are woody species that provide forage?	Currently planting large areas to comply with TMDL requirements	Tilia, Robinia, Acer, Salix, Oxydendron
Moving regime that reduces impacts to forage		
Is habitat fragmentation an issue? Do linear habitats provide additional benefits?		
Loss of habitat in suburban/urban areas	Economic incentive for homeowners/commercial concerns to plant home meadows similar to storewater programs (e.g., Prince George's Rain Check Program)	Funding source – rain check program (rain tax) – similar goals, rain garden = pollinator garden
Lack of availability of preferred forage plants at commercial (wholesale) level for homeowners beyond asters & golden rods	Create demand through education	Desire of homeowner for pretty flowers, incorporate into a larger picture/mix pretty w/ useful, a true meadow
Actually – I think we need to press planting of mature plants to accommodate the native bees as well as the rest of the native insects/birds, etc.		Market as a "buddy" planting – buy an aster & get a "x" plant with it
	Lists of plants? Check w/ Doug Tallamy (U of De)	
Monocultures or non-flowering plants, public & non-ag lands like parks + fields + playgrounds could be potential forage for nature + nearby HBS, many new backyard beekeepers & beekeeper clubs	Nurseries/garden centers/ large name-use garden centers + plant sellers, and how to help citizens plant an array of cart blooming stuff + have men talk to buyers	Education, reach out to landowners + managers, make it known where
		To find experienced beekeepers, etc. + how + where to ask advice

Lack of forage, especially lack of nectar sources	Plant nectar sources, encourage folk to grow nectar sources & provide forage, plant on public land	
Lack of education on need of forage for bees, trees historically prime source for nectar in MD	Find some way to educate, encourage planting of native nectar sources, trees like locust	
Lack of education on "bee safe" plants that might be treated with neonics	Educate	
Laws against growing bee friendly meadows instead of grass lawns	Give guidelines to grow forage instead of grass	
Grass monoculture on public lawns	Encourage clover growth on public parks & lawns like fields	
Managing pollinator habitat		
Complaints about mowing		
Knowing what to do		
	NRCS cost share programs	
Highway mowing		Against invasive
Insufficient bee forage in general	Work with timber industry to incorporate/incentivize planting of pollinators	Approach timber resource managers w/ this as a value added consulting services
	Plant forage under all US power lines using special regional seed blends ("Power to the Pollinators")	Encourage companies to sell seed blends + consult w/ individuals about management; could also offer physical management services
Monoculture, what to plant, how to plant	Education	
How to take care of weeds	Education	
Diverse forage is needed – seasonal (late season)		
Not enough forage on existing easements for pollinators	Promote new cover crops for grain producers, add a diverse forage option for the CRP program	
Education on thresholds – how many bees per acre	Look for the available equipment to plant on non-farmed properties	
Habitat loss, pollen rich – nectar poor	Native gardening, soccer fields with clover, China berry	
Small pest control companies only make money if they apply pesticides (not so with farmers)		
The "ban neonics" crowd does not see that if I have a pest problem, I'm going to apply a pesticide and if		

no neonic around then I'm going to apply something just as bad or worse		
Improving plant diversity in agricultural landscapes that coexist with crop/livestock production	Evaluate/implement planting of selected species in grass waterway/ buffer areas	Are these practices permitted or possibly encouraged by cost share programs?
Landowner awareness of possibility		
Lack of forage + nutrient	Managing for meadows/grasslands vs. reforest MD	Public outreach + perception
What plant species are good forage + nutritional value	Education/partnerships	
Managing invasiveness		
Not enough forage in urban areas	Increased planting of forage specifically as habitat	Management of areas for weeds, provide more education & techniques for management
People will be forced to replace lawns & landscape with habitat	Set aside specific areas for habitat but realize that lawn is here for a reason, propose "pollinator credit" system	Education, working with landscape & lawn
Many people do not realize what is/is not pollinator friendly	More education & research, nursery & greenhouse programs	Poor education w/ consumers and retailers, MD state program
Lack of meadows/native plants	Less mowing, leaving room for meadows whenever possible, public ed. Re: lawn vs. native meadows, mowing, natives & the advantages	Perceptions of "the perfect lawn" – more education (of homeowners AND code enforce, local govt., etc.) on benefits of non-lawn, concerns w/ weeds – more ed. Leaving dandelions, etc.
Diversity of plants → lack of adequate nutrition	Improvement of nutritional sources for pollinators	"Green lawn" penchant, aversion to the risk of stings, education of the public
Extension of nectar/pollen availability across the seasons (increase public-private planting)	Rant management	"Green lawn" penchant, aversion to the risk of stings, education of the public
Supplemental finding to augment honeybee diet		"Green lawn" penchant, aversion to the risk of stings, education of the public
Access to public land by pollinating/beekeepers management of rights-of-way		Incentivize pollinator/plant installation
Urban sprawl	Education of homeowners of issues and how they can enhance their landscape to be more "bee-friendly"	Money – partnerships, companies, grants, fundraiser, etc., resistance
Right-of-way	Huge opportunities, BMPs	Landownership, message -
Public education	School programs, bee center collaboration at schools (or easy to visit)	Money – partnerships, companies, grants, donations

BMPs to homeowners, best management practices, increase forage	Change perceptions of aesthetics	
State agencies	Better education, what to do, when to mow, what to use, herbicide	
Year round availability, effective forage with plants available year round research		
Native vs. non-native & decided native didn't wait to provide food so non-natives should be plants		
Want to know more about fungicides vs. yeast in honey-making	Incentive pollinator, stewardship program to encourage enroll in IPM, education, establishment of forage	
Lack of good forage habitat, need to change policy/add certain cost-share option to enhance pollinator friendly habitat		Don't know what native herbs are the best forage for nutrition
Allow homeowners to establish pollinator habitat in hard sites/without local code		
Educate landowners to take advantage of the CRP, etc., programs – best management practices		
Develop habitat in rights-of-way, utility lines		
Loss of habitat, monocultures	Habitat enhancement, more meadow plantings, not always tree plantings	
Lack of forage (late season), food needs, higher demands	CRP funding, seasonal	Money
Should beekeepers be required to plant pollinator friendly plants	Promote piggyback programs with solar panels	Money
Spread + propagation of good forage	Education – encourage more planting of good forage, try to enhance nutrition or both managed & native bees	
Lack/shrinking habitat	Utility r/w, parks – edges – designated space, subsidized private lands	Educate/reach out to municipal arborist or DPW
Increase native, diverse flowers	Bill introduced to require pollinator plans, HB132, create demand	Funding NWF, Ad campaign, brand development of pollinator, MD campaign
Coordination	State agencies lead by example	Exec. Order, HB132

Lack of forage	Lots of land managed in the state	
Lack of guidance		Big box, gas stations, reference for "how to", K.I.S.S. – not everyone is a botanist
Need more variety	Power lines, parks, public lands	Budget
Lack of forage	Mow less, herbicide loss	
Monocultures – follow the science	Different rinds, non-traditional providers of habitat, state/Fed Hwys, Education	Limited sources, no diversity in diet, residential settings, development
Seasonal planting, fall/spring, timing of flower	Non-traditional, Home Depot bee friendly, changing marketing, American beauty pageant	Native plants, we don't know how effective; just b/c its native doesn't mean it's great for pollinators
Understanding existent science, more info about plants, education: what to plant when? Where?	What + where, Sunflowers, zinnias, state info, incentives, pollinator trees	Where to buy, IMPA; think not many flowers bloom for several seasons
Making sure there are not disadvantages		
What is needed + where	Planting for bees could promote "good bugs", wasps, IPM Education	
Finding funding, incentive, state/Fed/farmers	Delaware tree program, BGE: give away trees for arbor day	
Understanding good bee mixes, affordability, seeds + plugs		Business can drive
Creating more habitat in suburban/urban communities	Buffer zones, MD low mandating trees, recovered specific plants, dandelions good	
Weak bees in fall – lack of late food sources	Plant native plants like aster + golden rod in areas where available	
Native bees health + bee biodiversity	Take advantage of land not bins utilize for encouraging planting native plants, educate on using natives	Inventory of potential habitats
Loss of forage, more variety of good pollen + nectar	Planting along roadway, informing public about planting	
Mowing of water ditches on eastern shore at farms		
Feeding of bees, high fructose corn syrup, pollen, sugar/honey ("bee food")		
2012 census, 30K out of 6M in MD (2M in Ag) fruits/veggies, limited habitat, 500 K in soybeans – native bees yield	Don't plant trees! ($1K/tree), Inventory, rights-of-way, edges, farmers to take land out of production, buffer zones, plant + maintain "Bay Restoration," locusts & poplars & maples (good for bees)	DOT – plants non-native (locusts, Johnson grass, rose, autumn olives), Annuals not natives, cosmos, etc., native golden rods + asters

Inventory, 10 best plants nutrition-wise	Native plants ("best supportive" plants like clover) Are they also good for bees? Maples, mustard, dandelions	
Mosquitoes/ticks & vector-borne diseases	Mowing more than 1x/year to keep down	Educate HOAs/schools/public areas, homeowner, incentives, tax incentives
30,000 Acres in fruit & vegetables		
Increase public knowledge, areas for forage	Education – increase private forage areas	Social media – FB, - garden & garden clubs
Weed control in meadows & building forage areas	Make successful private & public open space & land use	Feedback from – service & weed control
Move better plants for pollinators	What do they like, we'll grow it	List of forage w/ good governmental characteristics
Break out on unmanaged semi Mgd and highly residential	Different plants, "best" is not always best in every situation	
Not native only	Diversity!	

POLLINATOR PESTS, DISEASE, AND GENETICS			
Concerns		**Opportunities & Solutions**	**Barriers & Ways to Overcome**
No quarantine hives going out of state + returning mites + viruses			
Few locally raised hygienic queens and they are expensive			
Queen failures, mites		Research + development of stronger genetic stock, implementation of more non-toxic controls	
Genetics, viruses		Funding for VSH breeding programs mite biting behaviors, more research into virus + pesticide impacts, local survivor stock exchanges no cost	
Losses + drive to replace		Develop BMPs for incentive program for MD queens to energize MD queen breeders	
How are genetics handled w/important hives? For homeowners?		Encourage local queen bee breeders!	Costs + education
Weed control – grasses, mite-resistant		Spray to control grass + weeds	Pesticide use – timing

Information, management, education; find effective methods, search for alternative treatments, additional to "traditional"			
Spill over to wild bees of diseases			
Ensure genetic diversity to be less vulnerable to diseases			
No knowledge of this subject matter			
Teasing out factors that are important to pollinator disease and health are critical, inadequate funding + research		Good information management, citizen science programs	
No clear methods to integratively manage pollinator health		Develop multiple strategies & multiple layers of regulations to prevent outside influence	
External factors outside of beekeepers affect hive health and cannot be controlled		Registration of pesticide application sensitive population registry	Citizen science organized by extension services to conduct research on regional methods and effectiveness
Resistance to treatment of pesticides, How does honeybee disease affect wild bees + other populations?		Oxalic acid – as miticide, EPA approved formic acid, MDA helped get license for use	
Genetic diversity of local bees & national bee stocks, Incentive program good rate on replacement bees		Research will help us understand impacts in more of the same operators w/in a niche, evaluate the genetic diversity, enhance the genetic diversity	Approval of alternative methods, research
Impacts Varroa mites			
Best practices for in-hive control		Educating beekeepers	
Don't know if we have genetic diversity in MD		Encourage local breeding w/MDA incentive program	
Hobbyist starting out "wrong"		Take local beekeeping course, go to extension	Not enough space in classes
Varroa, bombs		Coordinating at times to lower varroa pop.	Unregistered beekeepers, treatment free, education
DWV + other viruses		More research	
SHB		Parasite	SHB not limited to bees in melon patches
Hygienic queens			

Improper ID of pest & control, off label use		Apiarist inspectors	Pesticide products in hive not approved, improved best management extension, when/what/how to fix registered prouct according to label
Lack of effective products, low efficacy			Drift watch coordinated between states, pool resources on one pollinator page
Treat or not to treat		Covered by first person	✓
Beekeeper misapplication using wrong products		Education/label compre.	Contacting all beekeepers
Super cleaners?! – Bee varieties that are aggressive at mite removal			
Pests, diseases			
Management in small scale producers, non-treatment		How does this group get information?	Misinformed, educated
BMP's economics of MD beekeeping (costs, timing)		Train the trainer etc.	
Are genetics known?			
Lack of diversity, lack of communication/outreach, small scale beekeepers no treating for varroa mites		Info + education, biological methods (BMP/IMP), stakeholder groups	State/feds & land, leverage when expert + institutional
MD seems to be high for late summer varroa mite		Research, monitoring, increasing floral resources in summer/fall	Finding & planting native plant seeds + container plants, getting farmers/gardeners + other land managers to see this as important + doable
Unnecessary pesticide applications in home & commercial landscapes		Teach + preach IPM – common sense, pest management that reduces pesticide applications through monitoring + non-chemical strategies – especially in ornamental plant landscapes and turf	Shifting personal perceptions of what makes for pleasing landscape + attractive plants – "0" damage aesthetic waste, time + resources + damage, ecosystems
Varroa mite		Eliminate bee monocultures, mite resistance in bees, treatment of varroa	European honeybee is the best for pollination, always causes another issue, cost associated
CCD		Need to study actual cause	Cost associated with a study

Need for diverse floral areas		Education on different floral resources back to native plants	How to educate
Genetic diversity of overall bee population in U.S.		Asian or European strains. Genetic modification	Public perception
Are there biological controls for bee pests?			
Do honey bee pests impact native bees?			
Lack of diversity in honey bees		Introduce more strains	Unsure of Barriers
Transport of pests by owners		Treatment hives at each step	
Spread of disease +pests			
Lack of education for backyard keepers + reluctant to treat= spread		Education. Treat Early. Research	
How can diseases be better contained?			
How can disease resistant bees be raised?			
Are there hive management practices that can minimize the vulnerability of hives to pests and diseases?			
I am not sure beekeepers have a good handle on miticides use and are problem with resistance & lack of control			Product level. Bee type pesticide use education.
Varroa mites & viruses vectored by varroa		MDA provide miticides to beekeepers	No $ available and historically not done.
Effect of fungicides on bee health and honey production.		Increase research on micro-biome of honey bees	
Transmission of diseases by small scale backyard bee hive owners.			
Regulation of movement of bees around the world to prevent disease spread.			
Our lack of knowledge/understanding of the large number of native wild bees, their habits, etc.		Basic research support.	
Viral/mite controls and proper use and education of control. Poor queen genetics			

Poor nutrition; better sampling methods; more $ for testing; ability to diagnose, test and resolve bee hives; national mite count day? Know your mite levels and know when to treat.			
Low genetic pool			
Low amount of beekeeper knowledge on beneficial insects and other pathogens.		Predator insects/beneficials	
No bee lab in the state.			
Beekeepers who don't treat their hives, the green guys, who make mite bombs			
Getting education to be understood by beekeepers who fall into the trap of thinking that there is a silver bullets.			
What is the next pest? We had tracheal mites then varroa mites now what comes next?			
How to control mites with fewer downside to the chemicals used so far.			
Is there opportunity to breed resistant bees?			
Hive resistant & inspects.			
I don't know a lot about this. Why do I need this info?		More research for bee keepers	
Mites.		Better educated applicators. Awareness of bad miticide and other pesticides.	
Genetic Failures.		Regulated introduction of new bees.	
Disease: How to use strain bees.			
Mite count			Where did it come over, what country?
Varroa miticide usage.		Provide more options to beekeepers.	

Varroa mites, fungal diseases.		More education. Focus on small-scalers; coordinate varroa treatments. Create a "mite shaming" website.	Beekeepers not wanting to treat for mites (Education). Resistance to fungicides/miticides near products.
Varroa, viruses, small hives beetles, AFB, nosema.		Better dissemination of results of valid research. Research on pests, disease to better define impact and devise appropriate responses.	Iconoclastic and non-participatory activities by (small) beekeepers - education is key.
Applies both to APIS and BOMBUS			
Adverse impact of imported non-native bumblebees which displace native bumblebees.		Importation/screening of bombus species to existing species.	
Insufficient genetic diversity among honeybee queen breeding stocks.		Importation of plasm to increase diversity	
Varroa mites and best management practices.		Sideline and small (backyard) scale BMP's	Misinformation; Instilled tribal management practices; economics.
Genetic Diversity		Encourage research or genetic resistance to various stressors.	Who does this; best techniques; cost.
Varroa and 3 mites per 100 bees.		Control mites with chemotherapy; predators; transmit diseases.	
Weak Queens. Varroa mites		Need better hygienic queens. IPM pesticides- not chemical.	Change wax, but not practical for large operators.
Lack of central options for mites.		Incentives to help industry. Develop new active ingredients for mite control.	
Varroa mites is number one problem. Need more education to public.			
Weakened genetic bees; AFB; CCD; Varroa mites amounts.		Education and joint state approach.	
How services of a problem are varroa mite		Chemical + non chemical research.	
How to deal with pests best?			
Mites, Virus.		Life cycle of mites? More research for mites: disrupt life cycle.	

Important to keep focus on native pollinators(in addition to honeybees).		Science based decision making.	
Mites carry the cycle and focus on bats and native bees.		Continual research and educate about the results. Avoid misinformation. Think about beneficial actions and policies. Bring beekeepers together and education.	
Varroa mites and small hive beetles; AFB; EFB; Brood; ER; Need more queen DNA (variety).			
		Treat virus, not mite.	
Number one varroa viruses SHB		Control	Resistance to disease.
Varroa mites; small hive beetle; American Fool Brood; fungus; AFB.		Education on ID for sideline beekeepers. And resources; MATRAS/formic acid. Do we know enough?	
How to prevent spread (bomb) of mites in the full when the seen to spike.		Applied research in techniques to minimize spread.	
Disease resistance is there a way to encourage developing a resistance.			
Which chemicals are least impact on bees and maximize effect on disease/ pest.			
Lack of diversity with regards to native bees.		Incentives of pollination habitat for farmers. Create a guide for having a veggie gardens.	
Mites. Better practices on mite check and control.		Watch level and all year, apiar. Hop Guard	
Bad queens- reseat on wheats causing it. Requeening within 2 years.			
Bears – less area for them to roam.		Electric fences.	
Due to mites – disease in some.			
No availability of thymol solution and oxalic acid solution for varroa treatments.		UMD provide, at cost, solutions to beekeepers and educate on use.	

Lack of consensus on use of pesticides in hives…need to get some useful to beekeepers.		Have speakers give talks to beekeepers on responsible use.	
Varroa mite, bears, viruses, small hive beetle, AFB.		Better assistance for small beekeepers; better inspection; better education to how to maintain bee hives. More research. GMO Honey Bee.	
Inbreeding of queens; Africanized bees; queen failure. Fewer queen producers; MDA/APHIS; budget; cut for inspection.			MDA dictates queen producers from various stores. Destroy Africanized queens or hybrids; GMO Queens Funding.
Feeding of bees corn syrup; sugar vs protein, supplements.		RD to find best diet for mid-Atlantic.	
Varroa mites and viruses; AFB		Educate about change in threshold nosema.	Monitor for 24 viruses outreach/ education in bee association. Anyone on registry gets education.
Small hive beetle. European hornets, odorous ants. Bears and attacks on hives.		R&D - extend education.	Funding for Apiarists at MDA and APHIS inspections.
Varroa, SHB			
AFB – 13 cases (MD), Nosema, brood diseases			
Genetics			
Varroa, "mite count day"		Funding for education, outreach	Beekeeper → beekeeper incentive to education
Research needs, what else is coming			Beekeepers remind beekeepers to treat for mites
More state inspectors		Deputize extension, pollinator's license plate	
Education especially small scale		Better presentation	Laymen terms, subsidy for control methods
Varroa, & mite (not so much a prob), SHB		Clustering -	Clones that – screening, least noxious
AFB – 13 cases (MD), Nosema, Brood diseases		Include apiary inspections	
Genetics, other gap		Queen rearing, genetics, education	External apiarist
Genetics (how to make less daunting) -> more accessible		Genetic stock, hygienic stock	

OTHER		
Concerns	**Opportunities & Solutions**	**Barriers & Ways to Overcome**
Commercial bees that return to the area are not required to be inspected, transfer of disease & pests	Monitor commercial bee movement and health when exiting & entering MD	Increase MDA bee funding to provide resources for inspection, monitoring, & education
How to measure success of MP3		
How was loss (60% in MD) measured		
Marking		
More communication between beekeepers and commercial applications.		

Appendix E: Electronic Polling Results

Q1: Please select the group that best describes you/your organization.	Percent	Count
Beekeeper (Bee.)	17%	11
Conservation/environmental organization (NGO)	6%	4
Crop producer (Crop)	6%	4
Government (Gov.)	30%	19
Supply chain (food, brand, retail, agribusiness) (SC)	9%	6
University or extension (Uni.)	9%	6
Other (Other)	22%	14
Totals	**99%**[12]	**64**

Q2: Which of the following topics do you believe are most important to address in improving pollinator health? Select up to three.								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
Bee pests – Varroa mites	28%	24%	25%	33%	29%	33%	22%	29%
Bee pests and disease – other	21%	24%	13%	25%	18%	11%	33%	21%
Colony Collapse Disorder	3%	0%	0%	0%	4%	6%	0%	2%
Pesticides	12%	21%	13%	0%	22%	0%	6%	7%
Starvation/lack of forage	27%	27%	38%	25%	22%	33%	33%	31%
Weather	5%	3%	0%	8%	2%	17%	6%	7%
Other	2%	0%	13%	8%	2%	0%	0%	2%
I don't know	1%	0%	0%	0%	2%	0%	0%	0%

[12] Due to rounding, the total percentages for this and other tables may not add up to 100 percent.

Q3: What solutions would best address concerns about the availability of pollinator forage and nutrition? Select two.								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
Modify planting and mowing practices on state and county land	21%	29%	38%	0%	15%	18%	25%	22%
Improve forage on utility rights-of-way	12%	10%	25%	0%	3%	9%	0%	30%
Promote pollinator habitat on non-production farmland	18%	14%	0%	50%	24%	27%	25%	4%
Promote pollinator habitat in residential and commercial landscaping	17%	33%	13%	33%	18%	9%	17%	4%
Improve access to nutritionally complete supplements/substitute diet	7%	0%	0%	0%	9%	18%	8%	11%
Provide best management practices, technical notes, and other educational resources for establishing and managing forage	25%	14%	25%	17%	32%	18%	25%	30%

Q4: What solutions to address concerns about the availability of pollinator forage and nutrition are most feasible? Select two.								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
Modify planting and mowing practices on state and county land	30%	47%	25%	13%	35%	18%	33%	25%
Improve forage on utility rights-of-way	10%	0%	13%	13%	3%	18%	17%	18%
Promote pollinator habitat on non-production farmland	10%	0%	13%	25%	12%	18%	8%	7%
Promote pollinator habitat in residential and commercial landscaping	11%	24%	0%	13%	9%	9%	17%	7%
Improve access to nutritionally complete supplements/substitute diet	8%	0%	13%	13%	3%	9%	8%	11%
Provide best management practices, technical notes, and other educational resources for establishing and managing forage	31%	29%	38%	25%	38%	27%	17%	32%

Q5: What solutions would best address concerns about pollinator pests, disease, and genetics? Select two.								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
Provide state funding for Varroa miticides	8%	9%	0%	38%	11%	0%	0%	4%
Better educate beekeepers on effectively controlling for Varroa	39%	18%	50%	25%	46%	42%	50%	46%
Promote local queen raising	4%	18%	0%	0%	0%	0%	0%	4%
Improve statewide monitoring of Varroa-infected apiaries	8%	9%	0%	0%	9%	8%	17%	4%
Improve quality, consistency, and dissemination of hive managing and monitoring tools and techniques	12%	18%	25%	13%	3%	25%	8%	11%
Promote the need for increased research, coordination, and funding on pests, disease, and genetics	29%	27%	25%	25%	31%	25%	25%	32%

Q6: What solutions to address concerns about pollinator pests, disease, and genetics are most feasible? Select two.								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
Provide state funding for Varroa miticides	4%	9%	0%	14%	3%	0%	0%	4%
Better educate beekeepers on effectively controlling for Varroa	42%	27%	50%	29%	43%	50%	50%	46%
Promote local queen raising	6%	14%	0%	0%	6%	0%	0%	7%
Improve statewide monitoring of Varroa-infected apiaries	3%	5%	0%	0%	0%	8%	8%	4%
Improve quality, consistency, and dissemination of hive managing and monitoring tools and techniques	15%	18%	13%	0%	17%	17%	25%	11%
Promote the need for increased research, coordination, and funding on pests, disease, and genetics	30%	27%	38%	57%	31%	25%	17%	29%

Q7: What solutions would best address concerns about agricultural and non-agricultural pest control? Select two.								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
Voluntary registration of hive locations to facilitate communication among beekeepers, farmers, and applicators	32%	24%	25%	50%	33%	36%	42%	25%
Disseminate scientifically-based pesticide education and best management practices to farmers and homeowners	32%	19%	38%	38%	21%	55%	42%	39%
Encourage Environmental Protection Agency to improve pollinator-related pesticide labels	19%	14%	13%	0%	27%	9%	8%	25%
Improve state monitoring and enforcement of compliance to labels	11%	19%	13%	0%	12%	0%	8%	11%
Implement pesticide restrictions near apiaries	7%	24%	13%	13%	6%	0%	0%	0%

Q8: What solutions to address concerns regarding agricultural and non-agricultural pest control are most feasible? Select two.								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
Voluntary registration of hive locations to facilitate communication among beekeepers, farmers, and applicators	41%	32%	38%	50%	50%	45%	50%	32%
Disseminate scientifically-based pesticide education and best management practices to farmers and homeowners	42%	42%	38%	50%	38%	45%	42%	46%
Encourage Environmental Protection Agency to improve pollinator-related pesticide labels	8%	16%	0%	0%	9%	0%	8%	11%
Improve state monitoring and enforcement of compliance to labels	3%	5%	13%	0%	3%	0%	0%	4%
Implement pesticide restrictions near apiaries	5%	5%	13%	0%	0%	9%	0%	7%

Q9: When you think about solutions that could be in an MP3, do you think about public sector action, private sector action, or both?								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
Public sector action: actions that MDA and other agencies can take	11%	9%	50%	25%	6%	0%	0%	14%
Private sector action: prioritizing the voluntary action of stakeholders	6%	0%	0%	0%	6%	0%	17%	7%
Both	83%	90%	50%	75%	89%	100%	83%	79%

Q10: Which of the following would you like to see the Maryland MP3 prioritize most heavily? Select two.								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
Improve partnerships among state agencies, beekeepers, crop producers, pesticide applicators, conservation organizations, etc.	33%	27%	25%	38%	39%	50%	25%	26%
Improve public outreach and education about pollinator health and the importance of pollinators	27%	18%	13%	38%	28%	25%	25%	37%
Continue and/or enhance research and monitoring on pollinator health, pesticide use and impacts, and forage/habitat establishment in MD	25%	23%	25%	25%	25%	17%	33%	26%
Modify state regulations or introduce legislation to require pollinator-friendly practices and funding	9%	27%	38%	0%	0%	0%	8%	4%
Support on-the-ground projects	6%	5%	0%	0%	8%	8%	8%	7%

Q11: How has your knowledge of the issues facing honey bees and other managed pollinators in Maryland changed over the course of the Summit?								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
No change	16%	36%	25%	25%	12%	17%	0%	7%
Increased somewhat	49%	55%	50%	25%	59%	50%	100%	21%
Increased significantly	35%	9%	25%	50%	29%	33%	0%	71%

Q12: How has your understanding of the challenges facing other stakeholders changed over the course of the Summit?								
Answer	**Total**	**Bee.**	**NGO**	**Crop**	**Gov.**	**SC**	**Uni.**	**Other**
No change	13%	9%	0%	25%	12%	17%	20%	14%
Increased somewhat	54%	45%	75%	75%	65%	33%	80%	36%
Increased significantly	33%	45%	25%	0%	24%	50%	0%	50%