Native bees, the pollinator pros

How we can help them in backyards and beyond

Francie Von Mertens
NHACC, November 5, 2022

Frances Fawcett

►Over 100 wild (native) bees pollinate NE apple orchards. (> 200 species in NH)

►250 blue orchard bees can pollinate one acre of apple trees.

A task needing 1½ -2 honey bee hives –

c. 15,000–20,000 foragers

(Xerces Society)

Bee larvae feed on protein-rich pollen balls.

Why the focus on pollinators?

87% of all plants require pollination by animals to reproduce.*

The remainder - most trees and grasses - are wind-pollinated.

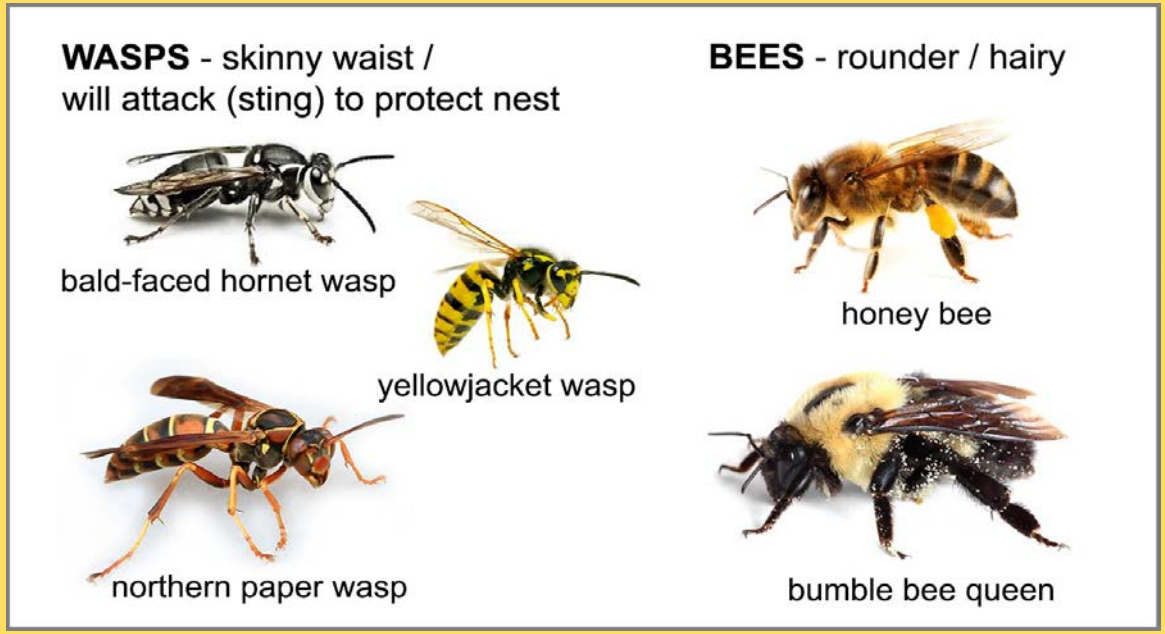
Humans the usual focus. One-third of what we eat & drink.

<u>The broader context!</u> The living, functioning, natural landscape beyond the supermarket. Anything that flowers must be pollinated to produce nuts, fruits, berries, and seeds to produce the next generation.

Pollinators are in serious decline.

***mostly native bees!**

Native bees and most wasps don't sting.



Images from pest control websites

Most are solitary, not communal ("social").
A communal hive will be aggressively defended by guard wasps/bees.

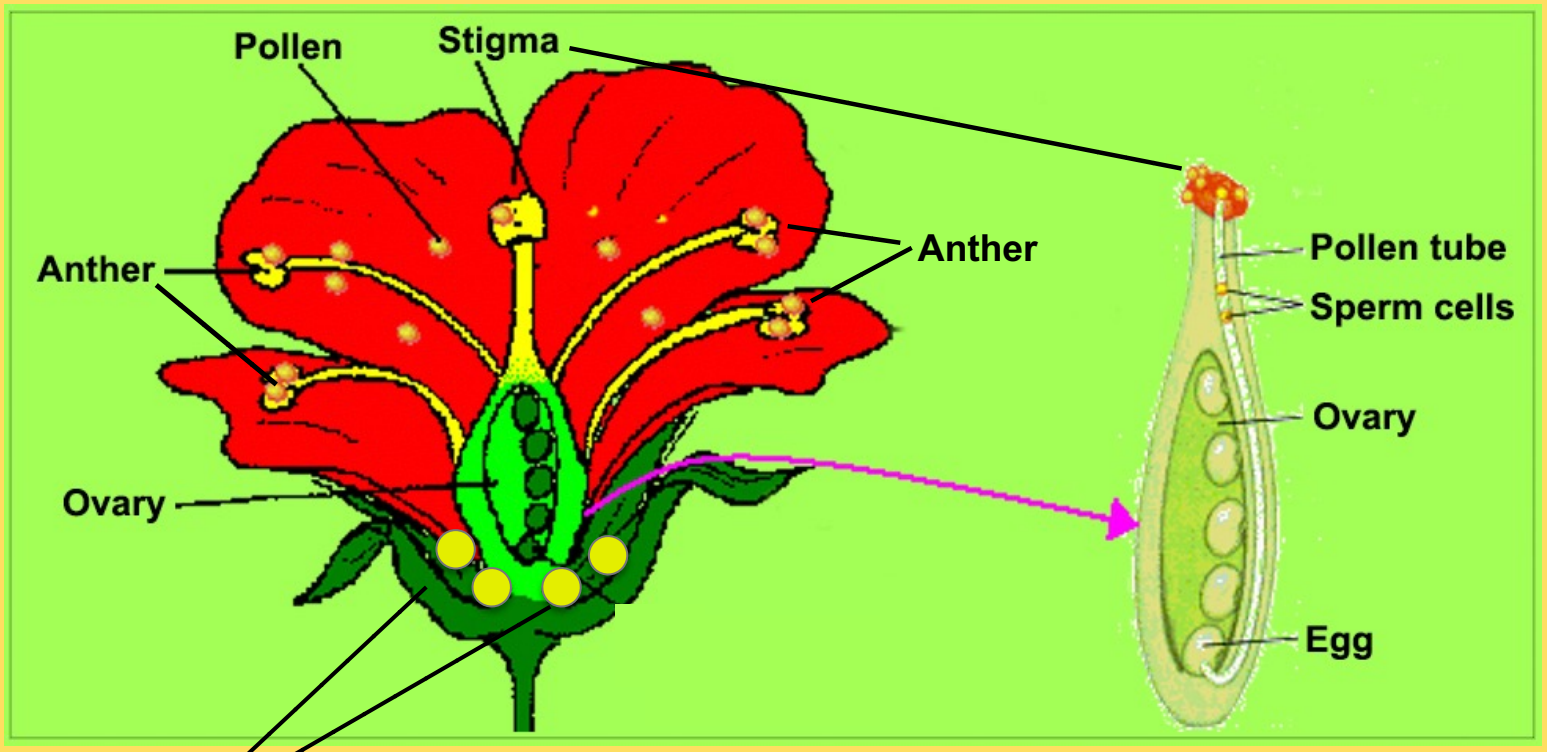
The first bees appeared soon after the first flowers c. 125 million years ago, splitting off from carnivorous wasps.

Flowers have diversified ever since to entice vegetarian bees with pollen (protein) and nectar (carbohydrates).

Bees diversified, too, all the better to access their favored plants.

Pollinators and plant sex

Male pollen must be delivered to female stigma.



Nectaries!

Plant Pollinator v. Plant Visitor

Often listed as pollinators:
butterflies,
hummingbirds,
moths, wasps,
bats, bugs, beetles, flies. . . .

Julie Gidwitz

Plant visitors, mostly - Interested in nectar, not pollen.
(All have important ecological roles, but <u>not</u> as key pollinators.)

Among the notable exceptions:
tiny no-see-um “chocolate midges.”

Firefly Books

The top pollinators are. . .

THE BEES!

From Hall Borland, “The Crocus and the Bee”:

Cider and apple jelly will be ours because a bumble bee found a crocus in bloom in April.

Why are bees such good pollinators?

Hairy bodies, electrostatically charged by wing-whir, attract and transport pollen.

"Pollen baskets" on hind legs carry a lot of pollen → less time commuting to nest and more time pollinating.

Common eastern bumble bee / *Bombus impatiens*

Flower constancy: Foraging bees generally focus on one plant species at a time.

AND 25% of native bees are specialists, able to digest pollen from a limited range of native plants.

Goldenrod pollen gets delivered to goldenrod.

Etc.

Bumble bees & “buzz pollination”

Grabbing onto a flower, they vibrate pollen loose with an audible “buzz.”

Bumble bees can pollinate flowers that have pollen that’s difficult to access: cranberries and blueberries included.

Cranberry

And tomatoes. Bumble bees are super efficient tomato pollinators. Tomatoes lack nectar that would attract other pollinators.

The bad news: “Our” most common bumble bee is raised and shipped to greenhouses worldwide. They experience the the same stressors as honey bees and the same “pathogen spill-over” to wild bees.

Bombus impatiens

The bumble bee and the gentian




Logical question: Why do some plants make extracting pollen so difficult that only certain bees (usually bumble bees) can pollinate them?

A. To avoid non-pollinating "visitors." Pollen takes considerable energy to produce. Important to protect.

CO-EVOLUTION: Native plants and their primary pollinators – gentians and bumble bees included – have co-evolved over millennia, always working on their relationship.

Honey bee v. native bees as pollinators

Honey bees: "Tidy" feeders (transport less pollen); ▶ Short tongues;
▶ Forage up to 2 miles from hive (time lost commuting);
▶ Remain snug in hive in wet, cold weather, relying on stored food.

John Quine

Native bees: "Messy" feeders;
▶ Nest close to favored plants (less time commuting);
▶ Diversity of native bees → diversity of tongue lengths **(!!)** to match diversity of flower shapes and sizes;
▶ Lacking stored food, they forage in wet, cold weather.

Maine blueberry study: Bumble bees visit twice as many blueberry flowers a minute than honey bees visit.

Oregon cherry study: Bumble bees are active twice as many hours a day.

European honey bee and native bees

European settlers arrived with domesticated bees and beekeeping skills.

The honey bee (*Apis mellifera),* essential to early Colonial life.
Pollination generalist (pollinates many crop varieties);
Movable hives, crop to crop with the seasons;
Produces wax for candles. **AND HONEY!**

Distinction: Honey bees have an important **agricultural** role; and little to no **ecological** role (maintaining natural systems).

Wild bees – some 4,000 species in North America – got the pollination job done before the European honey bee arrived.

“Insect Apocalypse”

Studies increasingly support what entomologists call the “**windshield phenomenon**”: fewer squished “bugs” on car windshields.

For bees, most population data is for bumble bees. (Size helps visibility.)

- Most species are in decline.
- Some are locally extinct –“extirpated” from most of their historic range.

Titled “Insect Armageddon,” a NY Times editorial concluded:

> “One thing is already clear: The fate of the world’s insects is inseparable from our own.”

(Insectivore birds – those that catch insects in flight - are the birds in greatest decline.)

Anthony Dunn

Almond orchard, CA

Pear orchard, China

Frances Fawcett

NH Fish & Game "Wildlife Action Plan" traces bee decline to:

Changing agricultural practices that:

Create large monocultures ✓

Use herbicides to kill "weeds" (milkweeds & other pollen/nectar resources) ✓

Use pesticides that "directly kill or cause impairment" in bees ✓

Decrease natural edge habitat and undisturbed ground for bee nests ✓

Transport honey bees and bumble bees for crop pollination, increasing general stress and "pathogen spillover" to wild bees ✓

Climate warming: Bloom times no longer in sync with main pollinators' emergence; drought-withered plants

Pesticides - especially systemic neurotoxins used in greenhouses and backyards, as well as in agriculture

POLLINATORS: WHAT CAN WE DO?

FEED THEM

Native plants for native insects

SPRING

Amelanchier
AKA Serviceberry

Foam flower

Pussy willow

SUMMER

MilkweedS
NJ tea
Northern bush honeysuckle

FALL

AsterS
Boneset
GoldenrodS

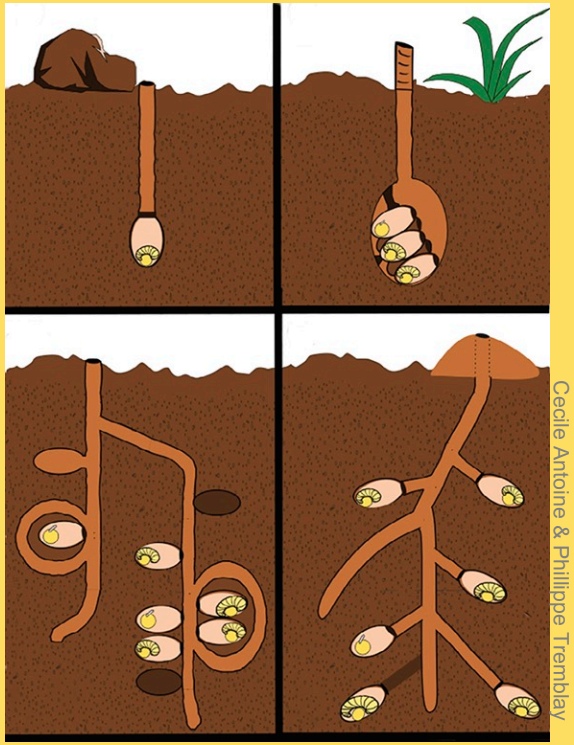
HOUSE THEM

Most native bees (90%) are **solitary bees:**

One female produces a brood alone.

She lays eggs in cells that she provisions with a pollen ball that the larvae feed on.

Ground-nesting females waterproof the cells before departing.



Cecile Antoine & Phillippe Tremblay

Most (75%) are ground nesters.

Robert Brown

Sandra Rehan

Lack of nesting habitat can be a limiting factor.

Mike LeValley

DON’T KILL THEM

When buying plants be sure to ask about "neonics" (neonicotinoids), systemic neurotoxins banned in some countries – and by some US towns.

A standard lawn treatment for grubs.

Tied to bee die-offs.

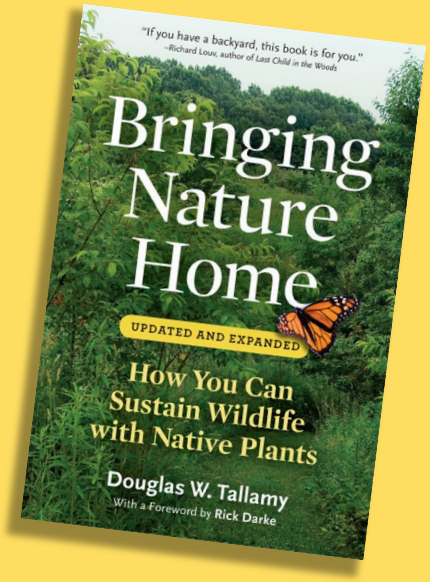
Good news:
Most growers have stopped using neonics for garden plants.

Doug Tallamy / The importance of native host plants

Black cherry supports 456 species of native moths and butterflies. Oaks support 534.

Burning bush supports 2; forsythia 1. No shared history (**co-evolution!**).

Over 6,000 caterpillars to raise one chickadee clutch.



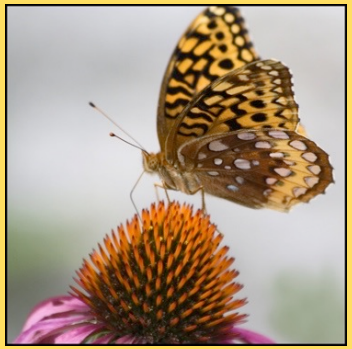
Doug Tallamy

Web search:
"Tallamy Maine Audubon video"

Host plants

We know that monarch butterflies need milkweed for their species' survival.

They have evolved to tolerate what's toxic to most browsers.



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Fritillary butterfly caterpillars eat only violets.

+

Nettles! - Milbert's tortoiseshell larval host plant.

We don't know about most plant and insect host relationships.
But we're learning.

Specialists (25% of native bees), one example:

(learned from Diane DeLuca at NH Audubon pollinator garden)

Three native yellow loosestrifes found locally.

All produce a floral oil, not nectar.
Logical question: How do they attract pollinators?

"Oil bees"!

Joel Gardner

Macropis nuda collecting oil and pollen

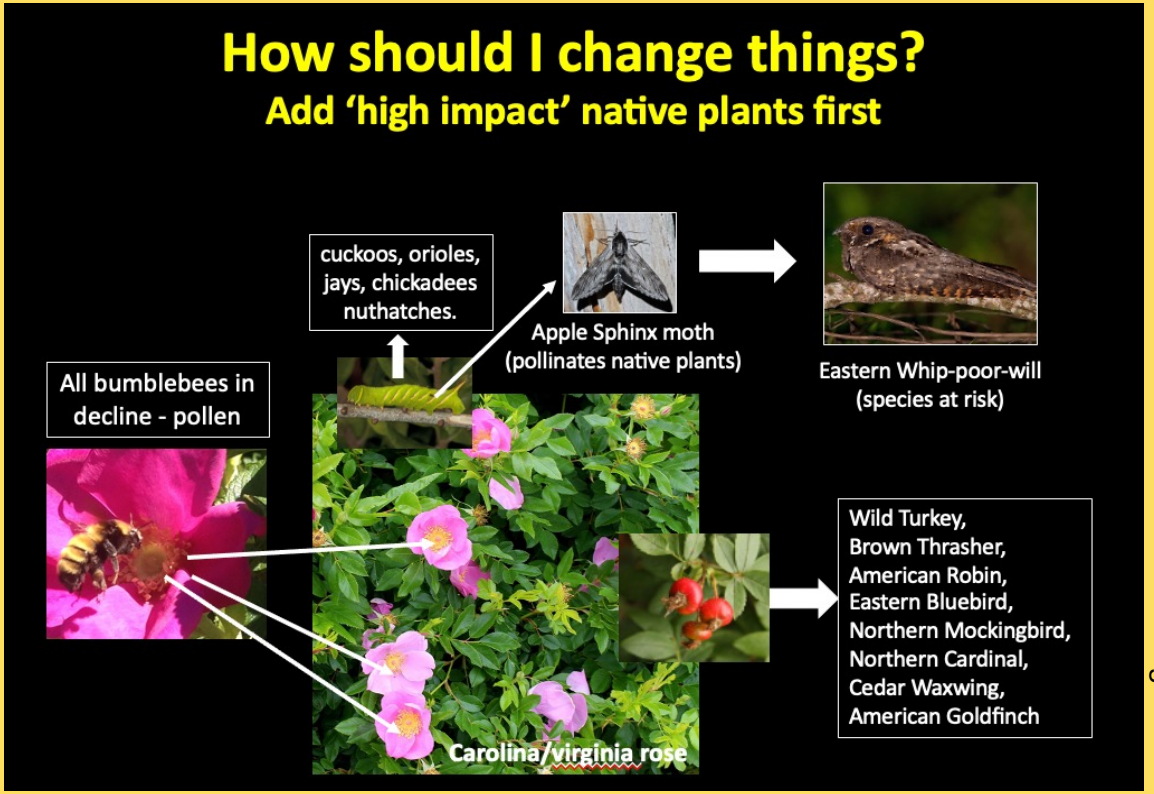
Females of the *Macropis* bee genus construct and provision their brood cells with loosestrife oil and pollen exclusively.

Swamp candles

Fringed loosestrife

Allen Norcross

Whorled loosestrife

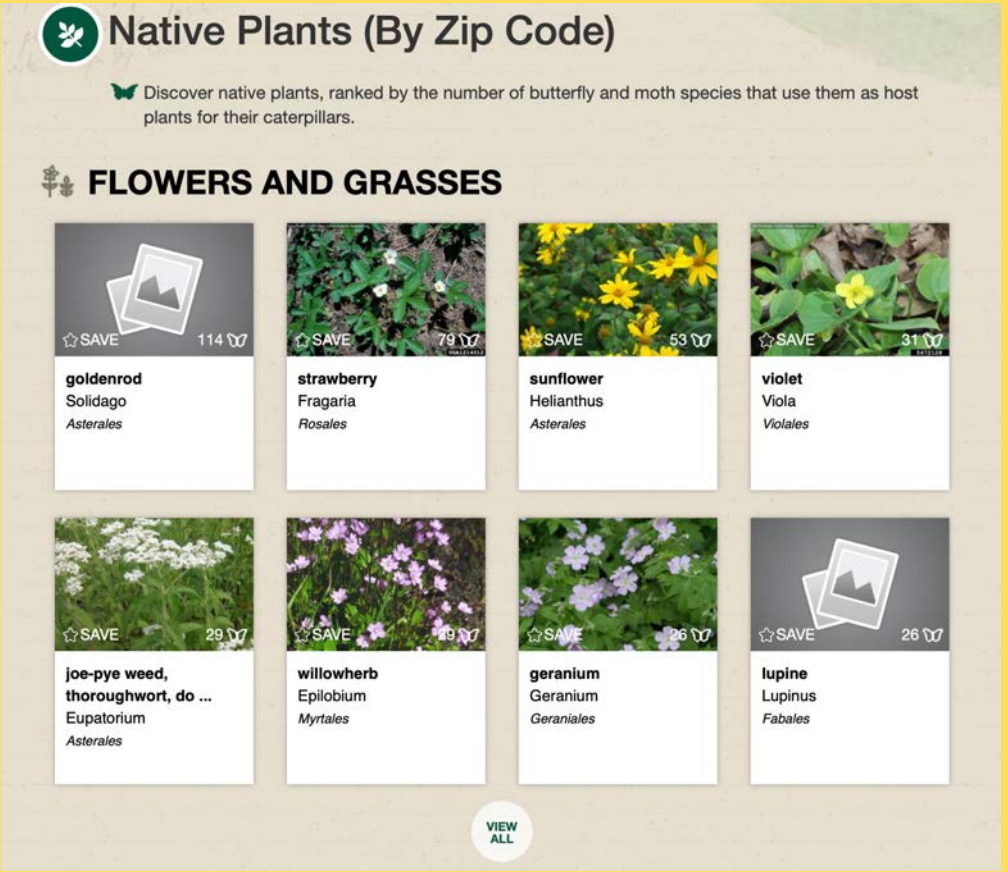


Landscape to support native diversity - with benefits well beyond bees!

Including beyond the pollinator garden!!

National Wildlife Federation
nwf.org/NativePlantFinder/Plants

Add your zip code to find your region's highest impact
- -Flowers and Grasses
- -Trees and Shrubs



Conservation Commission projects / a sampling

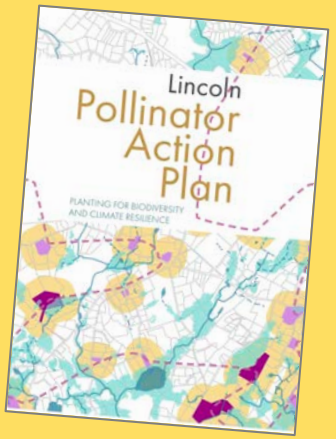
Jaffrey's pollinator garden initiative

Carolyn Garretson, ConCom Chair

- Pays for native plants for public spaces in town. Wholesale account with Van Berkum Nursery in Chester, NH;
  - Pays for signs for townspeople who garden for pollinators;
    - Web presence / plant lists / resources.

Momentum: Jaffrey's new Supt. of Roads and Facilities is excited about pocket parks; and landscaping two future roundabouts.

Lincoln, MA = THE most impressive pollination systems program. Several groups involved; annual native plant sale. And much more. (Rob Gegear consults.)



Kingston ConCom pollinator subcommittee
Evy Nathan (chair) and Marghi Bean

- Annual seed exchange: 30 top pollinator-friendly plants profiled, including which insects they host;
- Founders / catalysts for **Pollinator Pathways NH**, enlisting towns to join thru their ConComs

www.facebook.com/pollinatorpathwaysnh
evynathan@comcast.net

Epping Conservation Commission
Barbara Willis
Townspeople group lobbied for – and created – native landscaping at town library. Master Gardeners among the volunteers.

Concord Parks and Recreation Department has designed and created several pocket parks.

Major takeaway: Partnerships!

In general:

Manage town conservation land for meadow habitat.

Combat invasives!
(garlic mustard pull

Invite Evy Nathan and/or me to give our presentations (!)

Resources:

#1 Native Plant Trust Website; educational material / plant lists; demonstration Garden in the Woods, Framingham, MA; grows & sells native plants at Nasami Farm, Whately, MA; JOIN!

Doug Tallamy talks / YouTube, etc.

Other growers include :
Bagley Pond Perennials, Warner
Found Well Farm, Pembroke
Pemi Native Plants, Plymouth
Northeast Pollinator Perennials, Fairfax VT (by mail)

Great plant source:
GARDENERS DIVIDING NATIVE PERENNIALS IN THEIR GARDENS

A poignant note to end on. . .

Highly recommended: A short video of one man's search for the endangered rusty patched bumble bee (*Bombus affinis*).

Dan Mullen / Flickr Creative Commons

A story whose telling includes the plight of native bees, and steps taken in their behalf.

Spoiler alert: His quest succeeds.

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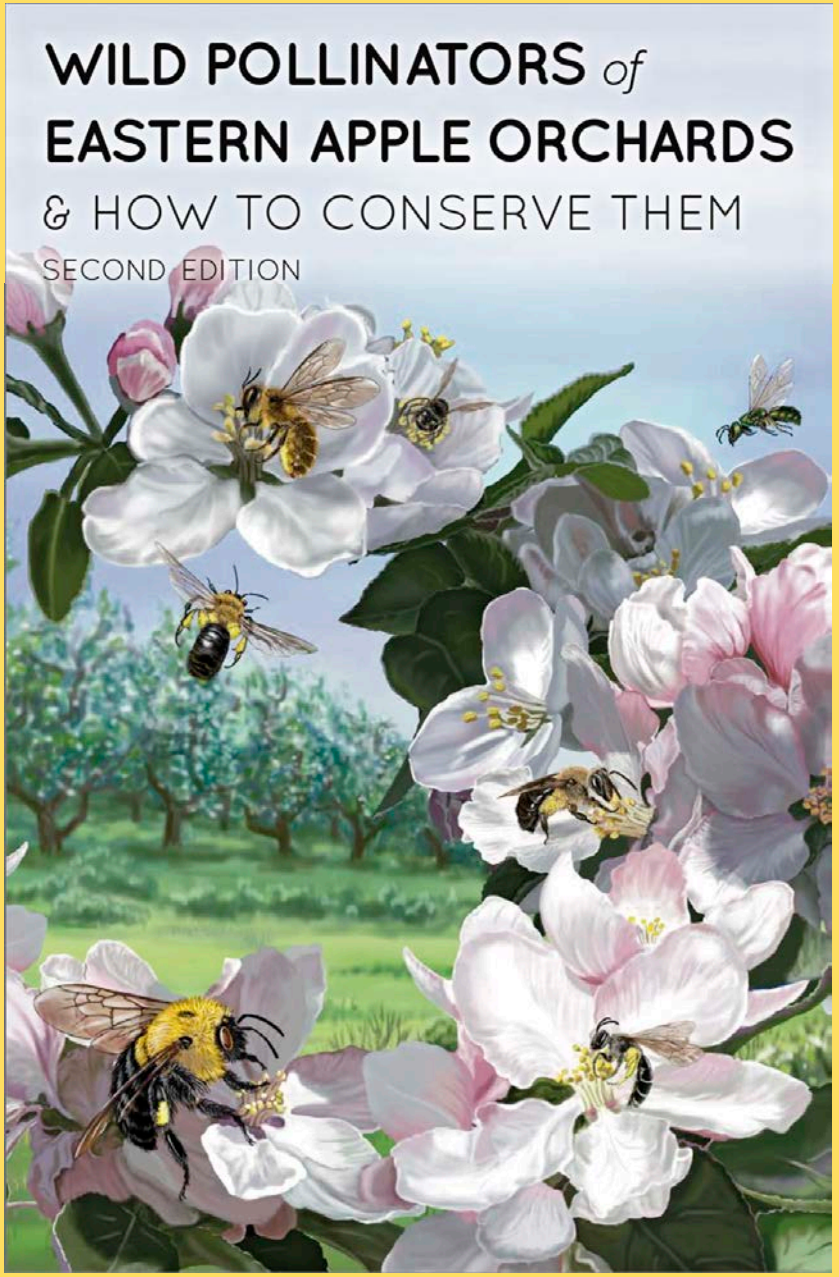

Frances Fawcett