Mapping how wild bees use Maine’s landscape

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Bee landscape ecology
What do bees need in their landscape?

Food:
pollen and nectar

Habitat:
open soil, dead logs and twigs

Within their flight limit
Bee flight limit

*Colletes inaequalis*
Max flight limit: 1096 yd

*Osmia inspergens*
Max flight limit: 495 yd

*Lasioglossum leucomomum*
Max flight limit: 31 yd

Photos © Laurence Packer 2014 via Discover Life
What makes good bee habitat?

- Lots of sun
- Some shade
- Some water
- Woody flowering shrubs
- Well-drained soils

Photos via Maine Natural Areas Program
Some types of land are better than others!

Photos via Wikimedia Commons
Put it on a map: Land cover type
Table 3. Average (± standard deviation) scaled landcover suitability values assigned through expert opinion.

<table>
<thead>
<tr>
<th>Landcover</th>
<th>Ground nesting</th>
<th>Cavity nesting</th>
<th>Spring forage</th>
<th>Early Summer forage</th>
<th>Late Summer forage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deciduous/mixed forest, edge</td>
<td>0.9(0.17)</td>
<td>1.0(0.19)</td>
<td>0.9(0.24)</td>
<td>0.9(0.24)</td>
<td>1.0(0.22)</td>
</tr>
<tr>
<td>Developed/other</td>
<td>0.9(0.25)</td>
<td>0.6(0.30)</td>
<td>1.0(0.27)</td>
<td>0.9(0.26)</td>
<td>1.0(0.22)</td>
</tr>
<tr>
<td>Coniferous forest</td>
<td>0.5(0.23)</td>
<td>0.6(0.28)</td>
<td>0.1(0.24)</td>
<td>0.1(0.21)</td>
<td>0.1(0.29)</td>
</tr>
<tr>
<td>Deciduous forest/mixed forest</td>
<td>0.6(0.21)</td>
<td>0.9(0.22)</td>
<td>0.7(0.21)</td>
<td>0.5(0.29)</td>
<td>0.4(0.18)</td>
</tr>
<tr>
<td>Emergent wetlands/scrub-shrub</td>
<td>0.2(0.14)</td>
<td>0.4(0.24)</td>
<td>0.7(0.22)</td>
<td>0.6(0.25)</td>
<td>0.6(0.20)</td>
</tr>
<tr>
<td>Wetlands/water</td>
<td>0.1(0.0)</td>
<td>0.1(0.05)</td>
<td>0.3(0.20)</td>
<td>0.2(0.16)</td>
<td>0.5(0.18)</td>
</tr>
<tr>
<td>Agriculture/field</td>
<td>0.7(0.29)</td>
<td>0.2(0.18)</td>
<td>0.9(0.31)</td>
<td>0.7(0.27)</td>
<td>0.9(0.33)</td>
</tr>
<tr>
<td>Blueberries</td>
<td>1.0(0.25)</td>
<td>0.4(0.26)</td>
<td>0.4(0.29)</td>
<td>1.0(0.28)</td>
<td>0.5(0.26)</td>
</tr>
</tbody>
</table>
+ wild bee life history characteristics
= predicted wild bee abundance
BeeMapper

• Aim: to help growers assess wild bee habitat around their wild blueberry fields
• Target audience: Maine wild blueberry growers
• Features:
  • Maps
    • Land cover
    • Predicted wild bee abundance
    • Navigational aids
  • User’s guide
  • Links for further reading
What can we do with bee maps?

• Strategically place honey bee hives
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What can we do with bee maps?

- Strategically place honey bee hives
- Determine existing lands for conservation
- Find potential sites for pollinator plantings
- Targeted to growers, but can be used by everyone
Making the maps better

• Expert opinion varies widely
• Summer 2015 bee survey—sites in each land cover type
• Sample throughout the summer
Acknowledgments

• Research Team:
  • Samuel Hanes
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