

The importance of pollinators

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Pollinators are having a moment



Three key ideas

1. Pollinators are important



2. Pollinators are in decline



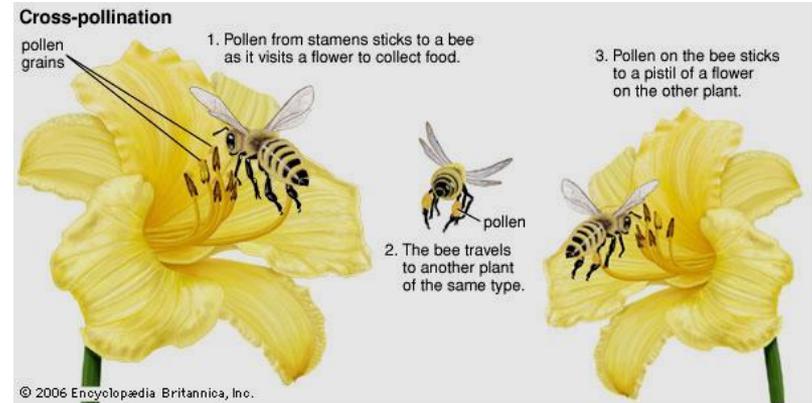
3. We can do something about it



Pollination basics

Bees, butterflies, moths, bats, birds....

More than 80% of plants on earth



Co-evolved over millennia



Useful today

Pop quiz 1

What percentage of the most important global crops benefit from animal pollination?

1. 30%
2. 50%
3. 70%
4. 90%
5. 100%

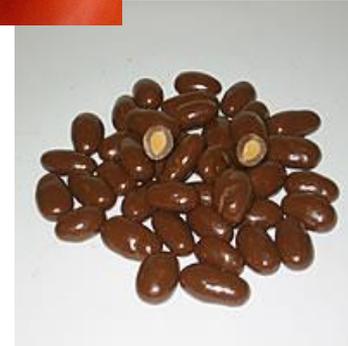
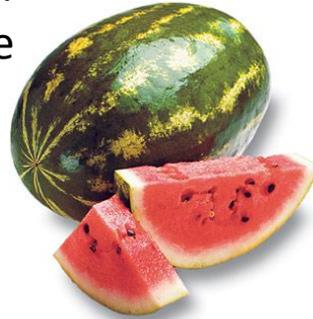
Pop quiz 2

Which of the following does NOT benefit from animal pollination?

1. Chocolate (cacao)
2. Apples
3. Coffee
4. Grapes
5. Blueberries

Crop pollination

- 70% of crops
- 100's of billions / year
- 5-8% of global production
- 5x more valuable per acre



(Klein et al. 2007. *Proc Royal Soc. B.*)
(Aizen et al. 2009. *Anal Botany.*)

Pollen limitation



Pop Quiz 3

How many bee species are there in Vermont?

1. 9
2. 54
3. 129
4. 275

Honey bees

Native to Europe, Africa

Workhorse of pollination

- Active; Social; Mobile

Widespread decline



Native bees



- 275 in Vermont
- 4000 in North America
- 20,000 in world

Wild crop pollinators

- Nest in and around farms
- Pollinate many crops
- Pollinate some better



Bombus on blueberry



Bombus on tomato

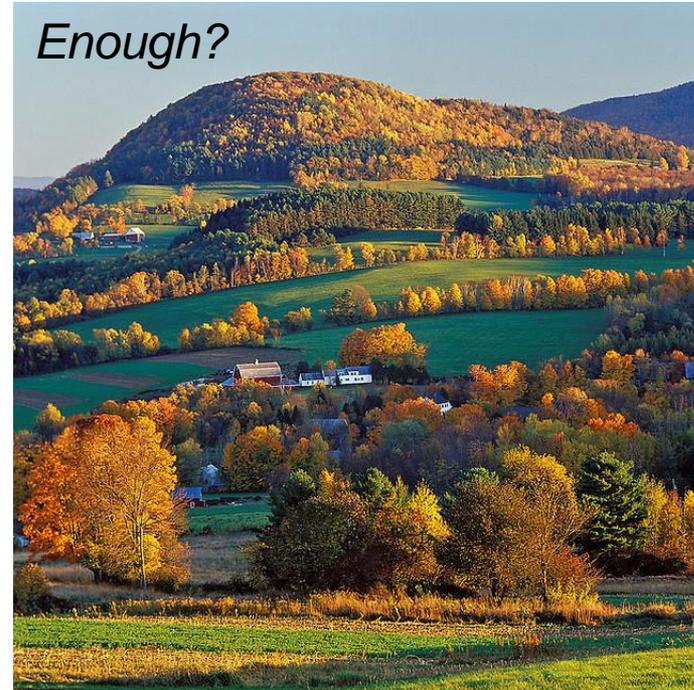


Osmia on apple



Andrena on almond

Providing what they need?



Three stories

1. Vermont blueberries
2. National maps of bees and agriculture
3. Global assessments and health



Vermont blueberries

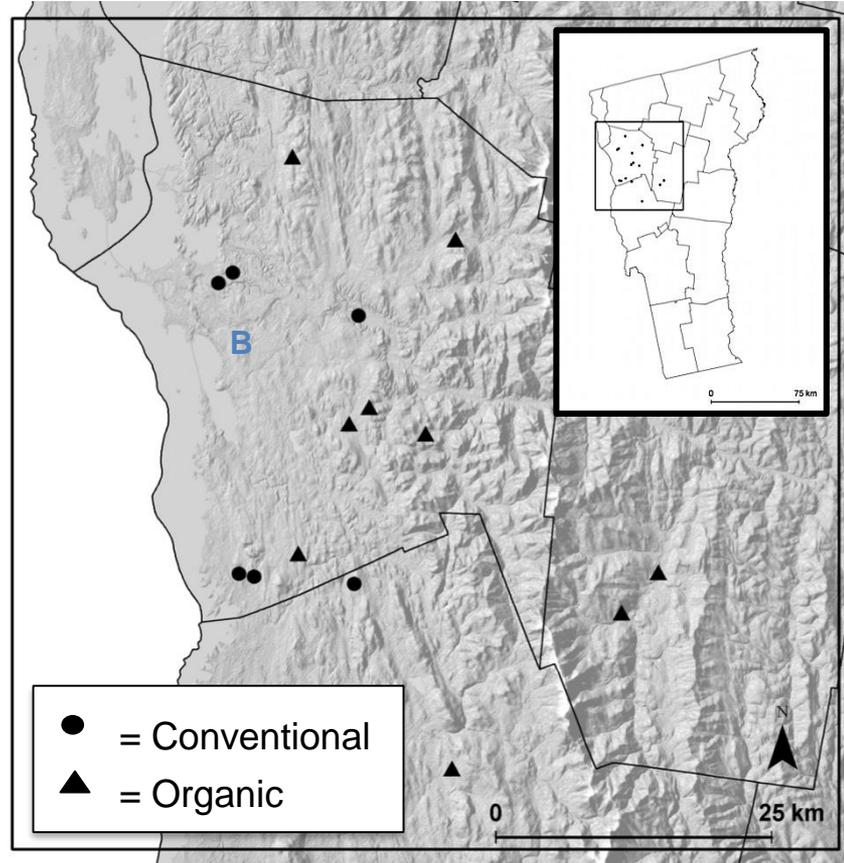
Who pollinates blueberries?

What affects their abundance?

How valuable are they?

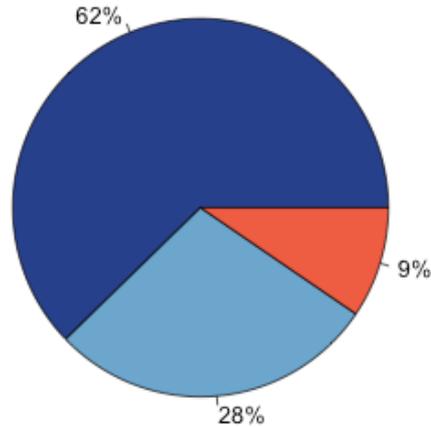
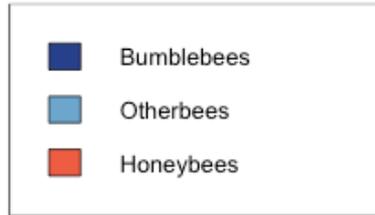


Field research

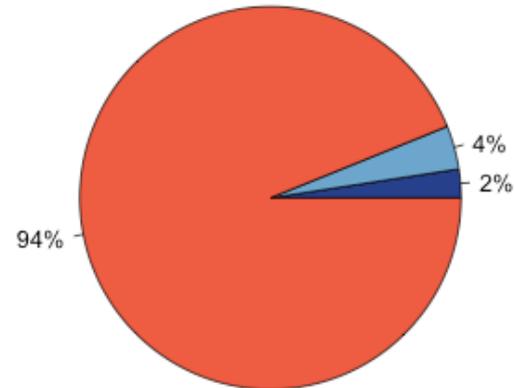


Vermont relies on native bees

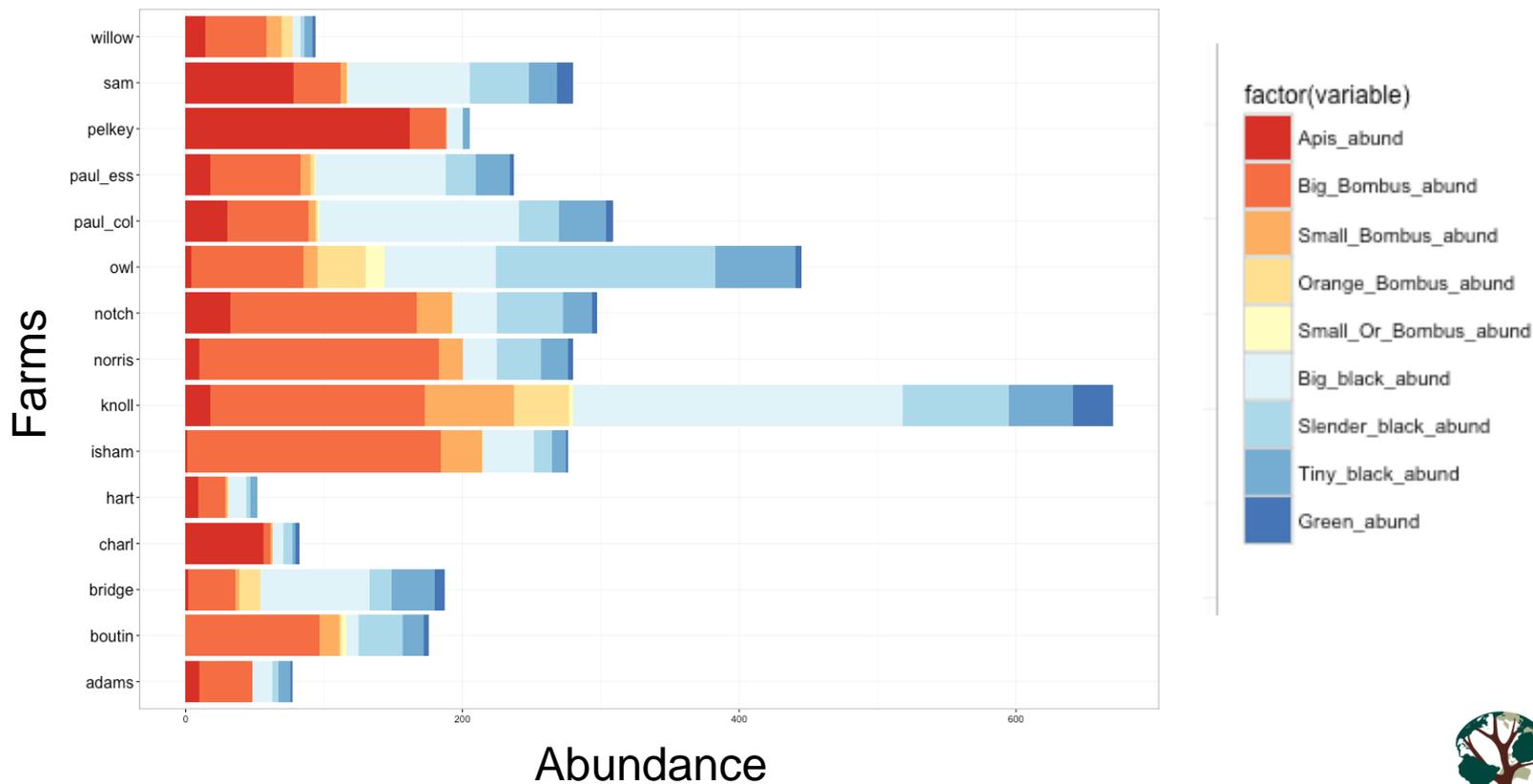
**Who visits
Vermont blueberries?**



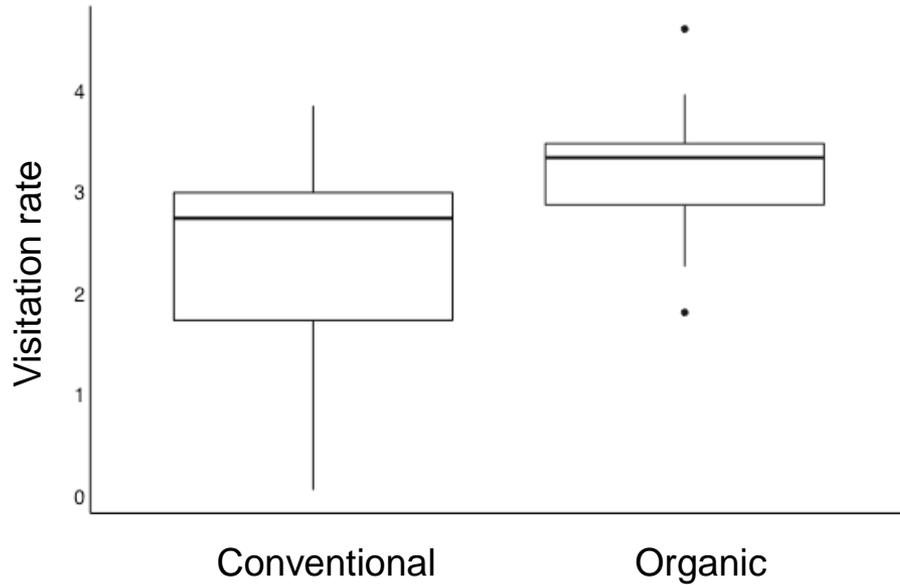
**Who visits
Michigan blueberries?**



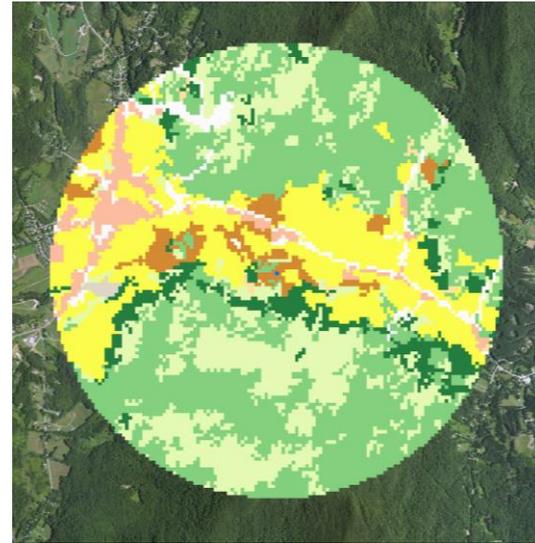
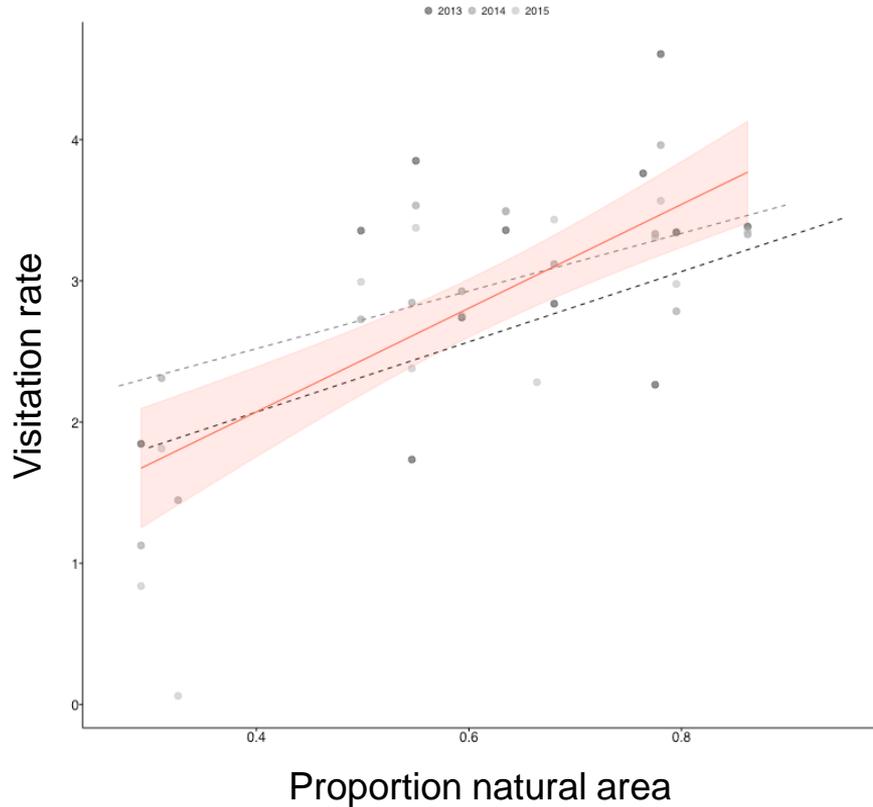
Big differences in bee activity



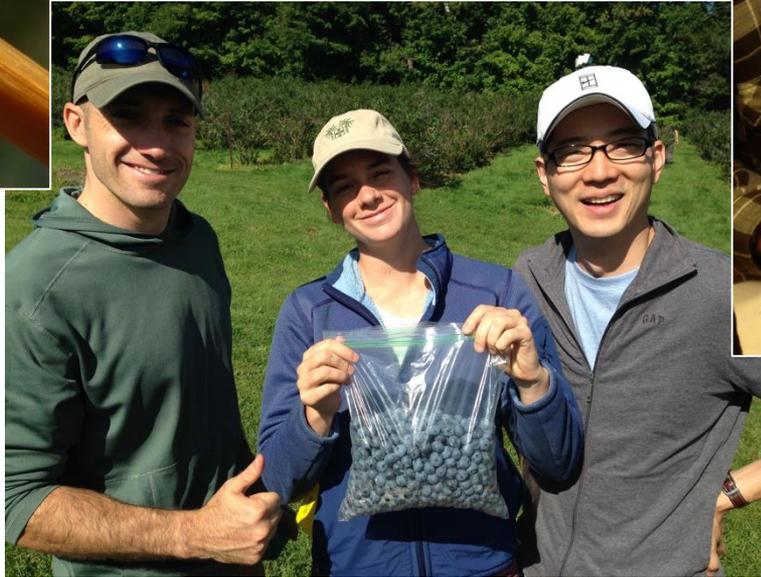
Management matters...



...so does the neighborhood



What is the value of wild pollinators?



Stay tuned...

Three stories

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3. Global assessments and health



Obama's on board



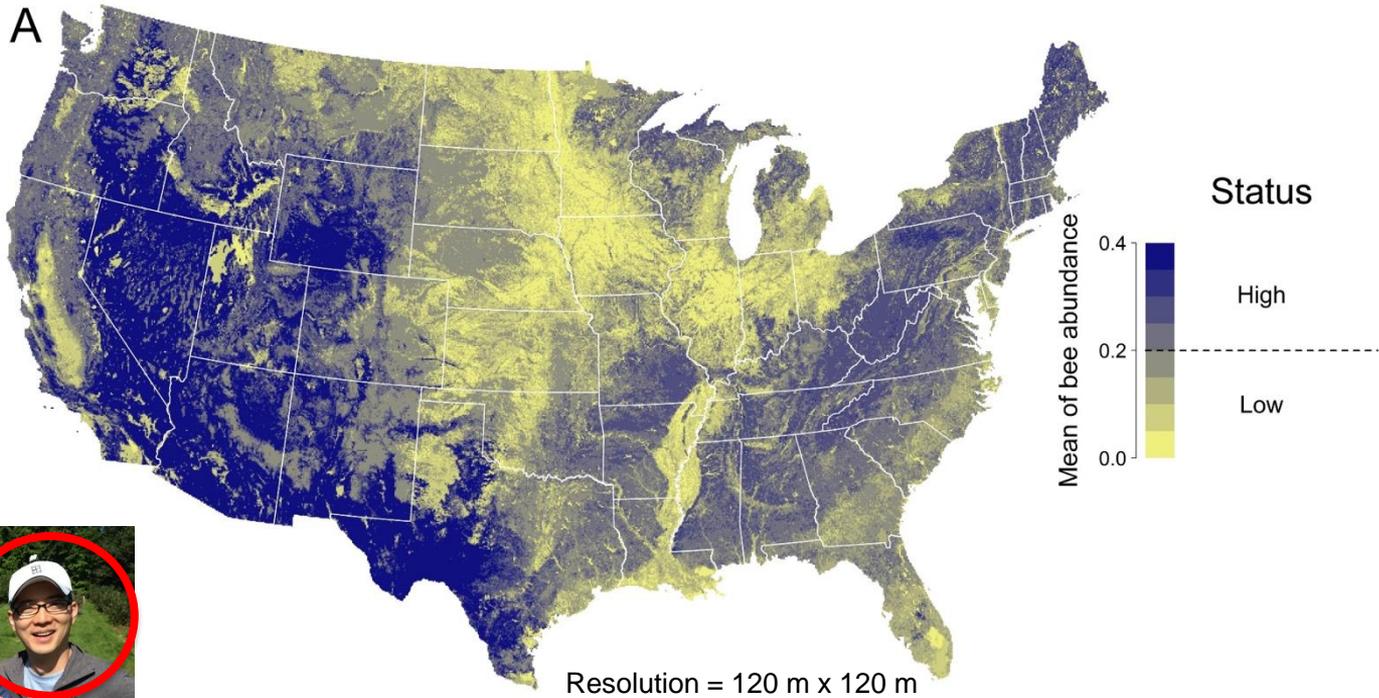
The screenshot shows a White House press release page. At the top, there is a navigation bar with links for BRIEFING ROOM, ISSUES, THE ADMINISTRATION, PARTICIPATE, and a page number 1600. Below the navigation bar, there is a breadcrumb trail: Home • Briefing Room • Presidential Actions • Presidential Memoranda. The main content area features the White House logo, the text "The White House Office of the Press Secretary", and social media sharing buttons for E-Mail, Tweet, Share, and a plus sign. The release is dated "June 20, 2014" and is marked "For Immediate Release". The title of the memorandum is "Presidential Memorandum -- Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators". Below the title, it says "MEMORANDUM FOR HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES" and "SUBJECT: Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators".



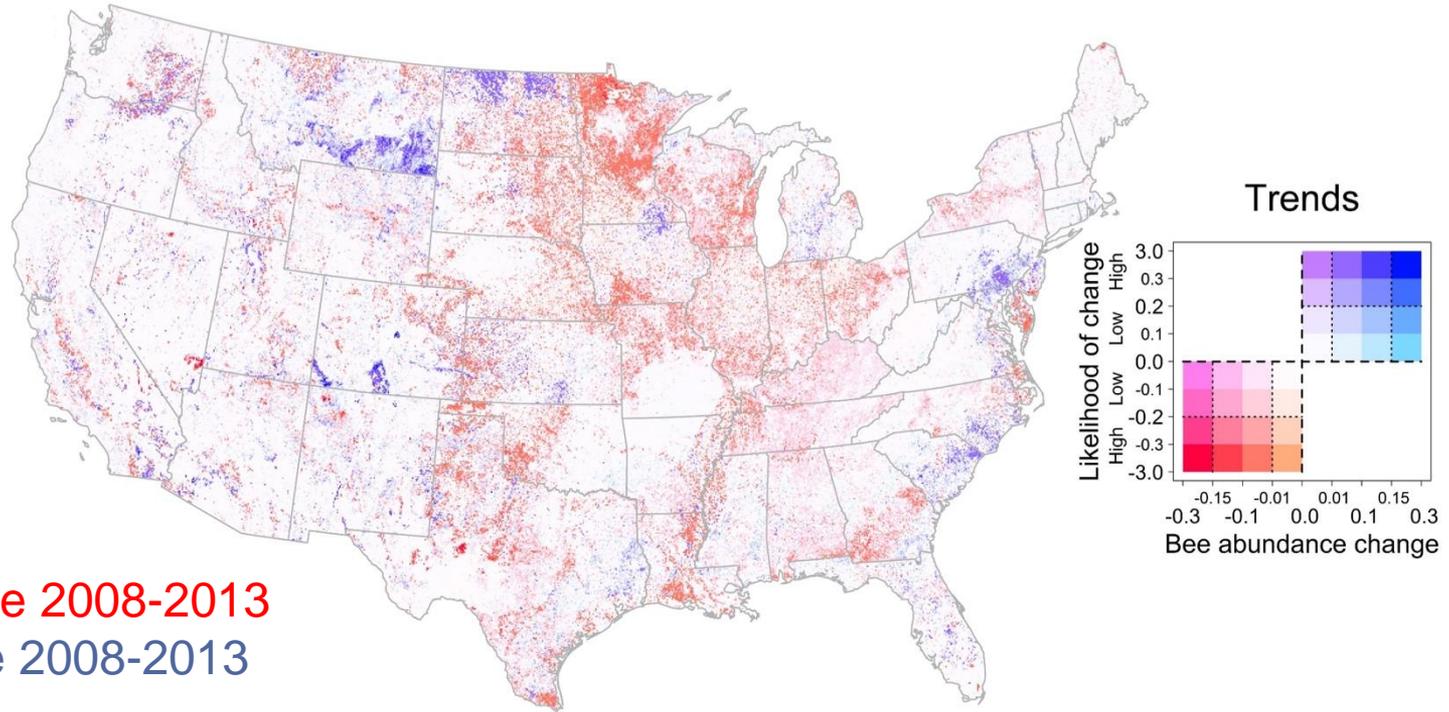
The graphic features the title "NATIONAL STRATEGY TO PROMOTE THE HEALTH OF HONEY BEES AND OTHER POLLINATORS" in blue text. Below the title, there is a large red "+ 7" followed by "million acres (over 5 years)" in red text. The entire graphic is enclosed in a black border.

Where would restoration do most good?

Map of pollinator abundance

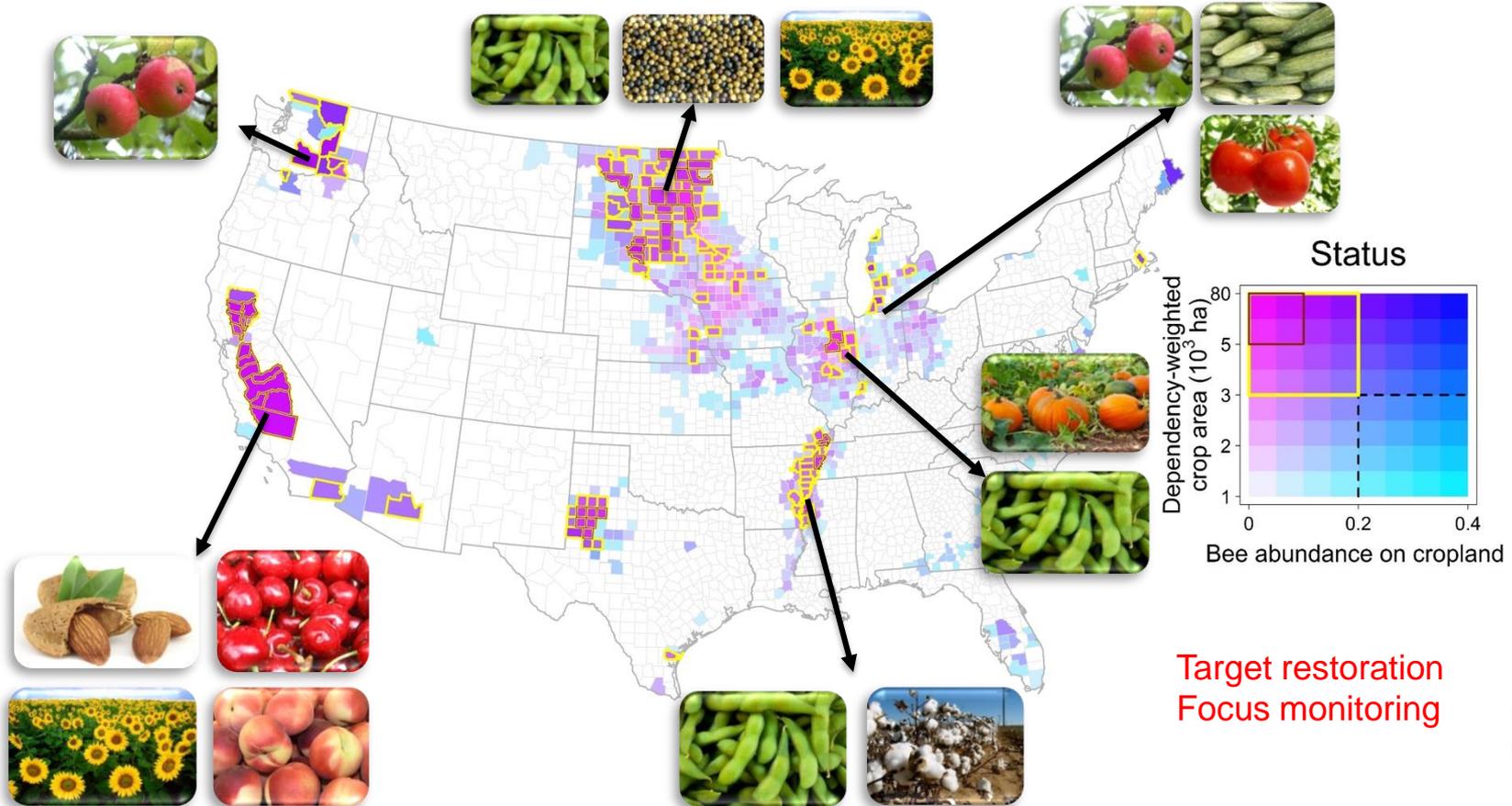


Trends over time

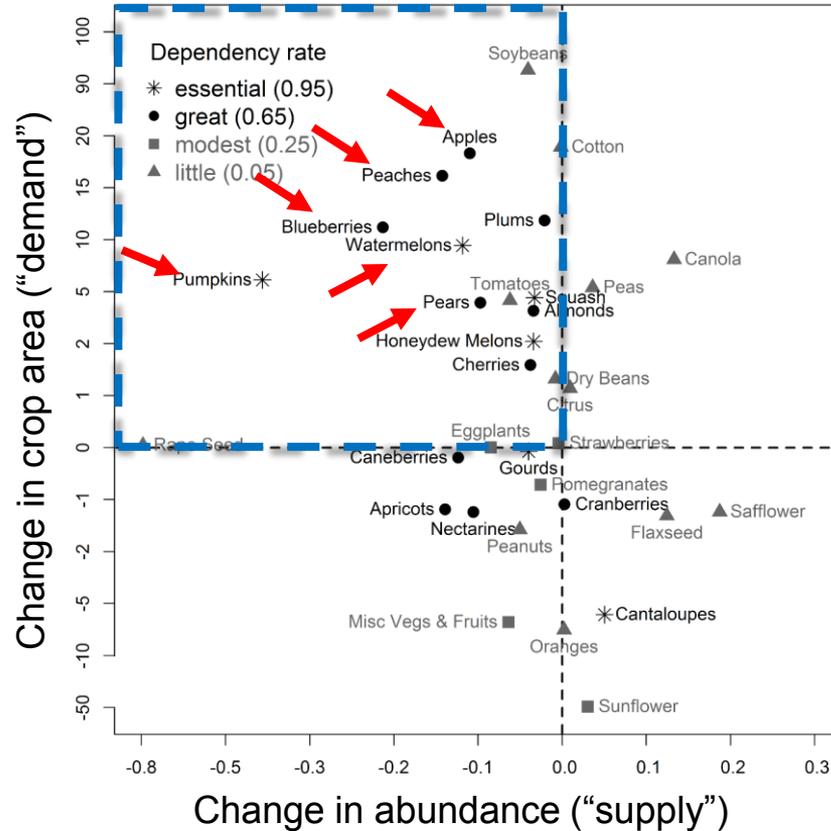


Decrease 2008-2013
Increase 2008-2013

Mismatched supply and demand



Crops to worry about



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UN report on pollinators

IPBES: new organization to assess economic values of nature



First report: pollinators



Ratified by 124 countries. Malaysia, 2016

Growing international attention



Decline of bees poses potential risks to major crops, says UN

Animal pollination responsible for 5-8% of global agricultural production by volume, says UN biodiversity panel, as it issues warning over their decline

THE FINANCIAL EXPRESS

Buzz Kill

Pesticides, climate change, etc, are killing key pollinators, putting farm output worth billions at risk

Opportunity for Vermont to innovate and demonstrate



Take homes

1. Pollinators are vital to natural and food systems
2. Managed and wild species are under threat
3. Solutions aren't mysterious or intractable
4. VT can help lead

