Struggling to get beyond best management practices in urban landscapes

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A key approach to advancing pollinator health in urban landscapes are best management practices (BMPs). BMPs are voluntary guidelines that outline how nurseries, retailers, landscapers, golf course superintendents and homeowners could reduce pesticide exposure to bees, and increase pollinator habitat. But while BMPs provide a robust starting point for an integrated strategy around pollinator health, there remains a significant challenge in translating guidelines into practices; we struggle to get beyond BMPs to practices that are simply routine.

One hypothesis as to why BMPs fail to make inroads into the world is that they often are not meaningful to the users, and users do not recognize outcomes. For a BMP to be meaningful it must: 1) be specific to the context of their State, region or industry, 2) have a means to set priorities (i.e., to tackle practices of highest risk first), 3) result in goals that can be acted on by extension (i.e., be "extension-able") and 4) have measurable outcomes. I describe efforts in Oregon to deal with these four challenges.

The problem of context and pollinator protection is perhaps the most pronounced in Oregon. Agriculturally, the state has a wide array of minor/specialty crops (i.e., over 200), including a large nursery sector. Moreover, horticultural industries in Oregon span strongly contrasting biogeoclimatic zones; from rain forests to desert, resulting in many distinct pollinator communities and landscaping conditions. Consequently, the path to better outcomes for pollinators must pass through a shift in practices distributed out across a wide range of management scenarios. A second peculiar aspect of Oregon's context is that concern for pollinators in the state is not disproportionately focused on agriculture, but rather, on the urban use of pesticides following the poisoning of bumble bees in suburban Portland in 2013 and 2014. Finally, a peculiarity of Oregon's context is that pollinator protection has overlapping mandates from the Oregon Department of Agriculture (charged with MP3s through EPA) and Oregon State University (charged by the Oregon Legislature to develop a pollinator health education and outreach plan).

In order to meet the challenges posed by these multiple layers of context, Oregon has developed the *Oregon Bee Project*, a collaboration between Oregon Department of Agriculture and Oregon State University with multiple partners throughout the state. Initial stakeholder consultations by the Oregon Bee Project revealed that many people who were actively working to improve the health of bee pollinators in the state were not 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 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 land managers to expand the scope of practices they were already using.

The Oregon Bee Project looks to these early adopters as a means for simultaneously developing meaningful and industry specific BMPs and broadly engaging horticultural industries. The Oregon Bee Project focuses on identifying specific Oregon land managers or industries that have already gone the

extra mile to protect pollinators, and working collaboratively with these partners to help guide the practices as a guide. The Oregon Bee Project will develop a venue to highlight and showcase these efforts in order to help market their products, services or industries to the public, through the use of a value-added logo and multiple media platforms. In doing so, BMPs begin from the point of actual existing practices in a sector, the development of practices centers on engaging industries and the adoption of practices incentivized through firm- or industry-level promotion to the public.

The Oregon Bee Project is addressing the challenge of *success metrics* in two directions. The first involves the implementation of clicker-based questions in recertification workshops for pesticide applicator licenses. Each workshop begins with a set of questions that test applicator knowledge on the Environmental Hazard section of pesticide labels, as well on effective steps for mitigating pesticide exposure to pollinators. The workshops then challenge participants to solve industry specific exposure scenarios around pollinators using pesticide labels and existing extension tools. We predict that as training and extension progresses, applicators will demonstrate higher levels of understanding of pesticide labels and mitigation measures. The second approach to measure pollinator protection efforts is through the development of industry-specific checklists, based on the BMPs, to help managers understand and self-assess their progress. These same checklists will be used to conduct periodic industry surveys, allowing the measurement of progress over time.

The combination of pest management and pesticide hazard could then help inform extension to the highest priority for an "extension-able" plan. Through this process the Oregon Bee Project has identified four key groups, around which extension and outreach efforts are being focused (Figure below).