STRATEGIC PLAN

A Strategic Plan for Keeping Oregon's Bee Pollinators Healthy (2018-2020)

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Oregon Department of Agriculture

Oregon State University Extension Service

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Oregon Bee Project Steering Committee

Buhl, Christine (Oregon Department of Forestry)
Kincaid, Sarah (Oregon Department of Agriculture)
Melathopoulos, Andony (chair, Oregon State University Extension Service)
Uribe, Gilbert (Oregon Department of Agriculture)

Oregon Bee Project Advisory Committee

GloryBee (Alan Turanski)
Golf Course Superintendent Association of America (Oregon Chapter) (David Phipps)
Kenagy Family Farm (Peter Kenagy, Albany)
Linn County Master Gardeners (Rich Little)
Natural Resources Conservation Service (Kathy Pendergrass)
Northwest Center for Alternatives to Pesticides (Sharon Selvaggio)
O'Loughlin Farm (Michael O'Loughlin, McMinniville)
Oregon Department of Agriculture (Clint Burfitt, Rose Kachadoorian, Helmuth Rogg)
Oregon Association of Nurseries (Jeff Stone)
Oregon Cover and Oregon Blueberry Commission (Bryan Ostland)
Oregon Department of Forestry (ODF) (Christine Buhl)
Oregon Department of Transport (ODOT) (Robert Marshall)
Oregon Farm Bureau (Jonathan Sandau)
Oregon Flora Project (Linda Hardison)
Oregon Forest and Industries Council (Seth Barnes)
Oregonians for Food and Shelter (Scott Dahlman)
Oregon Legislature (Rep. Jeff Reardon)
Oregon Master Gardeners (Rich Little)
Oregon State Beekeepers Association (Harry Vanderpool)
Oregon State University, College of Forestry (Jim Rivers)
Oregon State University, Department of Fisheries and Wildlife (Sandy DeBano)
Oregon State University Extension (Kristine Buckland, Rodrigo Corona, Weston Miller, Ramesh Sagili)
Northwest Berry Foundation (Tom Peerbolt)
US Fish and Wildlife Service (Eric Hein)
West Multnomah Soil and Water Conservation District (Jim Cathcart and Laura Taylor)
Xerces Society for Invertebrate Conservation (Mace Vaughan)

STRATEGIC PLAN

EXECUTIVE SUMMARY

Oregon has one of the most diverse, vibrant, and dynamic group of bees in the US (**Section 1**). This not only includes familiar bees, like honey bees and bumble bees, but three other managed species and at least 500 wild species. This level of species richness is supported by the diversity of both natural and managed habitats found within the state, including the more than 200 crops grown in Oregon. However, declines in honey bee populations, colony collapse disorder, concerns about wild bee populations, and a series of high-profile bee kills from the misuse of pesticides have catalyzed efforts to protect and improve pollinator health (**Section 2**). The formation of the Oregon Bee Project (Project) is a response to these concerns, state legislation and federal directives (**Section 3**).

The Project will address these concerns and directives through its core mission to **bring together Oregonians around a science-based strategy for protecting and promoting wild and managed bees through education, pollinator-friendly practices, and research.** In order to work toward our mission, the Project will focus on facilitating specific activities to accomplish the following goals over the next two years (2018-2020):

1. **Goal: Protect bees from pesticide exposure:**
   - **1.1. Objective:** Over 2,000 pesticide applicators will be trained in how to use pesticides around pollinators in both English and Spanish, via face-to-face trainings, and starting in 2018, through an interactive online training course. Through these efforts, the Project will increase trained applicator capacity to evaluate the pesticide products being used, which, in turn, will reduce the use of higher risk pesticide products on bee-attractive blooming plants.
   - **1.2. Objective:** Over 10,000 people will receive digital or print information around backyard pesticide use and how to reduce exposure to pollinating bees.
   - **1.3. Objective:** The Flagship Farms will train 35 growers how to reduce pesticide exposure to bees and how to minimize pesticide applications by utilizing integrated pest management.
   - **1.4. Objective:** Four Bee Protection Protocols will be completed and will increase proactive communication among growers, pesticide applicators, and beekeepers. Beekeepers will report a 25% increase in the number of applicators engaged in proactive dialogue around the timing of colony movement and pest control options on bee-attractive blooming plants.
   - **1.5. Objective:** Pesticide applicators, growers and beekeepers will be provided with updated information on the toxicity of pesticide products to bees, particularly around residual and chronic toxicity, as well as non-Apis toxicity and this information will be provided in a format that is easy to understand and access.

2. **Goal: Increase habitat:**
   - **2.1. Objective:** Flagship Farms pilot program will train 35 growers in techniques to increase pollinator habitat on their farms and identify an additional 25 Bee Innovators who are already providing remarkable habitat for pollinators.
   - **2.2. Objective:** The example set by the Flagship Farms and Bee Innovators will result in an additional 35 land managers increasing pollinator habitat on their properties.
   - **2.3. Objective:** Over 20,000 people will receive digital or print information around how to increase pollinator habitat in their backyards, and this will include a new responsive design website for plant selection.

2.4. **Objective:** Explore the opportunity for the Project to partner with existing backyard certification programs such as the Backyard Habitat Certification program in Portland.

3. **Goal: Reduce impacts of diseases and pests on bees:**
   3.1. **Objective:** The OSU Honey Bee lab will develop protocols for detecting all major honey bee diseases and viruses, and be in a position to explore the presence of these pathogens among Oregon's wild bees. The lab will have processed at least 500 samples from beekeepers to estimate infestations of the mite parasite *Varroa destructor* and 100 samples to survey for honey bee diseases.
   3.2. **Objective:** Training will be provided to over 500 beekeepers around managing diseases and pests, and an additional 200 people in managing pests and diseases among other managed bee species, particularly the blue orchard bee (*Osmia lignaria*).

4. **Goal: Expand our understanding of the bees of Oregon:**
   4.1. **Objective:** 150 citizen scientists will be trained on wild bee sampling, basic survey, and specimen curation techniques. 25 people will be trained to become para-taxonomists who can reliably identify bees to the taxonomic level of family and most common genera.
   4.2. **Objective:** The Project's volunteers will bring their understanding of bee biology back to their communities and host at least 12 outreach events per year in over 10 counties.
   4.3. **Objective:** Oregon will collect over 5,000 new bee records for the state and perform a survey of bumble bees and cavity nesting bees; the first statewide bee survey in Oregon's history.
   4.4. **Objective:** Historic records of two economically important bee genera (the bumble bees and cavity nesting bees in the Family Megachilidae), currently held in the Oregon State Arthropod Collection will be digitized and made publically available through a web portal.

The Project will accomplish these goals by broadly engaging Oregonians and connecting the dots among existing efforts from various groups, including extension, industry, conservation, research, local governments, and agencies by coordinating the following general actions (**Section 4**):

1. **Train & Engage:** The Project will expand training to urban and rural land-managers and beekeepers on how to reduce pesticide exposure, increase habitat and decrease losses to diseases and parasites. The Project will also provide training to volunteer groups (e.g., Master Gardeners, Beekeepers and Naturalists) on native bee taxonomy and survey methods to enhance our understanding of regional bee biodiversity. Volunteers will also engage people in their region to provide an accessible overview of how pollinator health is being addressed in Oregon. Finally, there is considerable information available to the public on bee pollinators, but it is spread across many sources. The Project will develop a website that helps different audiences locate the information they most need.

2. **Develop Decision-Making Support and Diagnostic Tools for Pollinator Stewardship:** Making real-time decisions around bee pollinator stewardship can be complicated. The Project will develop user-friendly decision support tools to help land managers make real-time decisions on the ground. This includes new extension material on bee stewardship that is specific to different land management contexts (Bee Protection Protocols), as well as to the diseases and pests of managed bees that have been an important driver of bee losses. It is also imperative that bee declines are accurately diagnosed in order to properly address the drivers of decline. The Project includes new diagnostic services to help beekeepers diagnose disease and parasite problems their colonies face to reduce losses.

3. **Recognize & Learn From Innovators:** The Project is working to showcase Oregon farms, forests, industries, and urban landscapes that implement practices that promote bee health. A key feature of these showcase initiatives will be the development of voluntary, industry-specific Bee Protection Protocols, as well as an advanced Flagship Farms and Bee Innovators programs, which identify outstanding contributions to bee stewardship.
4. **Research:** Better tools need to be developed for the Project activities to make inroads on the Project's goals. Over the next two years Project partners will be involved in a number of research projects that will help focus activities around reducing pesticide exposure, providing recomendations for both urban and rural land managers and creating market opportunities for innovative Oregonians. The Plan describes these projects.

We outline how we will measure our progress against the Project's goals in **Section 5.** The Project, along with this plan, are designed to be dynamic, changing and adapting as new data are collected, new input is received, challenges are overcome, and new challenges arise. **Section 6** outlines how the Project will recieve feedback from stakeholders around the state over the next two years. At the conclusion of two years (June 2020), the Project will issue a *State of Oregon Bees 2020* (**Section 7**) that will highlight progress against the Project's four goals and outline a strategy for the following five years (2020-2025). The final section of the plan (**Section 8**) summarize progress made over the past year.

STRATEGIC PLAN

1. OREGONIANS AND THEIR BEES

A brilliant, but often overlooked, native metallic sweat bee (*Agapostemon virescens*) Photo T. Shahan

Oregonians are interested in bees and their health, yet the rich endowment of bee species in the state remains a little-known fact. Unlike many agricultural states, Oregon maintains a high level of bee biodiversity. Although the Pacific Northwest lacks a comprehensive list of bee species, scientists estimate that the number in the region exceeds 800, a tally rivaling the total number of species found across all the states east of the Mississippi. However, only a few of these bees, like managed honey bees and wild bumble bees, are familiar to most Oregonians. Many go unnoticed.

High bee biodiversity in Oregon is partially a result of the way Oregonians manage their urban and rural landscapes. For one thing, gardeners, landscapers, nurseries, golf course superintendents and municipal governments have been busy over the last decade expanding pollinator habitat in cities. Furthermore, agricultural practices and crops contribute greatly to the diversity of pollinators; with over 220 different crops grown in the state, Oregon's agricultural lands are a patchwork of bee-attractive crops adjacent to natural areas. This mix means we have natural pollination services to help support our growers and the habitat to support abundant and healthy bees. Crops like clover seed, orchard fruits, berries, alfalfa, and squash, all provide nectar and pollen that bees use, and their visits, in turn, contribute to production of fruits and seeds. Finally, land managers working with forests, utility right-of-ways, and roadside vegetation management are learning how their practices contribute to pollinator health. Whether they know it or not, Oregonians are connected to their bee pollinators.

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The honey bee. Photo T. Shahan

Oregon beekeepers play a direct role in ensuring pollinators remain a dynamic part of what makes Oregon, Oregon. The honey bee is the most recognizable bee species in the state, and our state's 80,000 colonies produce an abundance of products such as honey, wax, propolis, and pollen. Moreover, our beekeepers are uniquely invested in the success of crops grown in the state, with over 75% of their income coming from rental fees paid by growers from over a dozen different crops. These rentals are strongly connected with the competitiveness of some of the state's most delicious crops, including Columbia Gorge cherries and pears, Hermiston watermelons, Willamette Valley blueberries and caneberries, and south coast cranberries. Honey bees also play a key role in boosting yields of seed crops, notably Willamette Valley vegetable and clover seed, and central Oregon hybrid carrot and onion seed. The seeds from these crops are planted throughout the US and worldwide.

Beekeeping has also experienced explosive growth in Oregon cities and honey bee colonies are a regular fixture in community gardens, on rooftops, and in backyards. In response, many Oregonians have planted pollinator gardens in their backyards and public areas to provide areas for honey bees to forage for pollen and nectar.

Honey bee pollination in Oregon includes sweet cherry (top), meadowfoam (second from top), radish seed (center), onion seed (second from the bottom) and backyard fruits and vegetables (bottom).

MONTH OF BLOOM

FEBRUARY
- Almond

MARCH
- Peach
- Vegetable seed (Cabbage, Kale, Turnip and Mustard)

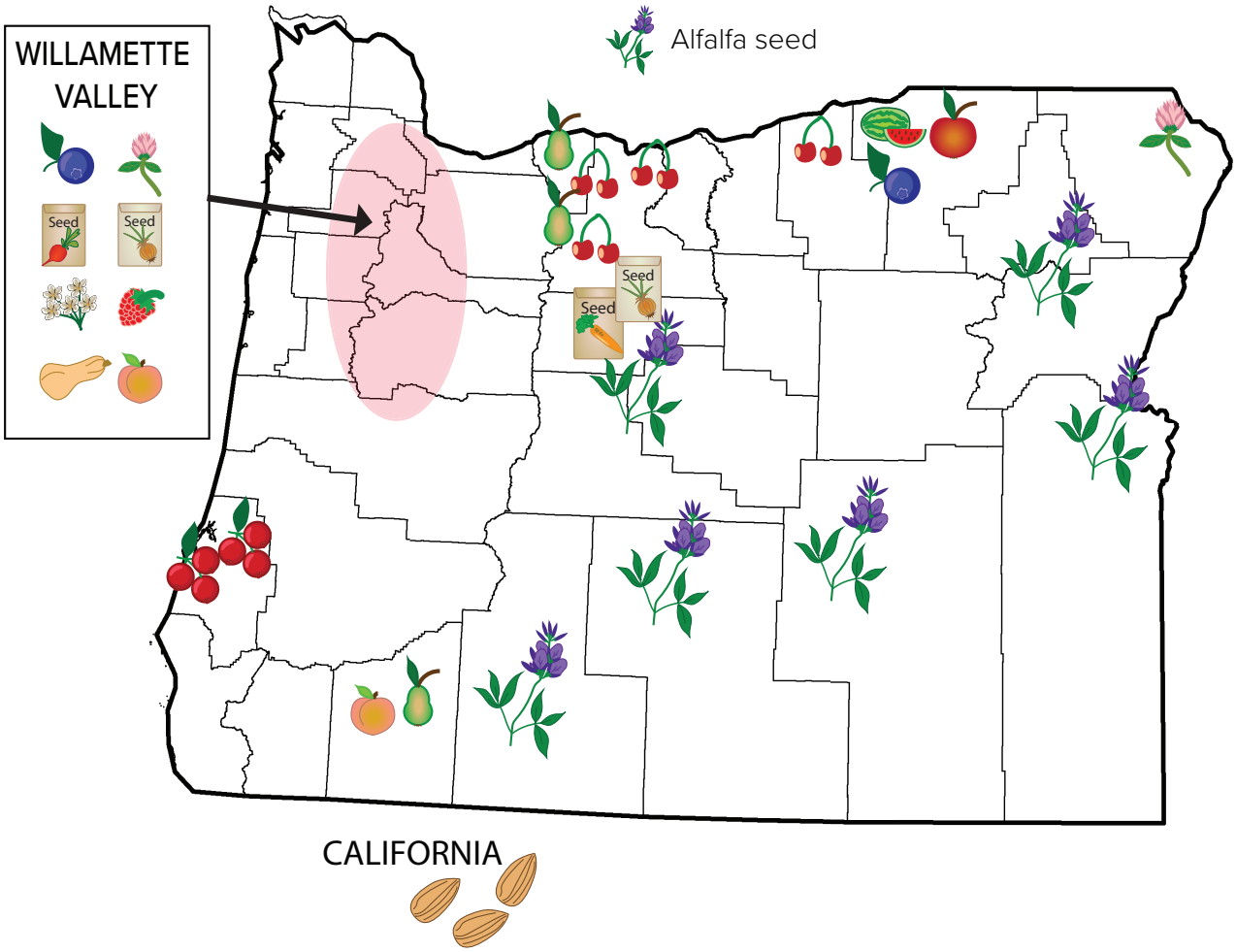
APRIL
- Cherry
- Apple
- Pear
- Blueberry
- Caneberries

MAY
- Meadowfoam
- Vegetable seed (e.g., radish)

JUNE
- Clover seed
- Cranberry
- Watermelon
- Alfalfa seed

JULY
- Onion seed
- Carrot seed
- Watermelon

AUGUST
- Pumpkin/Squash
- Watermelon



Major Oregon crops that rely on managed bee species for increased yields. Graphic: I. Korrmann

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The alkali bee. Photo C. Hedstrom

The managed bees in Oregon go beyond honey bees. Beginning in the 1950s alfalfa seed growers in the Pacific Northwest, in conjunction with Oregon State University, began developing nesting beds for the solitary native alkali bee (*Nomia melanderi*). These remarkable bees remain the *only* managed ground nesting bee in the world. In addition, by the 1960s these same growers also learned how to manage a solitary twig-nesting bee, the alfalfa leafcutting bee (*Megachile rotundata*), on a large scale. Combined, these two solitary species power the state's alfalfa seed sector. More recently, Oregon cherry and pear growers have been learning to manage a native solitary twig nesting bee, the blue orchard bee (*Osmia lignaria*). Blue orchard bees have also proven a terrific species for backyard and community gardens. In response, Oregon Master Gardeners and some Soil and Water Conservation districts have been active in training homeowners to care for and propagate these bees.

All of this is to say that bees are important to Oregon and Oregonians appreciate their bees. The Oregon Bee Project Strategic Plan is about "connecting the dots" among the efforts that already exist in the state; between the incredible diversity of our bees, the desire to learn more about who these bees are, the innovators who already integrate bee-protection into their businesses and the extension staff and educators who want to help others follow in these innovators footsteps.

Alfalfa leafcutting bees in Eastern Oregon pollinating alfalfa seed (top), nesting blue orchard bee (center), Oregon Master Gardener volunteer with an educational blue orchard bee nesting center at Jackson Bottom Wetland Preserve west of Portland (bottom). Photos: A. Melathopoulos and M. Alloy.

2. CHALLENGES BEES FACE

Oregon's bees have been subject to some of the same pressures experienced in other states. Honey bee colonies, for example, have been beset by significant new pest and disease pressures over the last few decades, and this has led to poor colony survival and substantially increased beekeeper input and labor costs. Challenges with pests and diseases have also been implicated with lower returns of alfalfa leafcutter bees and the rapid decline of some of our native bee species, most notably the Western Bumble Bee (*Bombus occidentalis*) in Western Oregon.

Bees are also susceptible to some pesticides that are used in agriculture, forestry, vector control, and landscape management. In 2013 and 2014 a series of bumble bee poisoning incidents around the treatment of linden trees drew attention to exposure risks associated with not just foliar contact applications, but also the use of systemic pesticides. The treatments associated with these incidence that included pre-bloom soil and basal bark applications of two systemic insecticides applied well before bees were ever visiting the treated area, which prompted both pesticide regulators and educators to rethink how these products may pose a risk to bees.

Much attention has been directed to neonicotinoid insecticides and some newer systemic pesticides, however, research on honey bees has indicated that no single pesticide class is associated with impacts on honey bee health, but rather, a combination of many products that may accumulate in colonies over time or directly impact foraging bees.

Perhaps the largest issue facing bees, however, is loss of habitat. While some areas of Oregon provide nectar and pollen resources for bees, these nutritional resources can be scarce in other areas, and also at some critical times in the season. Good nutrition increases bee survival and leads to higher reproductive output, which in turn mitigates stresses associated with diseases, parasites, and pesticides.

Finally, although we know considerably more about the factors influencing bee health compared to 10 years ago, there remains high levels of uncertainty around how all these factors interact to influence bee populations on the ground. Not only do we lack the tools to measure key variables at meaningful spatial scales (e.g., the distribution of native bee species across the state, disease levels in managed bee stocks, actual pesticide exposure to bees, etc), but we lack specfic, research-based recommendations for land managers that can be implented in a cost-effective manner.

3. THE OREGON BEE PROJECT

Since the lives of Oregon bees are entwined with the lives of Oregonians, any effort to keep the state's bees healthy necessarily involves many people. The Oregon Bee Project was initiated in 2017 by the Oregon Department of Agriculture (ODA), Oregon Department of Forestry (ODF) and Oregon State University (OSU) Extension Service and emerged out of the recognition that many Oregonians were already taking steps to protect bees. What was missing was a way to connect these individual efforts and build upon them with additional resources.

A key touchstone for the Oregon Bee Project was the Oregon Task Force on Pollinator Health, which highlighted the need to engage Oregonians broadly on pollinator health and develop new tools. The Task Force indicated the need for a range of new initiatives in the state, such as educating homeowners and landscapers on how to manage urban pests in a way that minimizes impacts to bee pollinators, improving pesticide expoure reporting and providing beekeepers with new pest and disease diagnostic services.

Young Oregonian holding a native bee at an Oregon Bee Project outreach event at the Oregon Zoo,
Photo: A. Melathopoulos.

The Oregon Bee Project takes its lead from the Task Force and starts from the premise that in order to keep our bees healthy, many people need to work together on an ongoing, collaborative, and statewide basis, including growers, beekeepers, pesticide applicators, entomologists, government agencies, educators such as the Extension service, gardeners, landscapers, and all others who are actively engaged in caring for our bees. To date, partners of the project include state agencies, such as the Oregon Department of Transportation (ODOT), as well as numerous individuals from regional groups such as Farm Bureau, Northwest Center for Alternatives to Pesticides, Oregon Association of Nurseries (OAN), Oregonians for Food and Shelter, Oregon Golf Course Superintendents Association (OGCSA), the Oregon Zoo, the Pacific Northwest Berry Foundation, Portland Metro, Soil and Water Conservations Districts (SWCDs), the Specialty Seed Growers of Western Oregon (SSGWO), the Xerces Society, and many more. This Plan outlines the various elements of how this collaboration will look and identifies key goals and elements of the Project.

The Project additionally addresses a federal directive outlined in the U.S. Environmental Protection Agency's (EPA) Policy to Mitigate the Acute Risk to Bees from Pesticide Products (2017) for states to develop and implement local pollinator protection plans to address potential pesticide exposure to bees at and beyond the site of application. EPA will monitor the success of these pollinator protection plans in mitigating risks to bees from highly toxic pesticides on an ongoing basis and use this information when deciding whether or not further label restrictions are necessary.

3.1 Project Goals

The Project's goals are to:

1. **protect bees from pesticide exposure,**
2. **increase habitat,**
3. **reduce impacts of diseases and pests on bees, and**
4. **expand our understanding of the bees of Oregon**.

These goals will be achieved through voluntary efforts and collaboration, using the interest, dedication, and commitment that Oregonians have already shown toward learning more about bees and how to protect them. Fulfilling these goals would go a long way to increase the health and productivity of Oregon bees, and the Project will achieve these goals by carrying out specific activities.

Each activity will be outlined below, are to be implemented over the next two years, along with proposed measures for impact assessment. These assessments will be shared with state and federal pesticide regulators to assess the overall progress of state managed pollinator protection plans, as well as with Oregonians (Section 5). However, it is important to note that in most instances, quantitative measures or direct links to the impacts from the Project's activities will be difficult to obtain. Additionally, many of these activities and the proposed assessment criteria are new to the state; in such instances, it will be necessary to collect baseline data before trends can be established and specific benchmarks can be set.

3.2 Plan Scope

The Plan covers all agricultural lands, including lands where bees are managed under contract, state and privately managed forests, right-of-ways, urban landscapes, and areas that are treated by vector control districts. The Plan includes the four managed bee pollinator species in the state, including those managed by large-scale commercial operators and those species that people manage for pleasure and direct use such as backyard honey bee and mason bee beekeepers. The Plan also encompasses the wild bees of Oregon.

4. ACTIVITIES

The activities outlined below are designed to address the four goals of the Project (Section 3). Each sub-section concludes with the proposed metrics that will be used to assess whether the activity is helping the Project meet these goals, followed by a methodology for evaluating each metric. The different methodologies used in the Project's metrics are described in Section 5.

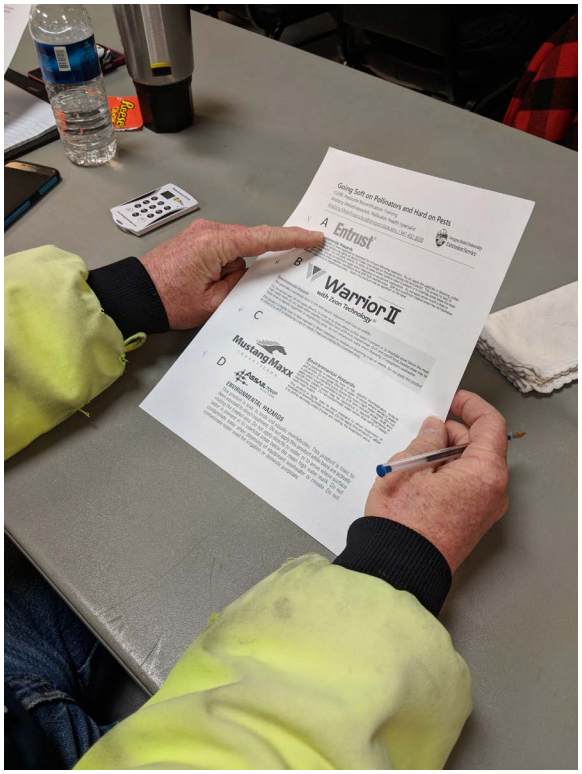
4.1 Training and Engagement

4.1.1 Licensed pesticide applicators

The Oregon Department of Agriculture (ODA) awards core pesticide recertification credits for training on how to safely apply pesticides around pollinating bees. These credits are necessary for pesticide applicators seeking to maintain several types of pesticide applicator licenses. People seeking to obtain certain types of pesticide applicator licenses are additionally required to study pollinator protection information and are tested on their comprehension. In the future, there will be an expansion in outreach materials in Spanish to ensure equal access to educational materials and opportunities.

The Project is developing new training materials that provide an opportunity for pesticide applicators and others to work through Oregon-specific scenarios that pose the highest risk of exposing pollinators to pesticides. The focus in each scenario will be understanding how pesticide exposure to bees can occur, pesticide properties that affect risk, and residual toxicity. The training will also focus on preparing applicators to assess mitigation options that enable good pest control with minimal impact to bees, including specific measures to facilitate communication between pesticide consultants, land managers, pesticide applicators, and beekeepers.

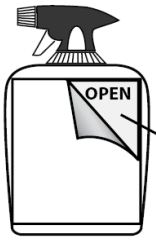
The Project will work closely with the Oregon State Beekeepers Association (OSBA) to provide interactive and specific training for pesticide applicators in both English and Spanish across the state to ensure equal access to educational opportunities, including a Professional and Continuing Education (PACE) online course through OSU by the end of 2018.



Core recertification training for pesticide applicators includes new interactive modules where applicators work through examples of pesticide labels.
Photo: A. Melathopoulos.

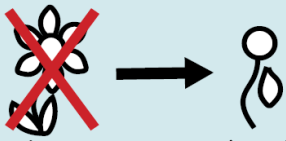
PROTECT BEES READ PESTICIDE LABELS

Five steps to reading a pesticide label to determine how risky a treatment is to bees.



1. OPEN THE LABEL and look for the **ENVIRONMENTAL HAZARDS** section.

2. BEE TOXIC PESTICIDES will be indicated by the phrase **"TOXIC"** or **"HIGHLY TOXIC TO BEES"**. If toxic:

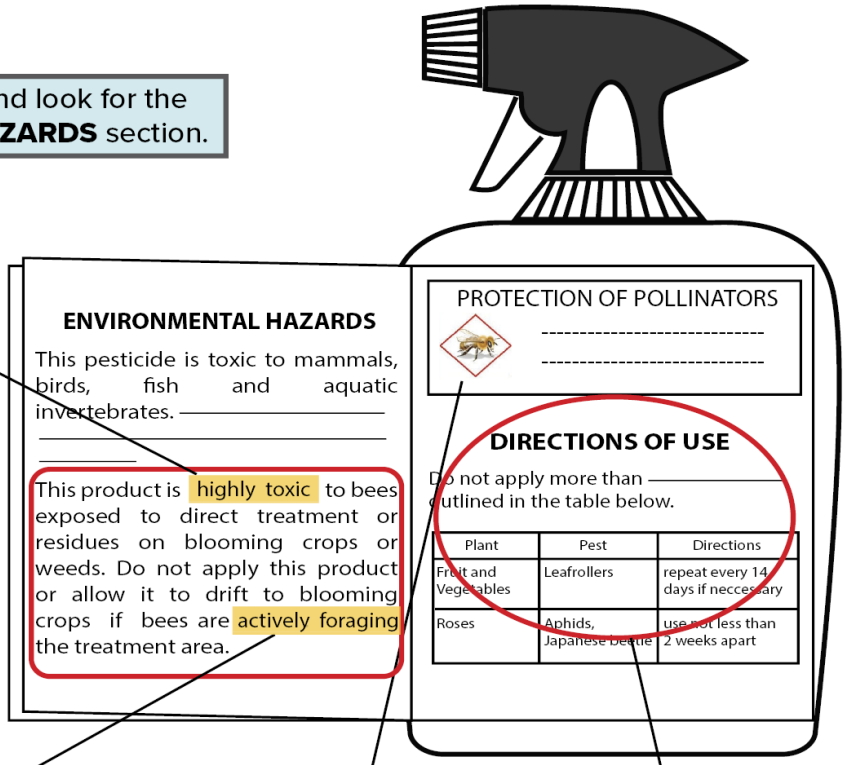


don't spray when in bloom → wait until all petals fall

3. Some bee-toxic pesticides **BREAK DOWN IN A FEW HOURS.** Look out for the words:

1. " FORAGING" or **"VISITING"** = remains toxic for more than 8 h. **DON'T APPLY TO FLOWERING PLANTS!**

2. "ACTIVELY FORAGING" or "ACTIVELY VISITING" = remains toxic for less than 8 h **ONLY APPLY IN THE EVENING WHEN BEES ARE NOT ACTIVE!**



4. BEE ADVISORY BOX
Newer products may have a Bee Advisory Box, which is clearly marked by a **SYMBOL OF A BEE IN A RED DIAMOND.** Carefully read these additional instructions on how to use the product safely around bees.

5. USE DIRECTIONS
Newer labels can also have additional precautions for using a products around honey bees **RENTED FOR POLLINATION.** Instructions may vary by use.

www.oregonbeeproject.org

Graphic by Iris Kormann and Andony Melathopoulos - Oregon State University; Rose Kachadoorian and Gilbert Uribe - Oregon Department of Agriculture

A new training infographic (provided in English and Spanish) that accompanies training and helps retain information about how to read a pesticide label for warning against bee pollinatiors.
Graphic by: I. Kormann, A. Melathopoulos, R. Kachadoorian and G. Uribe

4.1.2 Land managers

There is considerable interest among land managers with regard to developing inexpensive and effective techniques to establish and maintain pollinator habitat. The Project will develop new land management resources in parallel with the Flagship Farms Program (Section 4.3.1) and in close collaboration with partner groups with existing pollinator habitat restoration initiatives, such as Soil and Water Conservation Districts and Natural Resources Conservation Service. In May of 2018, the Project hosted the first trainings with Flagship Farms growers that included information on how to develop pollinator habitat.

OSU Extension faculty Clive Kaiser stands by a flowering strip for pollinators surrounding a commercial vineyard in Milton Freewater, Oregon.
Photo A. Melathopoulos

4.1.3 Beekeepers

The Project will work with the Oregon Master Beekeepers, Oregon State Beekeepers Association, and Oregon bee supply companies to promote trainings to educate beekeepers on best beekeeping practices. Trainings will be focused on new beekeepers, as their colonies are especially vulnerable to nutritional deficiencies and higher disease and pest loads due to lack of experience. In addition, the Project will provide new resources to professional beekeepers engaged in crop pollination on how to effectively communicate with pesticide applicators to reduce the risk of pesticide exposure.

Beekeeper education will focus on fostering basic skill development among new beekeepers and how to promote better communication with pesticide applicators and land managers during crop pollination.
Photo A. Melathopoulos

4.1.4 Vounteers

Volunteers in the OSU Master Gardener, Beekeeper and Naturalist programs provide considerable service back to the communities they live in. In many counties, these volunteers are currently the primary source of face-to-face engagement around bee pollinator health.

We also know very little about most of the wild bees in the counties where our volunteers live. Unlike many other states, where a small subset of crops dominates agricultural landscapes, sequential blooming of crop plants in parts of Oregon (e.g., blueberry, followed by clover seed), a diversity of typical and specialty crops, and verdant urban landscapes have contributed to robust wild pollinator populations. But without surveying, there is no way of documenting changes in their populations over time.

Oregon Bee Atlas volunteers combining their knowledge of Oregon bees with public engagment.
Photo: A. Melathopoulos.

In order to increase and coordinate a bee sampling effort in the state, the Project, working through a collaboration be-

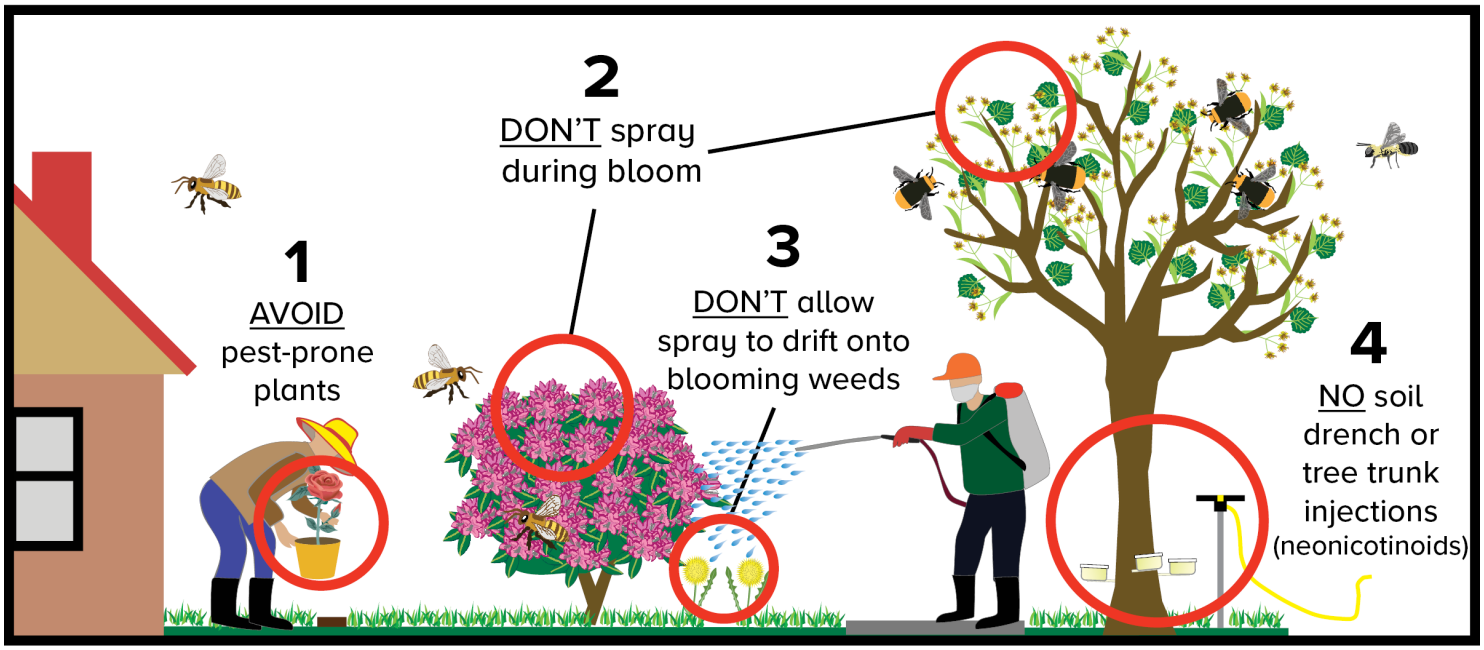
tween the Insect Pest Prevention and Management program at ODA and OSU Extension Service, will coordinate an **Oregon Bee Atlas** that would bring together:

a) historical baseline data about bees based on museum specimens and literature citations, with
b) newer observational data from volunteers living across Oregon.

As this initiative matures, volunteers will be dispatched to survey areas around the state that historically have not been sampled. Records will be housed on a publically accessible website operated by the **Oregon State Arthropod Collection**. Through the Oregon Bee Atlas, the Project looks not only to develop the state's first survey of wild bees, but also a regional network of advanced volunteers who can function as a resource for science-based information on the bees of their county.

4.1.5 The public and unlicensed pesticide applicators

The Project will develop new resources, for a broad audience, that highlight Oregon's bee diversity and what Oregonians can do to help keep Oregon bee-friendly. This includes a series of new, digital and print infographics from OSU Extension Service by mid 2018, that will provide basic information about the risk of



Example of infographics for the public to understand how to help bee pollinators in their backyard. These infograpgics (available in English and Spanish) can be distributed by volunteers within their counties (e.g., at Master Gardener Plant Clinics) or distributed through Oregon Bee Project social media channels.
Graphic by: I. Kormann, A. Melathopoulos, R. Kachadoorian and G. Uribe

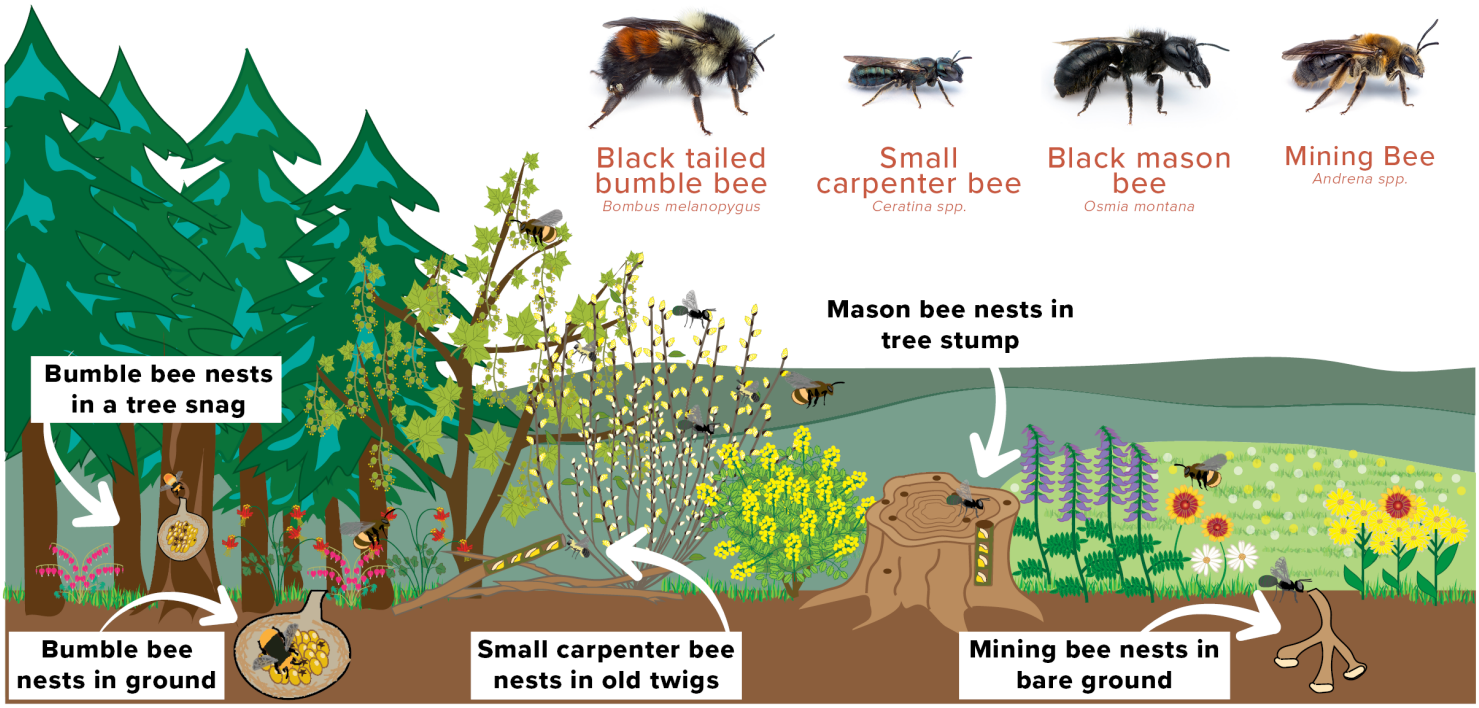
pesticide use on bee-attractive flowers; region-suitable and bee-attractive plant lists; and landscape designs for bees. These infographics will be distributed across social media channels and will be made available for volunteers to distribute them as postcards. The infographics will be connected to a call for action (beginning in 2019); namely, for urban residents to register their backyards as Bee-Friendly. Registration will involve having the urban residents submit an image and short description of how they implemented at least one Bee-Friendly practice outlined on a Project infographic.

Pollinator resources from the Project, partner agencies, as well as relevant educational material from other groups, will be consolidated at the Project's new website, which will serve as an interface for all Oregon Bee Project initiatives (www.oregonbeeproject.org). The website content will be organized by audiences and will provide the public with a single online platform to find resources. In order to facilitate broad access, the website will include both English and Spanish language resources.

Volunteers recruited for the Oregon Bee Atlas will be trained and supplied with material to engage the public around the diversity of bees in Oregon. Outreach material will include a display of curated bees from the region, infographic cards that describe the common bee species of Oregon and practical tips to help bees (available in English and Spanish) and interactive, tabling activities. Since many of the Project's volunteers belong to larger service organizations, particularly the Oregon Master Gardeners, Master Naturalists and Master Beekeepers, they will be encouraged to do train-the-trainer events in order that the broader membership of these organization can provide more resources to the public. The Atlas volunteers will host at least one annual events in their County centered around National Pollinator Week (the third week in June). Finally, the Project has a weekly podcast (PolliNation) through OSU Extension that profiles people making bold strides to improve the health of pollinators.

Oregon Bee Project website is organized around content organized by auidence, providing a single platform for resources on pollinator health.
Graphic by: Samara Group

WHERE ARE BEES IN THE FORESTS?



Example of public infographic designed to highlight the connection between land management practices in Oregon and bee biodiversity.
Graphic by: I. Kormann, A. Melathopoulos, C. Buhl

4.2 Decision Support

4.2.1 Bee disease and parasite diagnosis

Managed honey bees are under considerable pressure from several pests and diseases. Beekeepers can manage many of them by combining advanced diagnostic tools with rapid turnaround times of sample results. The **OSU Honey Bee Lab** is in the process of establishing an advanced pest and disease diagnostic service for Oregon beekeepers, enabling them to both get ahead of existing problems and build capacity to rapidly identify future threats to the beekeeping industry. Over the next two years the lab will finalize protocols to diagnose the following common honey bee diseases:

The OSU Honey Bee Lab's Ramesh Sagili collecting bee samples from commercial bee colonies in commercial hybrid onion seed fields in Central Oregon.
Photo: L. Ketchum

2018: Deformed wing virus, Varroa destructor virus-1, Black queen cell virus, Chronic bee paralysis virus, Lake Sinai virus and the trypanosome *Crithidia mellifica*
2019: Sacbrood virus, Acute bee paralysis virus, Kashmir bee virus, Israeli acute paralysis virus, and European foulbrood (EFB, *Melissococcus plutonius)* in adult honey bees, as well as protocols for detecting the individual strains of Lake Sinai virus, American foulbrood (AFB, *Paenibacillus larvae*) from honey and adult bees and determine the resistance of strains to oxytetracycline.

The lab will accept at least 500 samples from beekeepers for estimating Varroa infestation levels in 2018 and will process at least 100 samples for the above listed diseases by 2020. By 2020, the diagnostic tools will be ready to explore the presence of pathogens in wild bee populations.

4.2.2 Bee Protection Protocols

Pollinator protection plans around the U.S. have identified better communication among beekeepers, pesticide applicators and land managers as a key pillar of increasing pollinator health. Some states have adopted systems for mapping the location of honey bee colonies as a way to help growers and pesticide applicators locate colonies in the landscape, in order to help facilitate direct dialogue between these two groups. Due to the agricultural and landscape diversity in Oregon, beekeepers and land managers are best positioned to determine the kind of practices that maximize yield and minimize negative effects to honey bees. Mapping the location of honey bee colonies is presently considered unfeasible given the frequent movement of colonies across the Oregon landscape for pollination. Instead, increased opportunities for information exchange will be identified in the development of industry-specific Bee Protection Protocols and be translated into communication checklists for growers, pesticide consultants, pesticide applicators and

beekeepers.

The Oregon Bee Project, in conjunction with the Oregon State Beekeepers Association, has started approaching Commissions/Associations to develop Bee Protection Protocols for key crops that require pollination services; crops that are attractive to honey bees, but do not require pollination services (such as Christmas Trees); landscape plants; and vector control districts. The goal will be to promote industry-to-industry dialogue that results in Bee Protection Protocols. Protocols will include recommended practices related to:

Kristine Buckland (OSU's Vegetable and Specialty Seed Crop Specialist) records notes from a meeting to develop a Bee Protection Protocol for the Specialty Seed Growers of Western Oregon (SSGWO). The meeting included SSGWO members, members of the Oregon State Beekeepers Association (OSBA), crop consultants, Ramesh Sagili of the OSU Honey Bee Lab and staff from Oregon Department of Agriculture.
Photo A. Melathopoulos

1. Honey bee pollination (e.g., colony strength, timing and departure of colonies, placement of colonies),
2. Pest management activities that take place during bloom (e.g., identifying pests and diseases around bloom and how to manage them in ways that reduces honey bee exposure) and
3. Communication among growers, crop consultants and beekeepers, including the need to periodically revisit the protocol, create a communication checklist (e.g., the timing of communication, key areas that should be discussed), and elements to include in a pollination contract identified.

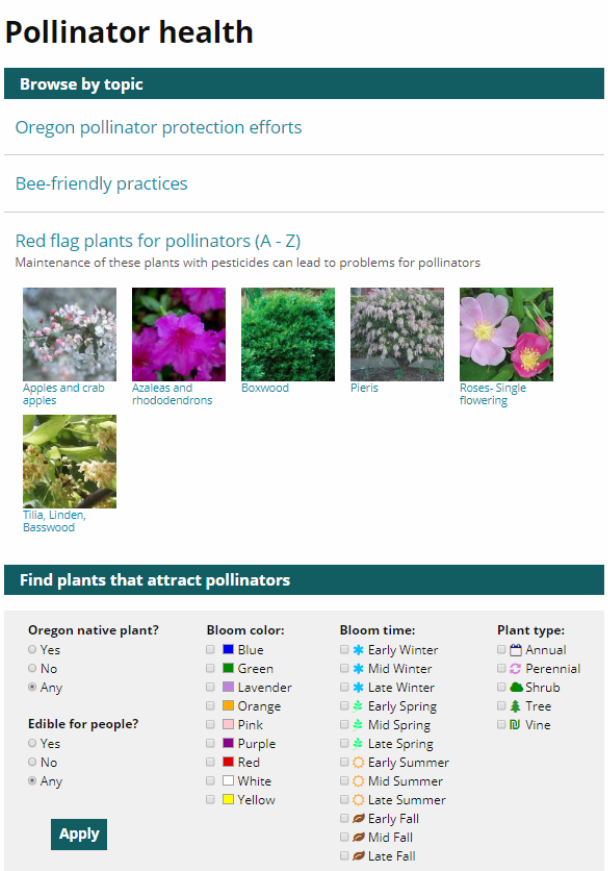
4.2.3 Bee health extension

There is considerable information available to land managers and those who advise them (from crop consultants, to regional agencies, to Master Gardener volunteers) on how to protect bee pollinators. Much of this information is spread across a number of disparate sources, has not kept pace with recent developments in the field and/or lacks the specificity needed to be implemented on the ground. In order to provide these land managers and their advisors with better decision making support, OSU Extension will develop the following new peer-reviewed digital and print tools by fall 2019:

- A complete revision of the pesticide decision support publication and mobile app How to Reduce Bee Poisoning from Pesticides (PNW-591). The revision will incorporate high-risk pest management scenarios and new residual and chronic toxicity data, as well as data for non-*Apis* bees.
- Two new comprehensive extension publications for landscapers and homeowners on plant selection, pest management decisions, and landscape design;
- Publications supporting each of the new Bee Protection Protocols;
- Extension publications highlighting the common native bees in Western Oregon backyards;
- Infographics that will be distributed across social media channels and available for volunteers to distribute as postcards on topics such using pesticides in gardens, and landscape design for bees (see Section 4.1 for examples).

4.2.4 Tool for urban residents: SolvePestProblems.edu

When it comes to household pest problems, urban residents encounter a confusing array of information online and on store shelves, making it difficult for people to diagnose problems and determine their best solution. There are also diverse communities who have been historically underrepresented in contributing to and accessing Integrated Pest Management information, and who are disproportionately impacted by pests and pesticides. Consequently, any approach to increasing the health of urban bees must be integrated into a broader set of tools designed specifically for homeowners.



Mobile view of solvepestproblems.edu Pollinator Health section. The site is set to launch Spring 2019.

SolvePestProblems.edu is currently being developed by OSU Extension to meet urban resident needs for a one-stop tool for making pest management decisions. The responsive design website will be easily accessible on mobile phones and tablets and will help people quickly and easily diagnose non-agricultural pest problems and determine effective IPM strategies for preventing and managing specific pests in homes, buildings, landscapes, gardens, natural areas, and other non-agricultural locations. Recommended strategies will pose the least possible risk to people, property, resources, and the environment, while preventing intolerable levels of pest damage. The information provided aims to reduce the use of pesticides by eliminating the unnecessary use of pesticides. SolvePestProblems.edu will address inequities in access to unbiased, science-based pest management information and be offered in both English and Spanish.

4.3 Learning from and recognizing innovators

Initial stakeholder consultations by the ODA and OSU Extension Service revealed that many people were already actively working to improve the health of bee pollinators in the state but were not being recognized for their efforts. Many land managers were already providing habitat for bees, had good communication with their local beekeepers, were using pesticides judiciously around bloom time, and had strong comprehension of the risks to honey bees specified on the pesticide label. Yet without recognition, there was little incentive to encourage others to adopt these bee-friendly practices, let alone inspire other land managers

to expand the scope of practices they were already using.

As a result, a key element of the Project is to identify specific Oregon land managers or industries that have already gone the extra mile to protect pollinators. The Project will develop a venue to highlight and showcase these efforts in order to help market their products or industries to the public through the use of a value-added logo and multiple media platforms. Currently, two distinct programs have been initiated, but a third for urban land managers is expected to follow in the future.

A vinal banner provided to a grower enrolled in the Flagship Farms program. The images in these banners are specific to the farm and use images captured during a farm visit with a professional photographer. Photo credit: Samara Group.

4.3.1 Flagship Farm Program

The Oregon Bee Project Flagship Farms Program operates under the notion that any farm can become a leader in promoting pollinator health by practicing wise land management strategies, maintaining and/or improving favorable habitat, adding to the state's knowledge about pollinator populations, and sharing insights with fellow farmers. Participating farmers will attend a workshop, help monitor wild bees on their property, and follow basic guidelines shown to improve pollinator health. The OSU Extension Service and ODA will work closely with the Flagship Farms program participants to find innovative ways of providing promotional support for these pioneering farms and aim to showcase the many beneficial aspects of the Oregon agricultural landscape. Participants of the program will be given access to a logo for use on farm signs and products in addition to becoming part of a broader grower network.

4.3.2 Bee Innovators Program

Outside of agriculture there are many people who are also contributing to bee pollinator health. Golf courses installing pollinator habitat in their roughs, gardeners creating urban pollinator habitat, lawn seed companies incorporating pollinator-attractive flowers into their mixes, managed forests adopting practices that promote pollinators in their landscapes, educators developing novel material to introduce students to the bees of Oregon - all of these initiatives are innovative and key to keeping Oregon bee-friendly. The Project will begin accepting nominations for Bee Innovators through its website during National Pollinator Week (June 18-24, 2018). Each month, the Steering Committee (Section 6) will select the most innovative initiative and

highlight it through a blog-post or an episode of the PolliNation. In December of each year, the Project will hold a competition to allow the public to select a winner of the **Oregon Bee Innovator of the Year Award**.

4.4 Research

The capacity to address the four goals of this Plan is constrained by our knowledge of the drivers of bee health in Oregon. Research conducted over the next two years will address some of the pressing knowledge gaps and aim to:

Pesticide Exposure:

- Develop a methodology and baseline to measure changes in pollinator pesticide exposure and pollen nutrition in major Oregon cropping systems, as well as the interaction between nutrition and pesticide toxicity (Researchers: Sagili and Melathopoulos; Funding: Foundation for Food and Agricultural Research, Central Oregon Seeds, GloryBee, Oregon State Beekeepers Association, Oregon Department of Agriculture).
- Determine the residual toxicity of insecticides commonly used around bloom, in support of the Bee Protection Protocol for the Specialty Seed Growers of Western Oregon (Researchers: Buckland and Melathopoulos; Funding: Specialty Crop Block Grant, Specialty Seed Growers of Western Oregon).

Urban Land Management:

- Document the bees that can be found in residential gardens in Western Oregon, and determine the local (within-garden) and landscape (around garden) characteristics that benefit urban bee communities. (Researcher: Langellotto).
- Identify Willamette Valley native plants that promote abundant and diverse bee communities, and develop recommendations for farmers, rights-of-way managers, and gardeners, on native plants that can be used to expand bee habitat. (Researchers: Anderson and Langellotto).

Rural Land Management:

- Determine the interactive effects of fire, livestock grazing, and exotic annual grass invasions on native bee communities in rangelands (Researchers: DeBano, Morris, Lukas, Fields, Schmalz, and Wooster, Funding: Foundation for Food and Agricultural Research).
- Examine both native and domestic ungulate effects on native bee communities in riparian areas of the Blue Mountains (Researchers: DeBano, Rowland, Mitchell, US Forest Service).
- Use metabarcoding techniques on pollen to better understand which plants serve as important sources of pollen for native bees in agricultural areas, forests, and grasslands (Researchers: DeBano, Frost, Wooster, Rowland, Arstingstall and Oregon Zoo; Funding: Agriculture Research Foundation).
- Quantify community- and population-level response of native bees to wildfire severity in mixed conifer forest (Principle Investigator: Rivers; Funding: Bureau of Land Management, Mealey/Boise Cascade/Boone and Crockett/Noble Endowment Fund, OSU College of Forestry; Fish and Wildlife Research in Managed Forests, OSU College of Forestry)
- Assess the role of managed conifer forests in promoting pollinator health and pollination services to

agricultural crops (Principle Investigator: Rivers; Funding: National Institute of Food and Agriculture, U.S. Department of Agriculture).

Native Bee Survey:

- Create a comprehensive checklist of two economically important wild bee taxa (*Megachilidae* and *Bombus*) and digitize historic records of the bees in the state from the Oregon State Arthropod Collection (Researcher: Marshall; Funding: Foundation for Food and Agricultural Research)
- Survey bumble bee abundance and diversity in Oregon (researchers: Hatfield and Jepson (Xerces Society); Funding: Foundation for Food and Agricultural Research)

Recognizing Innovators:

- The Oregon Bee Pilot Project: Knowledge, education, promotion (Project Team: Labonte, Kincaid, Burfitt;; Funding: Specialty Crop Block Grant)
- Determine the market opportunity for Oregon nurseries and flower seed producers for an Oregon Bee Project "Bee Plant Picks" logo to be used on Oregon nursery and seed products shown to be beneficial to bees and grwon in accordance with the industry's Bee Protection Protocol (Project Team: Melathopoulos, Buckland, Nackley, and Langellotto; Funding: Specialty Crop Block Grant).
- Survey gardeners and the general public to develop a better understanding of their confidence in choosing bee-friendly flowering plants, their current efforts to support Oregon's bee communities, and their willingness to transition habitat from turf or other uses, to bee-friendly habitat (Project Team: Bennett and Langellotto).

5. CONNECTING ACTIVITIES, GOALS AND METRICS

The ultimate measure of success of the Oregon Bee Project would be higher survival and productivity of managed bee stocks and maintaining wild bee biodiversity into the future. In addition to directly measuring pollinator population changes, success would also entail documenting increasing habitat for bees and reducing pesticide exposure. But how could this be measured? For example, measuring changes in habitat and pesticide exposure directly is unfeasible given the size and complexity of land management in Oregon. The US Environmental Protection Agency, the Pesticide Program Dialogue Committee, the Association of American Pesticide Control Officials and committees, and State Lead Agencies, such as ODA, have been working together to develop measurements of program success for the different efforts taking place in states, tribes, and territories across the US. Through ODA's involvement in these national discussions, the Project will develop a set of metrics that will be compatible with measures used in other states, allowing Oregon to participate in periodic national surveys, but in a manner that is tuned-in to the specific constraints and concerns of our state. Consequently, the Project will focus on the measuring the following key variables over the next two years to track the success of the plan:

1. Goal: Protecting bees from pesticide exposure.

1.1 Objective: More than 2,000 pesticide applicators will be trained in how to use pesticides around pollinators in both English and Spanish, via face-to-face trainings, and starting in 2018, through an interactive online training course. Through these efforts, the Project will increase trained applicator capacity to evaluate the pesticide products being used, which, in turn, will reduce the use of higher risk pesticide products on bee-attractive blooming plants.

Activities:

- Training and Engagement: Licensed pesticide applicators (Section 4.1.5)
- Bee health extension (Section 4.2.3)

Measures:

- The number of students taking ODA approved core credit courses for pesticide use around pollinators will be collected and compiled by the Project.
- Trainings will employ electronic clicker questions to measure applicator pesticide label comprehension before and after the session and to assess their ability to recognize mitigation tactics for pesticide applications made under higher risk situations (e.g., pest control during bloom when honey bees are contracted for pollination).

1.2 Objective: Over 10,000 people will receive digital or print information covering backyard pesticide use and how to reduce exposure to pollinating bees.

Activities:

- Public engagement around pesticide use and backyard habitat (Section 4.1.1)
- Bee innovators program (Section 4.3.2)
- Bee health extension (Section 4.2.3)
- Tool for homeowners: SolvePestProblems.edu (Section 4.2.4)

Measures:

- The number of people engaged at Project events, postcards distributed and social media engagements will be collected and compiled by the Project.
- Homeowners adopting pollinator friendly practices will be asked to share images of their efforts through social media and the number of images of homeowners successfully implementing a bee-friendly practice in their home will be counted.

1.3 Objective: The Flagship Farms will train 35 growers how to mitigate pesticide exposure to bees and how to minimize pesticide applications by utilizing integrated pest management.

Activities:

- Public engagement around pesticide use and backyard habitat (Section 4.1.1)
- Bee innovators program (Section 4.3.2)
- Bee health extension (Section 4.2.3)

Measures:

- Surveys of Flagship Farmers to determine whether trainings have reduced spraying during high risk situations and increased the adoption of integrated pest management techniques.

1.4 Objective: Four Bee Protection Protocols will be completed and will increase proactive communication among growers, pesticide applicators and beekeepers. By 2020 beekeepers are expected to report a 25% increase in the number of applicators engaged in proactive dialogue around the timing of colony movement and pest control options on bee-attractive blooming plants.

Activities:

- Bee protection protocols (Section 4.2.2)
- Bee health extension (Section 4.2.3)

Measures:

- Commercial beekeepers will be surveyed annually by adding questions to the existing pollination rental fee survey. Beekeepers will be asked whether they experience a change in the quantity and quality of communication and information exchange with growers and pesticide applicators as a result of the Bee Protection Protocol.

1.5 Objective: Pesticide applicators, growers and beekeepers will be provided with updated information on the toxicity of pesticide products to bees, particularly around residual and chronic toxicity, as well as non-*Apis* toxicity and this information will be provided in an easy to understand and more easily accessible formats.

Activities:

- Bee protection protocols (Section 4.2.2)
- Bee health extension (Section 4.2.3)
- Research (Section 4.4)

Measures:

- Oregon State University Extension will conduct client teaching evaluations to determine the extent to

which extension publications and workshops align with teaching objectives, are accessible and are readily applicable to the situations encountered in the field.

2. Goal: Increase habitat:

2.1 Objective: Over the next two years the Flagship Farms pilot program will train 35 growers in techniques to increase pollinator habitat on their farms and identify an additional 25 Bee Innovators who are already providing remarkable habitat for pollinators.

Activities:

- Training and Engagement: Land managers (Section 4.1.2)
- Flagship Farm Program (Section 4.3.1)
- Bee Innovators Program (Section 4.3.2)

Measures:

- Land managers will be surveyed at training sessions to determine their intent to manage and develop new pollinator habitat and tracked over time to determine actual levels of adoption.

2.2 Objective: The example set by the Flagship Farms and Bee Innovators will result in an additional 35 land managers increasing pollinator habitat on their properties.

Activities:

- Training and Engagement (Section 4.1)
- Flagship Farm Program (Section 4.3.1)
- Bee Innovators Program (Section 4.3.2)

Measures:

- Surveys of Flagship Farmers to determine if trainings have resulted in them increasing the quantity and quality of forage for pollinators on their farms.
- Follow up surveys to see if information provided by Flagship Farm and Bee Innovators program has inspired land managers to adopt new practices. Public interaction via the website (traffic on the Flagship Farm and Bee Innovators posts and site pages).
- Prompts to share practices and source of inspiration via social media.

2.3 Objective: Over 20,000 people will receive digital or print information around how to increase pollinator habitat in their backyards, and this will include a new responsive design website for plant selection.

Activities:

- Training and Engagement: Public (Section 4.1.5)
- Bee innovators program (Section 4.3.2)
- Pollinator health extension series (Section 4.2.3)
- SolvePestProblems.edu (Section 4.2.4)

Measures:

- The number of people engaged at Project events, postcards distributed and social media engagements will be collected and compiled by the Project.

- The number of images of homeowners successfully implementing a bee-friendly practice in their home will be counted.

3. Goal: Reduce impacts of diseases on bees

3.1 Objective: The OSU Honey Bee lab will develop protocols for detecting all major honey bee diseases and viruses, and be in a position to explore the presence of these pathogens among Oregon's wild bees. The lab will have processed at least 500 samples from beekeepers to estimate infestations of the mite parasite *Varroa destructor* and 100 samples to survey for honey bee diseases.

Activities:

- Bee disease and parasite diagnosis (Section 4.2.1)

Measures:

- Count the number of samples processed by the OSU Apiculture Lab.
- Establish baseline values for major honey bee diseases in Oregon.

3.2 Objective: Training will be provided to over 500 beekeepers on managing diseases and pests, and an additional 200 people on managing pests and diseases among other managed bee species, particularly the orchard mason bee (*Osmia lignaria*).

Activities:

- Training and Engagement: Beekeepers (Section 4.1.3)

Measures:

- Beekeepers will be surveyed at training sessions to determine their intent to adopt new best beekeeping practices.

4. Goal: Expand our understanding of the bees of Oregon

4.1 Objective: Instruct more than 150 citizen scientists on wild bee sampling, basic survey, and specimen curation techniques, and train 25 people to become para-taxonomists who can reliably identify bees to the taxonomic level of family and most common genera.

Activities:

- Training and Engagement: Volunteers (Section 4.1.4)

Measures:

- The Project will collect and compile data on volunteer activity and retention over time.
- The activity of volunteers will be tracked at the level of effort spent across Level III ecoregions.
- The skill level of volunteers in wild bee taxonomy will be assessed using a standardized collection of wild bees. The assessments will be tracked over time to establish the training effort required to reach a certain level of skill.

4.2 Objective: The Project's volunteers will bring their understanding of bee biology back to their communities and host at least 12 outreach events per year in over 10 counties.

Activities:

- Training and Engagement: Public (Section 4.1.5)

Measures:

- The date, location and description of outreach events will be recorded and compiled by the Project and made publically accessible through the Project's website.
- The number of people talked to at Project events, postcards distributed and social media engagements will be collected and compiled by the Project.

4.3 Objective: Oregon will collect over 5,000 new bee records for the state and perform a survey of bumble bees abundance and cavity nesting bees; the first statewide bee survey in Oregon's history.

Activities:

- Public engagement around the bees of Oregon (Section 4.1.6)

Measures:

- The date, location and description of outreach events will be recorded and compiled by the Project and made publically accessible through the Project's website.
- The number of people talked to at Project events, postcards distributed and social media engagements will be collected and compiled by the Project.
- A total of 20 new bee para-taxonomists will be practicing in Oregon who can reliably determine specimens to common bee genera and conduct some sub-generic determinations. At least a 5 of these para-taxonmists will be located in Eastern Orgeon.

4.4 Objective: Historic records of two economically important bee genera (the bumble bees and cavity nesting bees in the Family Megachilidae), currently held in the Oregon State Arthropod Collection will be digitized and made publically available.

Activities:

- Research (Section 4.4)

Measures:

- Collection curated and determinations confirmed
- Specimen records digitized
- Records are made publically available through a freely accessible Interactive Bee Atlas hosted by the Oregon State Arthropod Collection
- An annotated checklist of the species in these two groups found in Oregon published.

6. ORGANIZATIONAL STRUCTURE

The Oregon Bee Project's success depends on multiple levels of collaborators and supporters. In order for this project to truly make an impact, state partners will work alongside Oregonians in every region of the state. We recognize that collaborators will provide a diverse set of experience in their capacity to contribute, including playing a coordinating, steering or advisory, or other participatory role.

Steering Committee: The Steering Committee is responsible for the day-to-day planning & operation of Oregon Bee Project programs and coordinating with partners. The Steering Committee consists of the Pollinator Health Extension Specialist (chair), two members from the ODA representing the Insect Pest Prevention and Management (IPPM) and the Pesticides Program, and a member from ODF. Members of the Steering Committee are experts in the fields of pollinator health, honey bees and wild bees, ecology, pesticides, land management, and public policy. The Steering Committee's responsibilities also include:

- working in alignment with the Mission of the Project,
- meeting on a weekly basis to discuss the progress and direction of the Project,
- providing a quarterly progress report on the objectives of the Plan to the Advisory Committee via email,
- producing the annual public report on the progress towards the objectives of this Plan,
- ensuring the Advisory Committee is convened at least once a year,
- identify the most appropriate Advisory Committee members to help with Mission-oriented activities across the state, and
- help facilitate networking among Advisory Committee members and organizations outside of the Project.

Advisory Committee: Members of the Advisory Committee support the development of the Project by providing feedback and expertise. The Advisory Committee is comprised of diverse representatives and pollinator health experts and researchers, both national and regional; industry groups; land management experts such as farmers, Soil and Water Conservation Districts (SWCD), Natural Resources Conservation Service (NRCS) and conservation groups; traditionally underrepresented groups; and at least one member of the general public. The Advisory Committee's responsibilities include:

- working in accordance with the Mission of the Project,
- attending an annual meeting to review progress on the Plan,
- review quarterly progress reports and provide feedback to the Steering Committee,
- responding to Steering Committee requests on Project deliverables,
- distributing information about the Project through their networks,
- nominating Flagship Farms and Bee Innovators, and
- help develop priorities and identify program gaps.

Specific tasks to be completed by the Advisory Committee by 2020, as a whole or by selection of a sub-committee, will include:

- developing a selection process for future Advisory Committee members, to be approved by both the Steering Committee and a majority of the Advisory Committee, and

- drafting other necessary bylaws deemed necessary by the Steering or Advisory Committees and approved by the Steering Committee and a majority of the Advisory Committee.

Regional Leadership Teams: Long-term success of the Oregon Bee Project requires regional leadership to represent local priorities, carry forward local projects, and create a robust network across the state. Regional leadership will consist of diverse representatives including OSU Extension, growers, researchers, SWCDs, and community volunteers. Regional teams will represent the unique challenges around the state and will be situated, at a minimum, in the Willamette Valley, the coast, central, Southern, and Eastern Oregon. The Regional Leadership Teams responsibilities include:

- coordinating regional public events,
- provide feedback to the Steering and Advisory Committees on progress towards the objectives in this plan, and
- identifying needs in their region and reporting on local initiatives to the Steering and Advisory Committees - reports will be provided on an annual basis through an electronic survey provided by the Steering Committee.

Oregon Bee Project Advisory Committee meeting, breakout session, January 5, 2018.
Photo credit: A Melathopoulos

7. STATE OF OREGON BEES 2020

On National Pollinator Week 2020 the Project will release its The State of Oregon Bees 2020 Report outlining progress towards meeting the goals and objectives outlined in Section 5, as well as new knowledge, challenges and opportunities that emerged over the two years covered by the Plan. The State of Oregon Bees 2020 will also include basic information on the status of bees in Oregon, and will include reports on honey bee colony losses, a preliminary checklist of Oregon wild bees and ODA-verified pesticide bee kill incident data.

The release of the State of the Bee 2020 will be an opportunity for the Advisory Committee and Regional Leadership Teams to reflect on the Project and its priorities beyond 2020. The Oregon Bee Project, along with this Plan, are designed to be dynamic, changing and adapting as new data are collected, new input is received, challenges are overcome, and new challenges arise. This Plan is a work in progress, and different aspects of the Plan will continue to be bolstered as the Project moves forward.

Western Oregon beekeeper George Hansen stands in a pollinator habitat he planted.
Photo credit: A Melathopoulos

8. PROGRESS TO DATE

Oregon State University

Oregon Department of Agriculture

2017–2018 PROGRESS REPORT

Helping Oregonians help bees

The mission of the Oregon Bee Project is "bringing together Oregonians around a science-based strategy for protecting and promoting wild and managed bees through education, pollinator-friendly practices, and research".

6 Growers enrolled in Flagship Farm bee-friendly program in 2017

50 Episodes of PolliNation podcast highlighting bee-innovators

9276 Oregonians engaged with bees of Oregon since Jan 2017

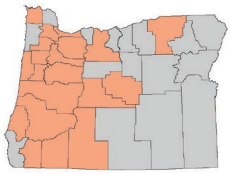
3291 Pesticide applicators trained since Sept 2016

146 Community scientists trained to survey for the Oregon Bee Atlas

1410 Social media followers Twitter + Facebook

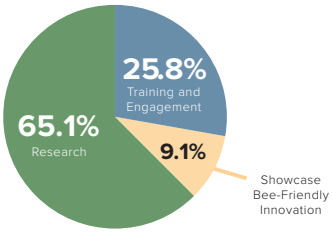
64 Stakeholder meetings trained to survey for the Oregon Bee Atlas

Oregon Bee Project tracking activity map



A total of 12,783 people were reached through outreach activities and training in these counties of the state.

Funding by activity



CURRENT FUNDING SOURCES

$ 240,000	(2017 – 2018)	Pesticide Licensing and Registrations
$ 544,929	(2018 – 2021)	Foundation for Food and Agriculture Research
$ 70,000	(2018 – 2021)	Central Oregon Seeds Inc, GloryBee and Oregon State Beekeepers Association
$ 86,100	(2016 – 2019)	USDA Specialty Crop Block Grant
$ 3,500	(2017)	Western SARE

Continued commitment from agencies to support project coordination through the following Full Time Equivalents (FTE)

Oregon Department of Agriculture IPPM: **0.5 FTE**
Oregon Department of Agriculture Pesticides Program: **0.3 FTE**
Oregon Department of Forestry: **0.1 FTE**
Oregon State University: **1.5 FTE**

NEW WEB SITE

Compiling resources for bees relevant to Oregonians
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