

A Resource for Conservation  
Landowners in the  
Finger Lakes Region



# AFOOT IN THE FIELD

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One of the best things about my job stewarding conservation easements across the Finger Lakes region is getting to know landowners with diverse backgrounds, careers and interests. Among the long list of conservation easement donors and property owners we have a rocket scientist, a surgeon, a luthier, an architect, and farmers who grow everything from wine grapes to wheat.

A few of our conservation easement landowners happen to know a lot about bees. I fondly recall the honey that landowners have shared with me, including honey produced by Martha Brewster on her property under the name Bessie's Bees. I have been impressed by the watchfulness of Betsy and Dick Darlington over a long-time wild bee hive in a large white pine tree on their property in Candor (now part of the Logan Hill Nature Preserve). Tom Seeley is a renowned bee researcher and his wife Robin Hadlock Seeley (a marine biologist) has found a "bee tree" in the forest on their conservation easement property in the Town of Dryden - they are profiled in this issue of *Afoot in the Field*. Still another conservation easement landowner, Robin Radcliffe, a wildlife veterinarian, recently wrote about his adventures hunting for a "bee tree" in the woods near his home in the Town of Caroline, for the *NY State Conservationist* magazine, a copy of which we have enclosed.

Why pay attention to bees? The sweet, unique taste of honey is one obvious reason that all of us can appreciate. But perhaps more importantly, bees - honeybees and other bees - are incredibly important pollinators. Many flowering plants depend on insects and other animals for their continued fruit production and species reproduction (and hence survival). Fruit and other produce that we enjoy and which contribute hugely to agricultural economies, depend on this. The importance of animal pollinators, and how to protect and provide habitat for them, has become a hot topic in recent years for not only beekeepers and farmers, but also ecologists and natural area managers. Land conservation organizations and private owners of natural lands - even folks who may only have a rooftop butterfly garden in a city - are important partners in the effort to perpetuate this important natural system and ecosystem service.



Chris Olney  
Director of Stewardship

# POLLINATION ECOLOGY: THE LAWS OF ATTRACTION

We give bouquets of flowers to those we appreciate and love, and adorn holiday wreaths with pine cones. However, there is more to a flower or pine cone than just beauty. These parts of plants are for transferring pollen from one plant to another in order to produce the next generation's seeds. Over time plants have evolved their own unique characteristics and morphologies for attracting animals (or making use of the wind) to aid pollination. For example: a strong fragrance can draw an insect to the general vicinity of the plant, then the visuals of flowers draw pollinators further in. Animals are responsible for approximately 80% of all plant pollination, while wind is responsible for 19.6%, and the remaining 0.4% is by water.

Here are the different modes of pollination, and the plant characteristics they assist:

## Wind

Most conifers (spruce, pine, etc.), and 12% of flowering plants, including grasses and many broadleaved trees (oak, aspen, birch, and ash), depend on wind to blow lightweight, smooth pollen granules to the female flowers of nearby trees. The flowers are typically small and lack colors, odors, petals, or nectar.



The catkins (male flowers) of a pin oak.

Famarrin/O/C-BY-SA-4.0

## Bees

These powerhouses of pollination cannot see the color red, so bees are more likely to visit blue, purple, or yellow flowers that have a sweet aroma and bilateral symmetry.



A carpenter bee visiting a swamp milkweed flower.

Photo: Nigel Kent

## Moths

Many moths are nocturnal, so the flowers they pollinate are typically white or dull colors, strongly fragrant, and open at night.



A may apple flower with a well-camouflaged pollinator moth.

Photo: Charles Peirce

Photo: Ken Thomas



A goldenrod soldier beetle on a cluster of yarrow flowers.

## Flies

While typically not as good at carrying pollen as bees, some species of fly are impressive bee mimics and notable pollinators. Flowers pollinated by flies are typically pale to dark brown or purple, and may have a strong odor of rotting meat or dung.

Photo: Charles Smith



Giant Swallowtail butterfly on a milkweed plant.

## Birds

More than 2,000 species of birds around the world feed on flower nectar, and in the U.S. hummingbirds are particularly important. Flowers pollinated by hummingbirds are usually bright red, yellow, or orange, with a tubular shape containing abundant nectar.

Bat Conservation Intl.  
Photo: Merlin D. Tuttle



A lesser long-nosed bat visiting a cactus flower.

## Beetles

While beetles are essential pollinators for many plants, they also have a tendency to eat parts of the flower too. Beetles commonly visit flowers that are white or green, and are either large, solitary flowers or small and in clusters.



D. Gordon E. Robertson/  
CC BY-SA 3.0

Red trillium attracts flies with their deep red color, strong smell, and pollen.

## Butterflies

Butterflies seek out nectar from brightly colored flowers in daytime. They are not particularly useful pollinators because they are able to perch on their tall, thin legs when they visit flowers without picking up much pollen with their bodies.



Photo: Bill Buchanan/  
USEFWS/CC-BY-2.0

A ruby-throated hummingbird getting nectar from a cardinal flower.

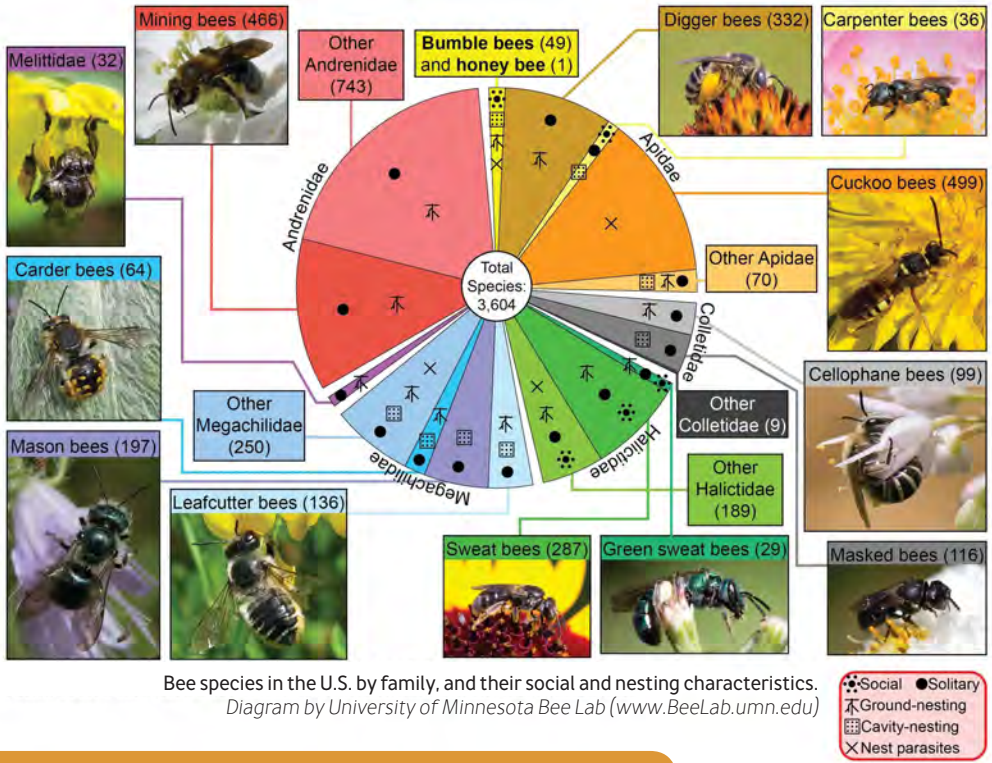
## Bats

In New York, all of our bat species consume flying insects. However, in some parts of the country and world, bats consume nectar, playing an important role in pollination for many species of tropical and desert fruiting plants. Bats tend to visit nectar-rich flowers that are large, fragrant, & pale or white in color.



# BEE DIVERSITY

While many different kinds of insects and animals provide pollination services, there is incredible species diversity within bees alone. Bees are in the Order Hymenoptera, which also contains wasps and ants. In total, there are 20,000 known species of bees, with 450 species in New York. Bees come in many shades of emerald green, black, and yellow, but even more diverse than their coloring are their nesting materials and locations. Many bees dig burrows in dry, sandy soil. Cavity-nesting bees may use hollow plant stems, or holes in wood created by boring insects.

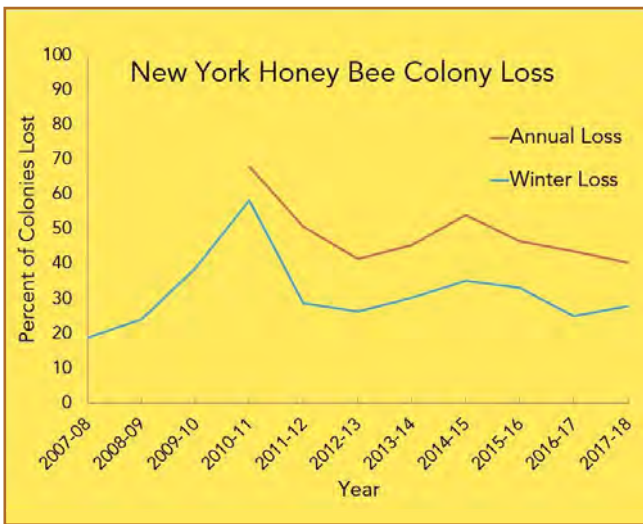


Bee species in the U.S. by family, and their social and nesting characteristics.  
 Diagram by University of Minnesota Bee Lab ([www.BeeLab.umn.edu](http://www.BeeLab.umn.edu))

## HONEY BEES & COLONY COLLAPSE DISORDER

How does the honey bee fit into this family tree? The honey bee is a social, “domesticated” species that is native to Europe. Unlike many other bees that feed on pollen, honey bees feed on nectar. Since 2006, honey bee colonies have been imperiled by Colony Collapse Disorder (CCD), a phenomenon in which a hive’s adult bees disappear, leaving behind a live queen, some immature bees, and a dwindling supply of honey. New York has seen annual colony losses between 40% and nearly 70% over the past several years. Losses of more than 20% are regarded as unsustainable. As losses from CCD reduce honey bee supply, prices for honey bees have nearly quadrupled since 2004.

Unfortunately, there is still no single identified cause of CCD, and researchers have



concluded that CCD is due to multiple stress factors, such as parasitic *Varroa* mites, neonicotinoid pesticides, habitat loss, and climate change. While there is no silver bullet fix, beekeepers can implement known best practices to decrease colony loss in the meantime.

« Annual and winter colony losses in New York State, beginning 2010-11. Winter is defined as October 1 - April 1. Data provided by the Bee Informed Partnership.

## POLLINATORS AND LOCAL AGRICULTURE

While the Finger Lakes region is only 12% of the land area of New York State, it contains more than 20% of the farmland. Protecting land where local food is grown is at the core of our mission at the Finger Lakes Land Trust. For many of the foods we enjoy, we are indebted to not only the hard work and dedication of farmers, but also to pollinators. The table below shows some of the top crops for the New York State economy that depend on pollination by insects.

Other food plants, such as cabbage (\$59.5 million in annual NY production), do not depend on pollinators for their yields, but do need pollinators to develop viable seed for the following year. These fruits and vegetables make up more than 10% of the New York farm economy.

Farmers often rent or maintain honey bee colonies, or other “managed” bees, in order to ensure adequate pollination during the short time period that flowers are in bloom. In addition to honey bees, native bees provide significant pollination services to farms. Several studies have shown that the greater the pollinator diversity on a farm, the higher the crop yield. Wild, native bees like the *Andrena* species are highly effective on a per-visit basis, depositing more pollen, and in cooler weather, than honey bees. Improving habitat for wild pollinators increases the resilience of a farm, and thereby the resilience of our food supply.

Crop	Annual Production in NY (2017 unless otherwise noted)
Apples	\$343 million
Tomatoes	\$47 million
Squash	\$23.3 million
Peaches	\$11.4 million
Pumpkins	\$9.7 million
Strawberries	\$6 million
Pears	\$4.8 million (2015)
Blueberries	\$3.7 million
Cherries	\$2.4 million

(USDA National Agricultural Statistics Service)

# LANDOWNER PROFILE:

## TOM SEELEY AND ROBIN HADLOCK SEELEY

**FLLT:** *Why did you decide to donate a conservation easement on your property?*

**T&RH Seeley:** Having assembled this 100-acre forest by purchasing four contiguous parcels in the 1980s and '90s, we wanted to protect it from fragmentation from development and from degradation from poor forest management. This would also protect the wildlife in this forest.

**FLLT:** *What kind of habitat management do you do on your property?*

**T&RHS:** We do no habitat management in the 35 acres that we assigned to an Environmental Protection Zone. In the remaining 65 acres, we perform timber stand improvement while cutting our firewood. We have also thinned two stands of sugar maple trees to create a "sugar bush" for a future maple syrup operation of approximately 100 taps.

**FLLT:** *What can landowners and bee lovers do to support native bees and pollinators?*

**T&RHS:** Perhaps the most valuable thing is to keep old fields open—by mowing them every 3 or so years—to provide sunny habitat for wildflowers like brambles, milkweed, goldenrod, and asters. These are excellent food sources for the bees. And in wooded areas, leave the yellow poplar, basswood, and red maples, for these are superb food sources for the bees. Also,

### DID YOU KNOW?

Some examples of native plants that benefit pollinators include: downy serviceberry, American witch-hazel, marsh marigold, closed bottle gentian, wild bergamot, foxglove beardtounge, and partridge berry.

For a more extensive list of how to aid pollinators, as well as a flower calendar, find the "Laurentian" plant list at [www.pollinator.org/guides](http://www.pollinator.org/guides)



### About the Landowners:

Tom Seeley and Robin Hadlock Seeley donated a conservation easement on their property in the Town of Dryden, Tompkins County to the Finger Lakes Land Trust in 2012. Tom is a biology professor at Cornell University who studies the behavior, social life, and ecology of honey bees. Robin is a marine conservation biologist who studies state and federal policy on, and the environmental impacts of, commercial harvesting of the underwater seaweed "forests" along the coast of Maine. Tom grew up in Ellis Hollow, outside of Ithaca, and Robin grew up in a little town on the coast of Maine.

in the future, when blight-resistant American chestnut trees become available, plant them, because the flowers of American chestnuts are rich sources of nectar and pollen. Finally, if you find a bee tree - a tree with a cavity occupied by a wild colony of honey bees - enjoy it as a special place.

## **FLLT:** What is “swarm intelligence”?

**TS:** Swarm intelligence is the solving of cognitive (decision-making) problems by a group of individuals who pool their knowledge and process it through social interactions. A honey bee colony uses swarm intelligence to find a new home by sending out hundreds of scout bees to find possible nesting cavities in trees and then holding a kind of debate among these scout bees to identify which site is the best for their new home.

## **FLLT:** How do honeybees communicate to one another?

**TS:** They share information with one another using numerous chemical and mechanical signals. The most amazing is the waggle dance behavior, whereby one bee performs a special behavior that tells other bees the direction and distance to a valuable resource, such as a patch of flowers brimming with good food, or a tree cavity that offers an excellent shelter as a home site.

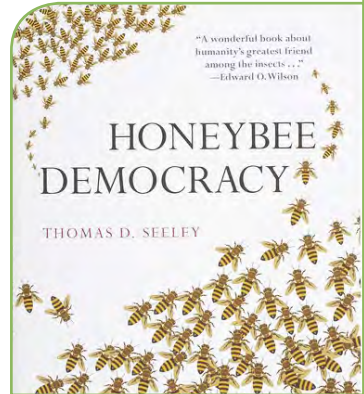
## **FLLT:** Are there other species that use swarm intelligence?

**TS:** Definitely. Besides human groups - which use swarm intelligence in committee meetings, elections, and such - the groups of many other kinds of animals also use swarm intelligence. For example, flocks of Canada geese use it when deciding when to take off, after resting overnight on a lake or pond, and again, once they are airborne, for which direction to fly.

## **FLLT:** What can humans learn from bees’ decision-making process?

**TS:** We can learn that a group will do best in making decisions if its members focus on their shared interests, consider all the options proposed by the members, tconduct an open and amicable debate about the options, and, finally, if they identify the most popular option by conducting an anonymous poll of the members’ preferences.

« Robin was walking through the woods when she heard a swarm of wild honey bees moving to their new home, and followed them to this red maple tree. The entrance to the nest cavity is the dark knothole near the top of the photo.



Dr. Tom Seeley is the author of the book *Honeybee Democracy*, which explores how honeybees make decisions collectively when finding a new home.



Photo: Tom Seeley



## HOW TO HELP POLLINATORS

- Plant and maintain a variety of flowering native forbs, shrubs, and trees that will bloom throughout the year.
- Group plants of the same species together for efficient foraging.
- Convert unneeded mowed lawn areas to pollinator habitat by allowing grasses and wildflowers to grow. Mow once every 3 years to keep down woody shrubs and trees.
- Leave dead trees (especially those with observable cavities) for nesting sites, as well as other dead plants and leaf litter for shelter.

*The NYSDEC is selling low-cost, native tree and shrub seedlings now through May 9, including many pollinator-popular species! Visit [www.dec.ny.gov/animals/9395.html](http://www.dec.ny.gov/animals/9395.html) for plant lists and order information, or call 518-587-1120*



The Finger Lakes Land Trust's West River Preserve at the south end of Canandaigua Lake features a meadow that is managed for the benefit of grassland birds and native insects.

The Finger Lakes Land Trust is a member supported, non-profit conservation organization that works cooperatively with landowners and local communities to conserve forever the lands and waters of the Finger Lakes region, ensuring scenic vistas, local foods, clean water, and wild places for everyone.

*Afoot in the Field* is provided for landowners in the Finger Lakes who own conservation easement properties, or who are otherwise committed to land conservation and wildlife habitat protection. For questions or concerns regarding your conservation easement, please contact Chris Olney by calling the Land Trust at (607) 275-9487 or email [chrisolney@fltt.org](mailto:chrisolney@fltt.org)



Finger Lakes Land Trust

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