

Food Security and Pollinators



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The Importance of Pollinators

- 80 - 96% of angiosperms require pollinators for reproduction
- 1/3 of the food that we eat
- Support and maintain ecosystem services:
 - recreation, climate regulation, erosion control, raw materials production, cultural services

Pollination and Food Production Services



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1000 of 1200 common crops are pollinator dependent

1/3 of every bite of food we eat (McGregor 1976, Buchmann and Nabhan 1997)

Support of meat and dairy production – alfalfa production

Declines in production associated with pollinator declines (Klein et al. 2005)

Value of pollinator services

\$217 billion global crop production from insect pollination

Gallai et al. (2008)

84% of European crops depend on animal pollination

Williams (1994)

\$6.8 billion from honey bees in US

\$3.1 billion for native bees in US

(from Losey and Vaughan 2003)

\$2 billion in Canadian Agriculture

AAFC (2016)

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Vulnerability of Agricultural Exports to Loss of Pollinators



**>50 % Pollinator
Dependent**



**25-50 % Pollinator
Dependent**



**10-24 % Pollinator
Dependent**



**>10 % Pollinator
Dependent**

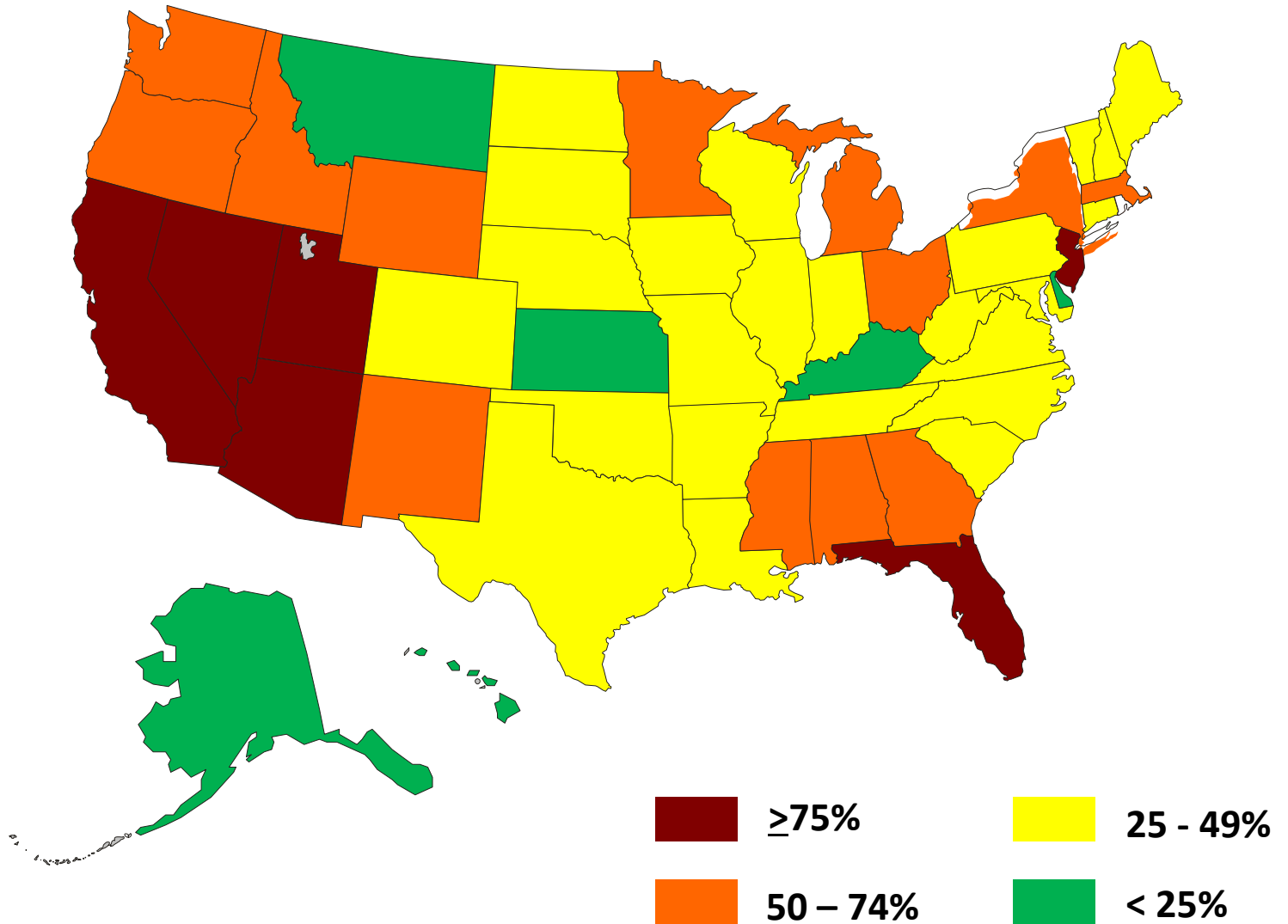


Not an OAS State

Total Agricultural Exports
(2005) = \$172 Billion




IMPORTANCE OF POLLINATORS TO U.S. AGRICULTURAL CROPS: VALUE OF AGRICULTURAL PRODUCTION (2007)



Foods Requiring Pollination



- Vanilla
- Sugar Cane
- Cinnamon
- Sesame Seeds
- Lettuce
- Onions
- Cheese
- Mustard
- Butter
- Meat
- Canola Oil
- Pickles
- Tomato
- Ketchup
- Potato



Globally: disturbing signs of decline

- **Loss of habitat**
- **Disease**
- **Parasites**
- **Invasive species**
- **Pesticides**

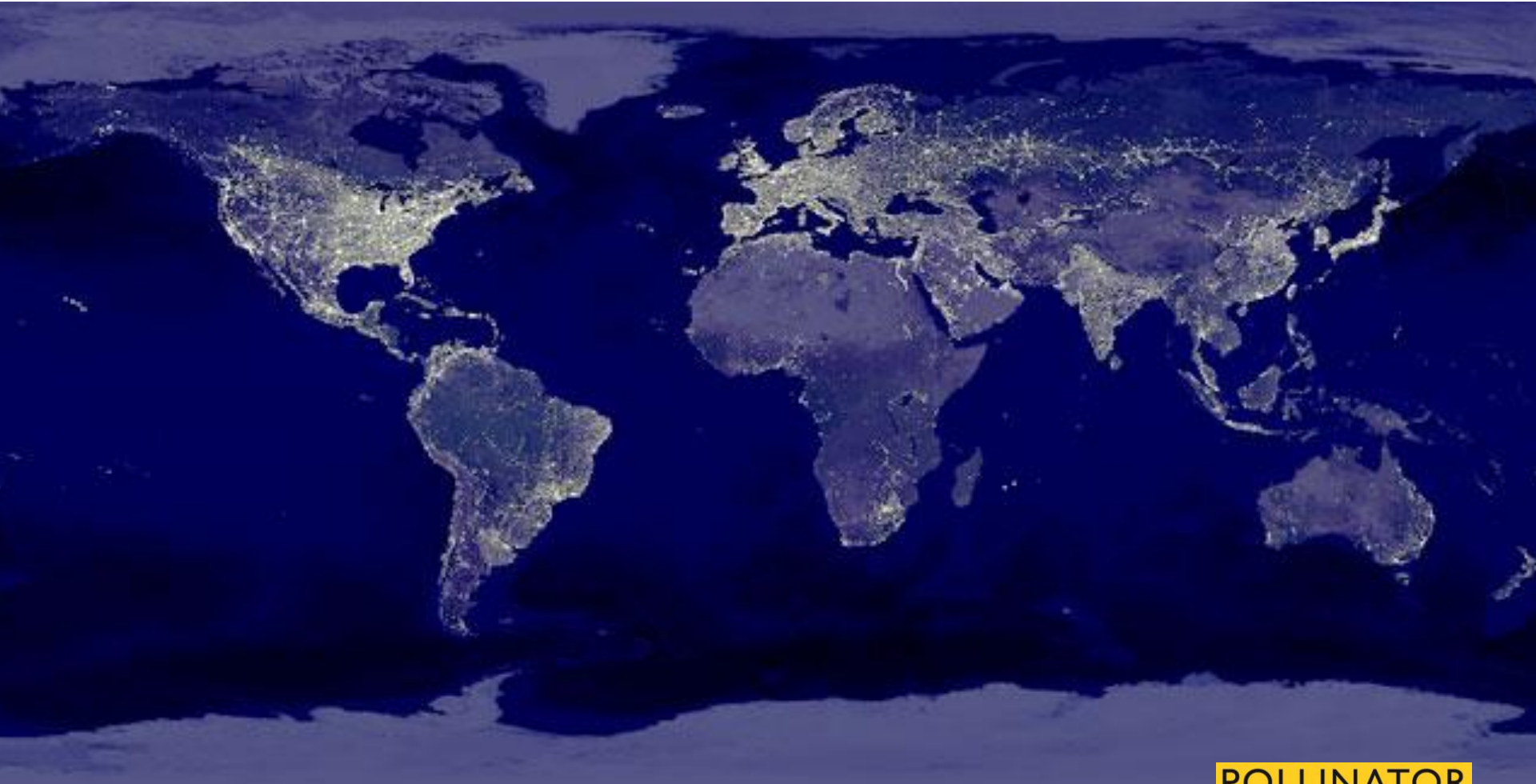
Lost pollinators = Lost pollinator functions

Securing Pollination Services Means Supporting Pollinator Habitat

Everywhere

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How do urban areas fit into the pollination equation?



Pollinators in Urban Landscapes

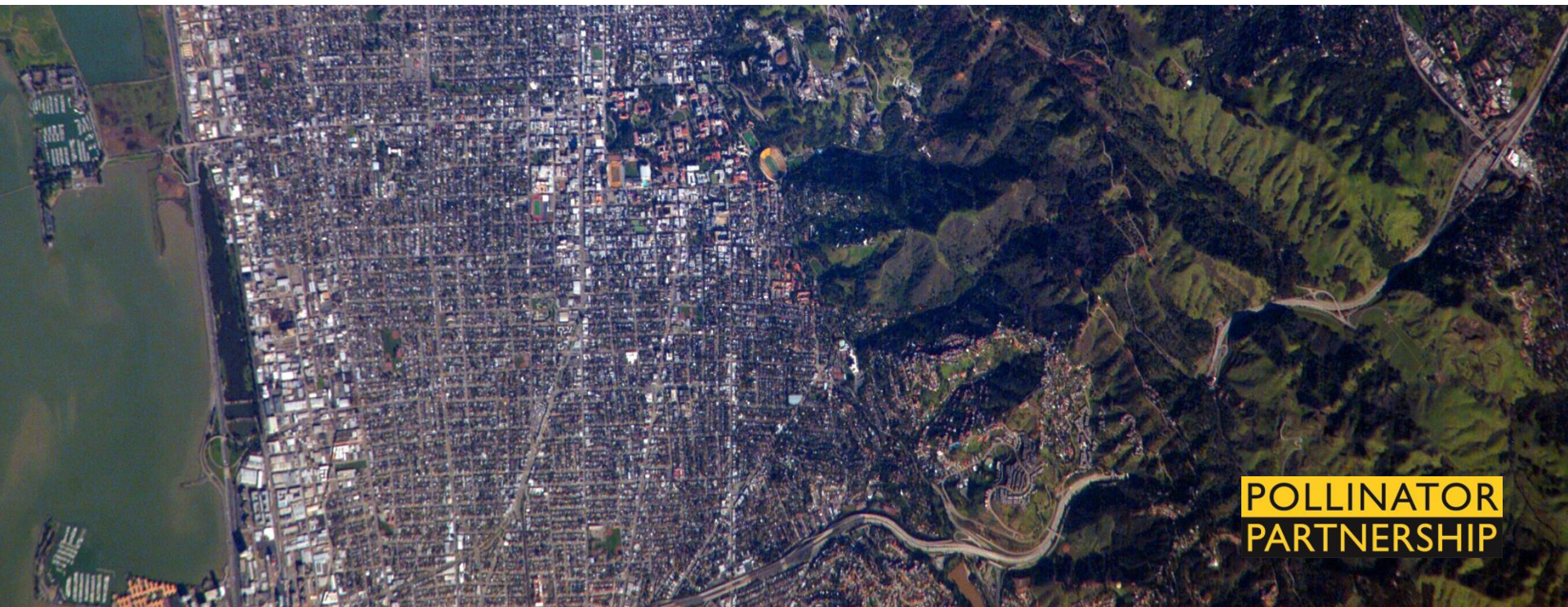
- Present Globally
- Patterns of diversity (urban more diverse)
- Associated with floral species (native and exotic)
- Completing full life cycle in city
- Species of conservation/ag importance

We still need to define

- Pollination systems
- Drivers of service provision
- Drivers of community structure
- Ecosystem services

What do urban pollinators prefer?

- Are urban and natural land bee communities similar?
- What characterizes a more attractive resource patch?
- Is there anything unique about the urban landscape?
- Can we use this information to support pollination and food production in cities?



Urban Pollinator Habitat Study



What factors might impact where you find pollinators in the city?

Distance to the urban-wild land interface

Distance to riparian areas (nesting sites)

Land use (residential vs. commercial)

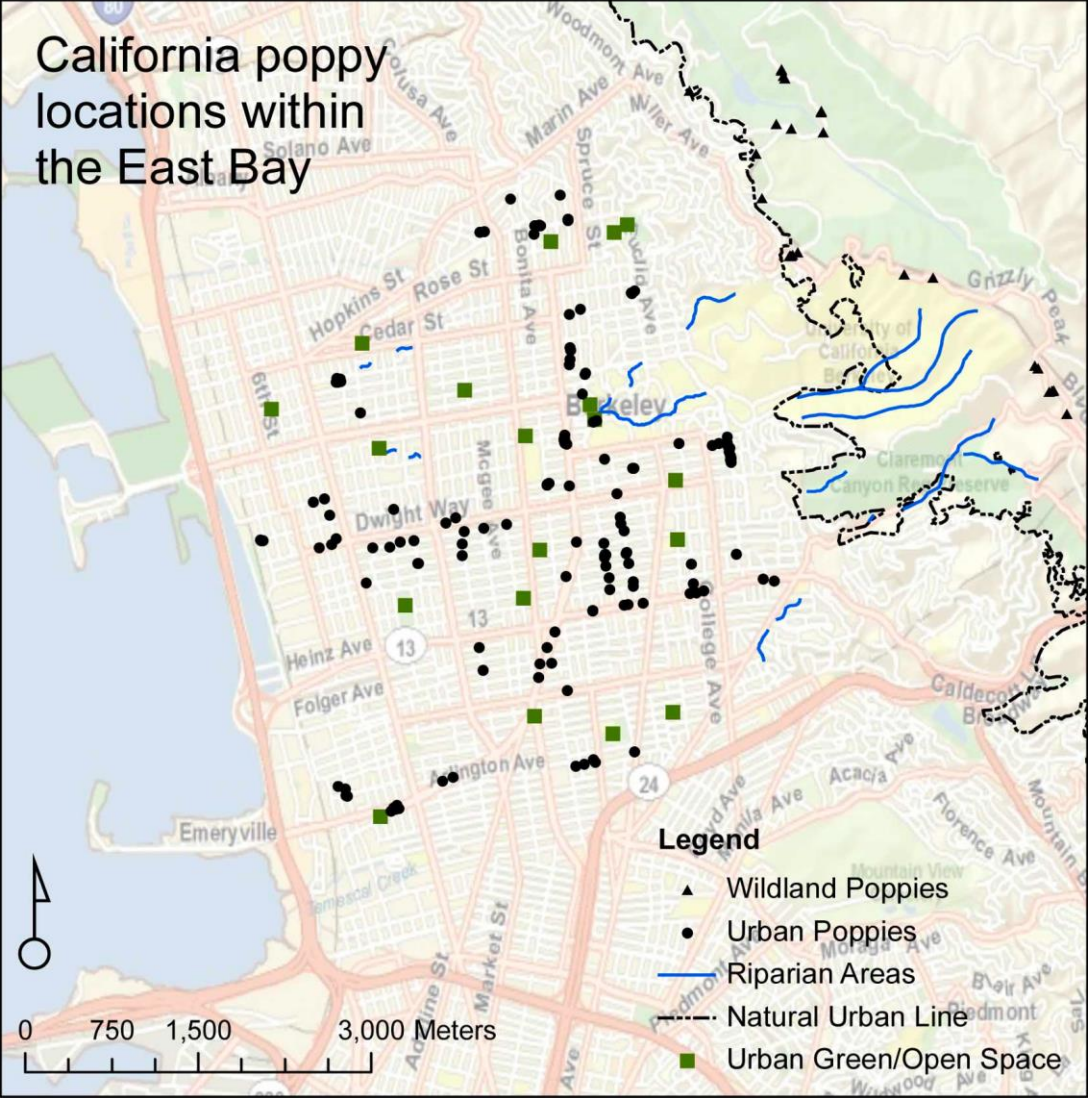
Proximity to open space

Patch (habitat) characteristics (size, density, local richness)

Disturbance (traffic)

Pollution and toxins

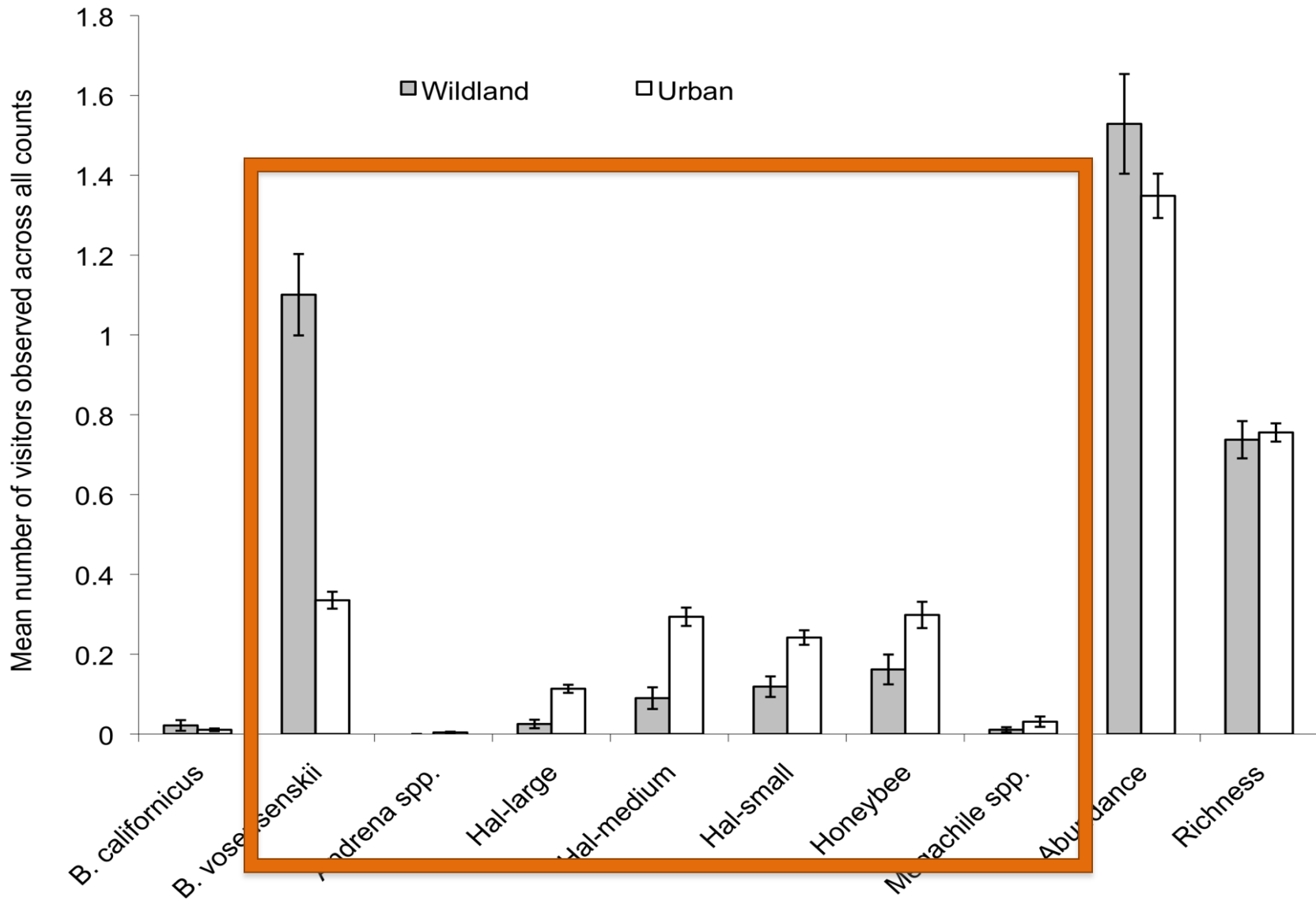
Where are we finding bees and why?



General Results

- Urban and Wild Land bee communities are different.
- Urban and Wild Land bee communities respond to different factors.
- Resource size and density is a dominant factor in urban landscapes, landuse is not.

Mean Abundance and Richness



Models of Foraging

Community	Urban	Wild
Abundance	poppy area (+), flw density (+)	flw density (+), floral richness (+)
Richness	poppy area (+), flw density (+), dist wui (-), dist rip (+)	flw density (+)
Groups	Urban	Wild
<i>Andrena</i> spp.	dist rip (+)	ns model
<i>Apis mellifera</i>	flw density (+), floral richness (+)	patch area (-), poppy area (+)
<i>B. califronicus</i>	ns model	ns model
<i>B. vosensenskii</i>	poppy area (+), flw density (+), dist rip (+)	flw density (+), floral richness (+)
Halictids-small	dist rip (+), dist wui (-)	flw density (+)
Halictids-medium	dist wui (-)	poppy area (+), patch area (-), road class (-)
Halictids-large	ns model	ns model
<i>Megachile</i> spp.	flw density (+)	ns model

A close-up photograph of a field of bright yellow poppies. The flowers are in various stages of bloom, with some fully open and others as buds. The background is filled with green leaves and stems, creating a dense, natural setting. The lighting is bright, suggesting a sunny day.

CITIES ARE, AND WILL CONTINUE TO BE, HIGHLY MANAGED LANDSCAPES.

WHY NOT MANAGE THEM FOR THE PURPOSE OF SUPPORTING AND PROMOTING FUNCTIONAL POLLINATOR ECOSYSTEMS?

Securing Pollination Services Means Supporting Pollinator Habitat

Everywhere

If every resident in Berkeley,
California...

...planted one good bee plant in
a flower pot...

...there would be 102,743
potential individual foraging and
nesting sites scattered throughout
the city.



If every household in Berkeley, California...

...had bee-appropriate landscaping...

Berkeley Area: 27.1 km² (10.5 sq mi)

Approximate number single family occupied units in Berkeley is 4000 and 26,000 renter occupied units (dividing by half for number of sites, 13,000)

Average landscaped area (2 x 5 m) = 15 m²

$(4000 + 13,000) \times 15\text{m}^2 = 255,000 \text{ m}^2$ or 0.255 km² of bee nesting and foraging habitat.

...an additional 1% of Berkeley could be bee habitat.

Currently 7% of land use is green space.



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www.pollinator.org
non-profit founded in 1997

Our mission is to promote the health of pollinators,
critical to food and ecosystems,
through conservation, education, and research.

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Signature initiatives include:

- NAPPC (North American Pollinator Protection Campaign)
- Pollinator Week
- Original Research
- Pollinator Policy
- EcoRegional Planting Guides
- SHARE Mapping



Why Care About Pollinators?

Bees, butterflies, hummingbirds and other pollinators help sustain our food supply and natural landscapes, but many are facing a significant decline.

Pollinators support YOU with nearly one out of every third bite of food you eat!

You can help pollinators and add beauty to our environment by planting pollinator-friendly plants.

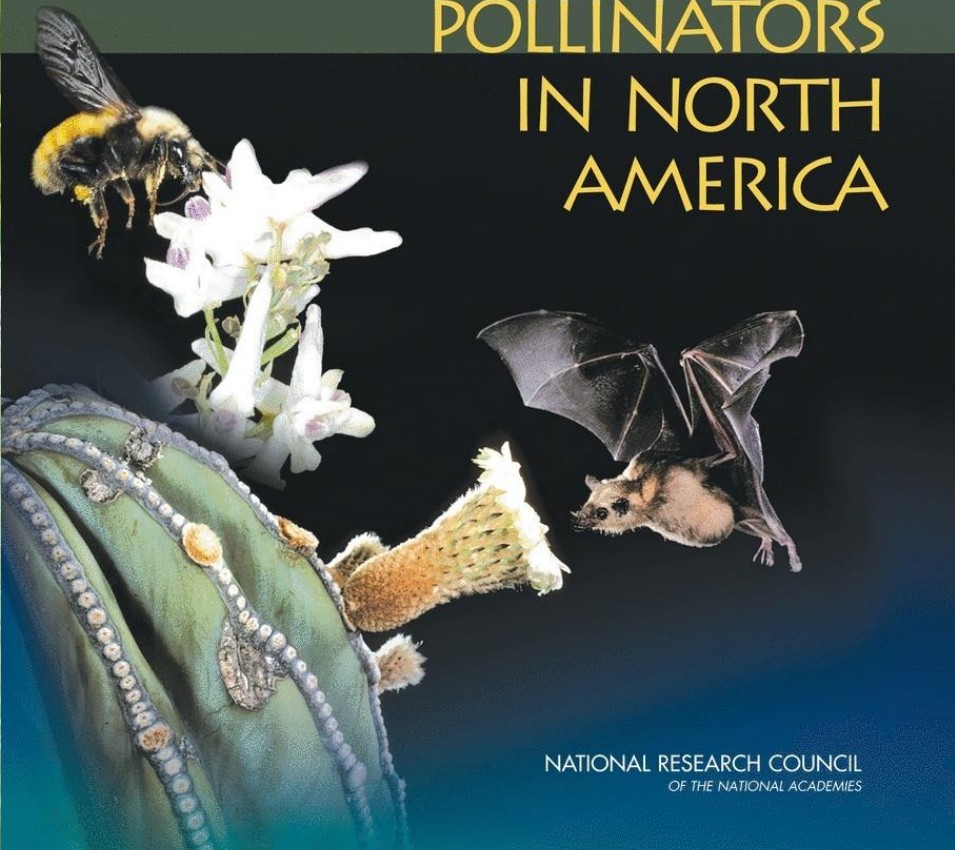
It is fun and easy to share your "habitat." The plantings around you demonstrate habitat you can create to support your local and migratory pollinator species.

VISIT WWW.POLLINATOR.ORG

Science-based
The one-stop shop for
pollinator conservation
issues in North America



STATUS OF POLLINATORS IN NORTH AMERICA



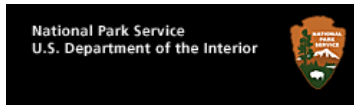
NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES



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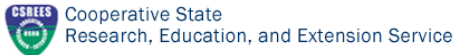
North American Pollinator Protection Campaign (NAPPC)

Some of our partners...



Environment Canada

Environnement Canada



Conabio
Comisión nacional para el conocimiento y uso de la biodiversidad



Smithsonian
National Museum of Natural History



I.C.P.P.R.
INTERNATIONAL COMMISSION FOR PLANT-POLLINATOR RELATIONSHIPS



YOUR LOCAL CONNECTION

A Touchstone Energy Cooperative



Canadian Electricity Association

Association canadienne de l'électricité



David Suzuki Foundation

SOLUTIONS ARE IN OUR NATURE



Santé Canada



In business to deliver



Conserving the Migration



Canadian Forage and Grassland Association
Association Canadienne pour les Plantes Fourragères



Natural Resources Conservation Service



Bayer CropScience



Parks Canada

Parcs Canada



SECRETARÍA DE MEDIO AMBIENTE Y RECURSOS NATURALES



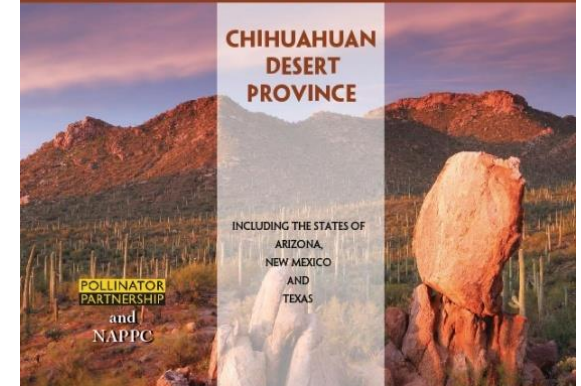
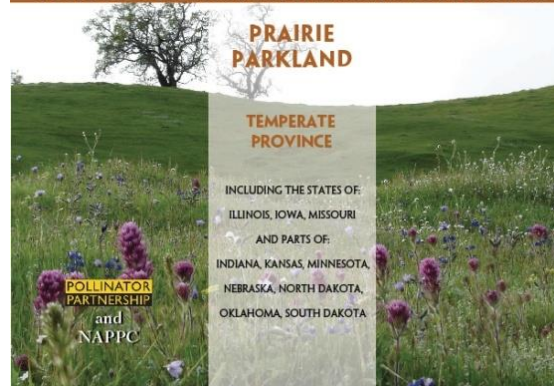
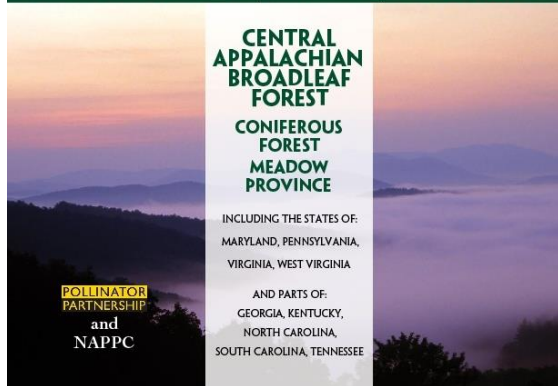
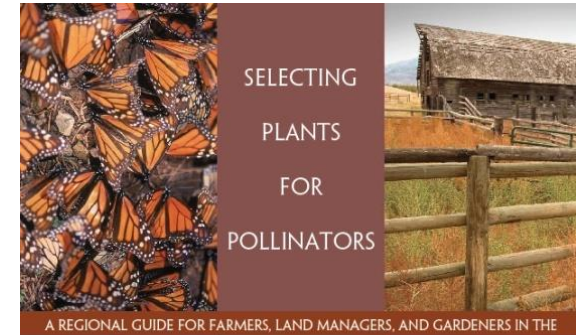
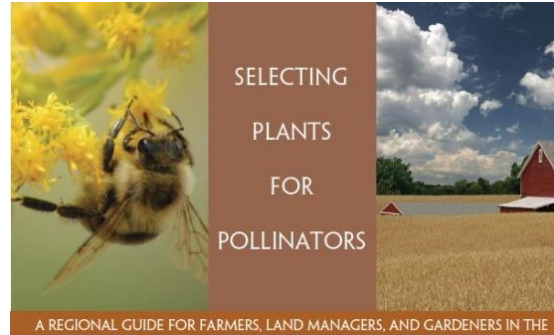
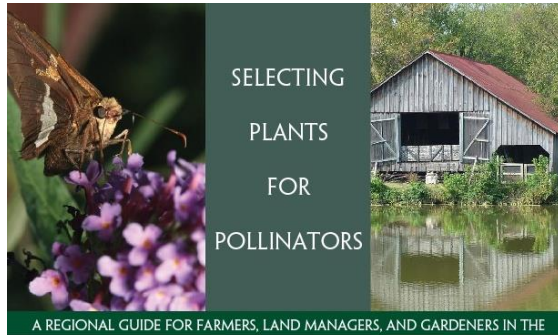
1. Plant for Pollinators

A photograph of a garden path lined with flowering plants. The path is made of light-colored gravel or sand. On either side of the path, there are various plants, including purple and yellow flowers. In the background, there are green bushes and trees. A large, semi-transparent yellow text box is overlaid on the lower half of the image, containing text about pollinators.

Pollinators need plants that bloom all season.

Select local native plants that support local native pollinators.

Use EcoRegional Planting Guides



FREE EcoRegional Guides

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And an APP

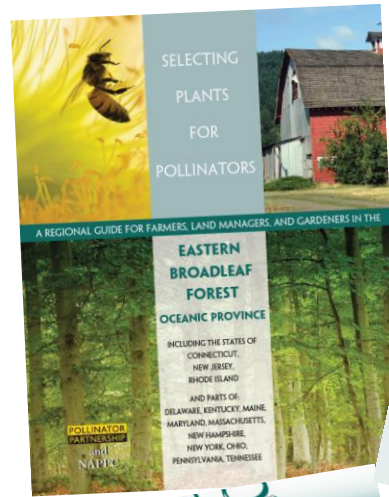
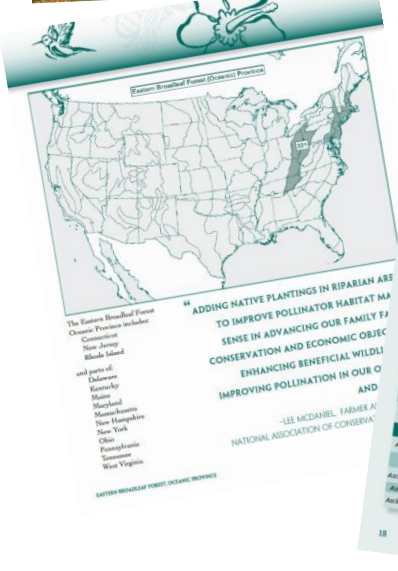
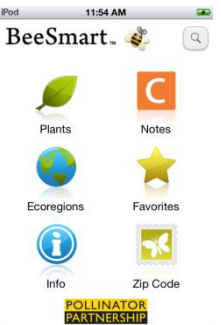
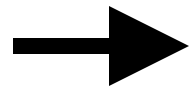


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This is one of several guides for different regions in the United States. We welcome your feedback to assist us in making the future guides useful. Please contact us at feedback@pollinator.org

SELECTING PLANTS FOR POLLINATORS

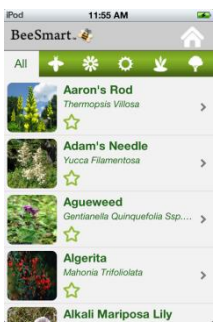


PLANTS THAT ATTRACT POLLINATORS IN THE EASTERN BROADLEAF FOREST, OCEANIC PROVINCE

The following chart lists plants that attract pollinators. It is not exhaustive but provides guidance on where to start. Annuals, biennials, perennials, and cover crops provide food and shelter for pollinators, too.

Botanical Name	Common Name	Color	Height	Flower Season	Sun	Soil	Visitation by Pollinators	Notes
Trees and Shrubs								
Aster sp.	aster	red, orange	80-100"	Mid-Apr	full sun	moist, well-drained	bees	
Asplenium platyneuron	rock-rose	white	12-15"	Mid-May	part shade	moist	hawkmoths	
Asplenium platyneuron	rock-rose	white	6-12"	Mid-May	part shade	moist	bees	
Asplenium platyneuron	rock-rose	white	3-4"	Apr-May	full sun	moist, acidic, well-drained	bees	X
Asplenium platyneuron	rock-rose	white	3-4"	Apr-May	part shade	moist, acidic, well-drained	bees	X
Asplenium platyneuron	rock-rose	white	7-10"	Apr-May	part shade	moist, acidic, well-drained	bees	X
Asplenium platyneuron	rock-rose	white	6-12"	Apr-May	part shade	moist	bees, flies, moths	X
Asplenium platyneuron	rock-rose	white	20-30"	Apr-May	part shade	moist	bees, butterflies	X
Asplenium platyneuron	rock-rose	white	25-30"	Apr-May	part shade	moist, acidic, well-drained	bees	X
Asplenium platyneuron	rock-rose	white	3-4"	Mid-May	part shade	moist, acidic, well-drained	bees	X
Asplenium platyneuron	rock-rose	white	1-5"	Mid-May	part shade	moist, acidic, well-drained	hawkmoths, bees	X
Asplenium platyneuron	rock-rose	white	2-3"	Apr-May	part shade	moist, acidic, well-drained	bees, bees, butterflies	X
Asplenium platyneuron	rock-rose	white	2-3"	Apr-May	part shade	moist, acidic, well-drained	bees, bees, butterflies	X
Asplenium platyneuron	rock-rose	white	2-3"	Apr-May	part shade	moist, acidic, well-drained	bees	X
Asplenium platyneuron	rock-rose	white	2-3"	Apr-May	part shade	moist, acidic, well-drained	bees	X
Asplenium platyneuron	rock-rose	white	2-3"	Apr-May	part shade	moist, acidic, well-drained	bees	X
Perennial Flowers								
Asplenium platyneuron	rock-rose	white	3-5"	Apr-May	part shade	moist, acidic, well-drained	bees, butterflies	X
Asplenium platyneuron	rock-rose	white	3-5"	Apr-May	part shade	moist, acidic, well-drained	bees, butterflies	X
Asplenium platyneuron	rock-rose	white	3-5"	Apr-May	part shade	moist, acidic, well-drained	bees, butterflies	X
Asplenium platyneuron	rock-rose	white	3-5"	Apr-May	part shade	moist, acidic, well-drained	bees, butterflies	X
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Asplenium platyneuron	rock-rose	white	3-5"	Apr-May	part shade	moist, acidic, well-drained	bees, butterflies	X
Asplenium platyneuron	rock-rose	white	3-5"	Apr-May	part shade	moist, acidic, well-drained	bees, butterflies	X

SELECTING PLANTS FOR POLLINATORS



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BURT'S BEES

Our Story | Our Nature | Sustainability | Wild For Bees

Search by keyword or item



Lip Colour | Lip Care | Face | Body | Baby | Classics | More | Gifts | Outlet

Home | Wild For Bees

WILD FOR BEES

- Meet The Bees
- Every Third Bite
- Burt's For Bees
- Go Wild
- Wild Eats
- Bee Hotels

— We're building —
BEE HOTELS!

Because bees-in-need deserve rest indeed!

▶ DISCOVER MORE



In partnership with Sustainable T.O., Fairmont Hotels & Resort and Pollinator Partnerships Canada.

SUSTAINABLE.TO
ARCHITECTURE • BUILDING

Fairmont
HOTELS & RESORTS

POLLINATOR
PARTNERSHIPS
CANADA



MEET THE BEES

Isabella Rossellini gives us an extraordinary look at life inside the hive.



EVERY THIRD BITE

Some of the most nutritious and delicious foods wouldn't exist without bees.



BURT'S FOR BEES

A world without bees is unimaginable. We won't let it happen.

2. Reduce or Eliminate Pesticide Use



Solving Your Pest Problems Without Harming Pollinators

**Plight of the Pollinator:
How You and Your Garden Are Needed**

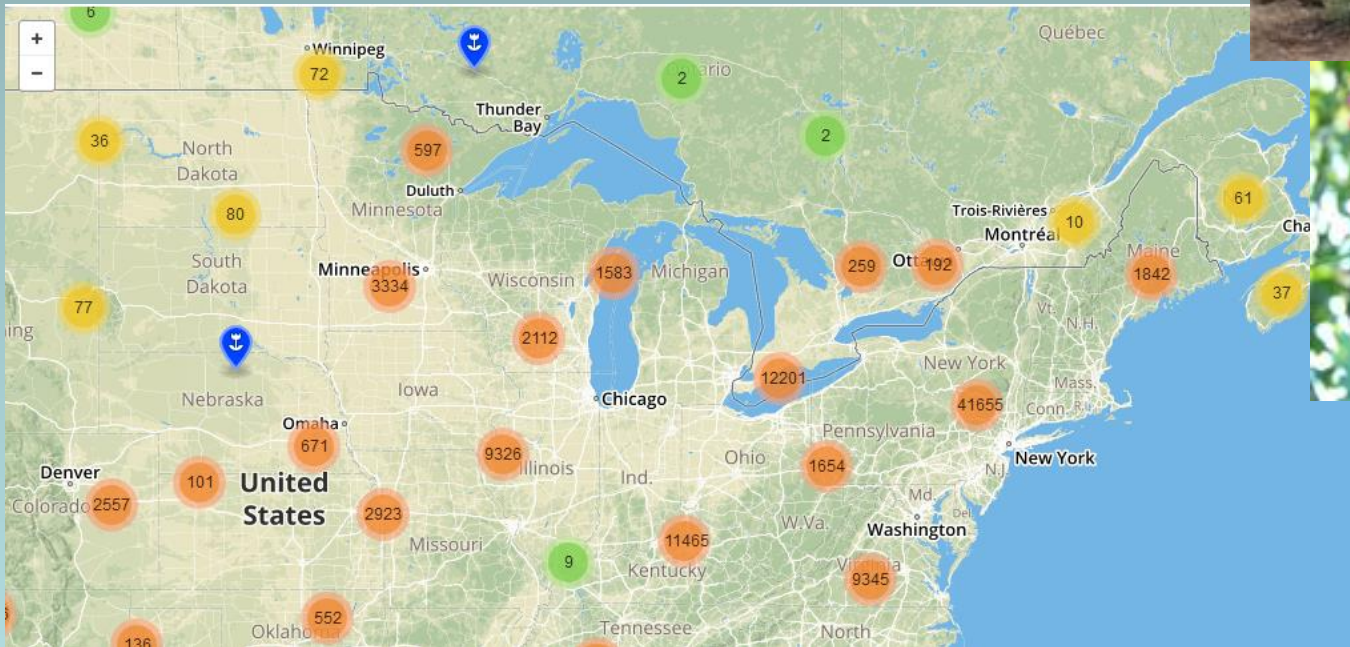
What are pollinators and why should you care?

- Pollinators are bees, butterflies, hummingbirds and other animals which feed from flowers, transferring pollen in the process.
- Nearly 80% of all flowering plants need the assistance of pollinators to transfer pollen within flowers in order to produce seeds, fruits, and vegetables.
- Approximately one out of every three bites of food you eat depends on the work of a pollinating animal.
- Pollinators also produce seeds and fruits that feed birds and other wildlife.
- Many blooming plants depend on pollinators for survival, and globally many pollinators are showing disturbing signs of decline from a variety of causes.
- When you use pesticides you could unintentionally harm pollinators and other beneficial insects. Your careful actions can prevent harming pollinators.

Prepared by the
Pesticide Task Force of the
North American Pollinator
Protection Campaign (NAPPC)

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3. Register a S.H.A.R.E. site

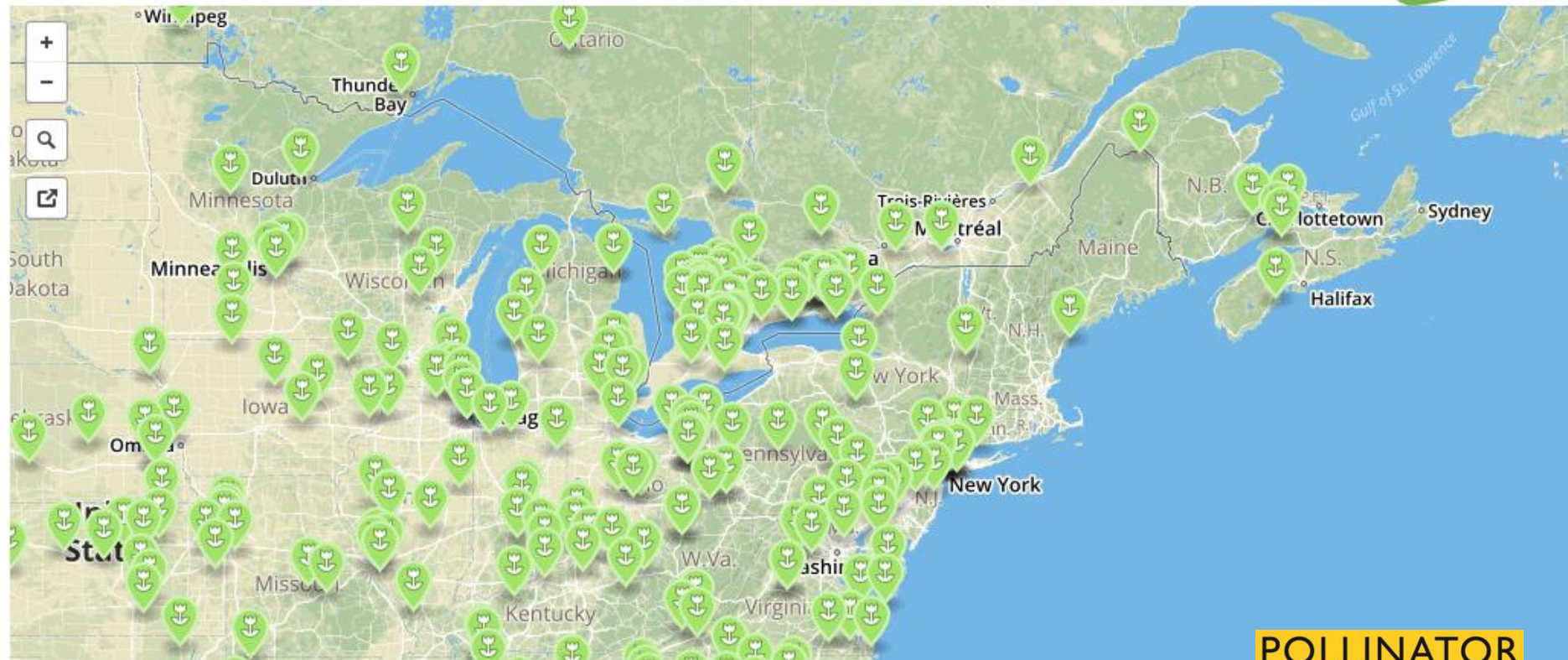


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Bee Friendly Farming

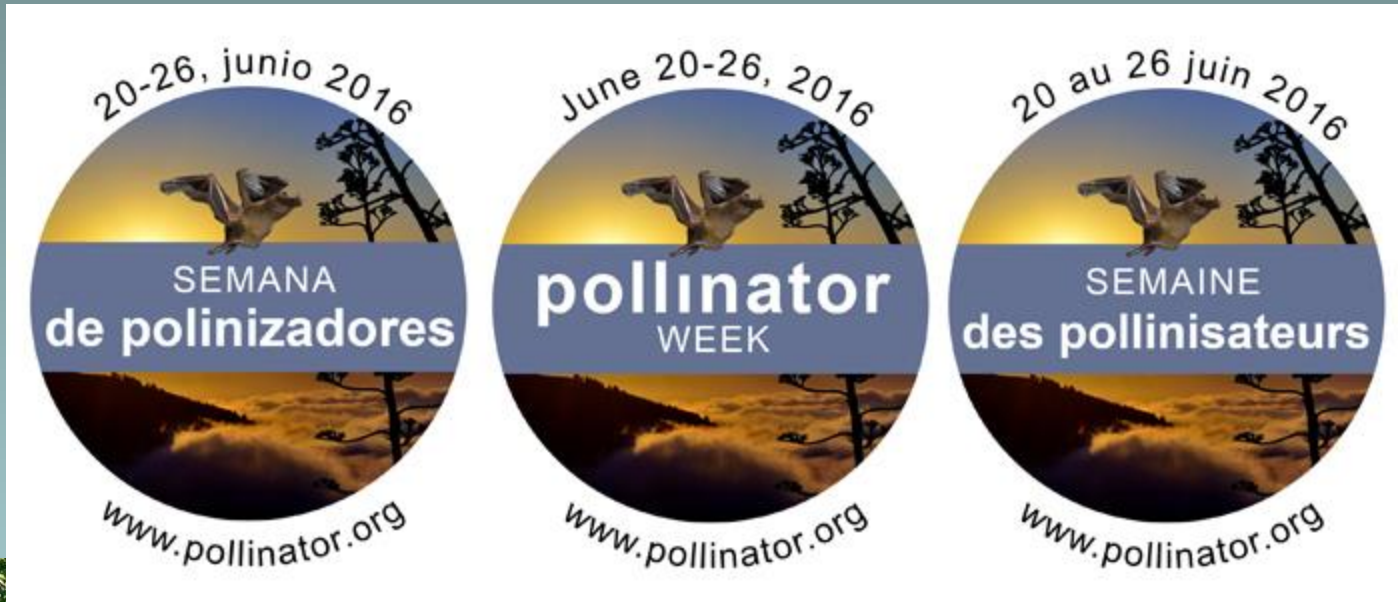
Bee Friendly Farmers

Bee Friendly Farming (BFF) is a program that provides guidelines for farmers and growers interested in promoting pollinator health on their lands.



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4. Reach out to others – inform and inspire



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Tools that let everyone help:



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5. Support local bees and beekeepers.



6. Conserve all of our resources; use less and reduce your impact.



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7. Support the work of groups promoting science based, practical efforts for pollinators.

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Happy Pollinator Week



Where to get info

www.pollinator.org