Caring for Our Piece of the Earth

Birds, Bees, and Other Creatures

Janet Allen

Session 4: Birds, Bees, and Other Creatures

Updated 6/21/22

Caring for Our Piece of the Earth

Birds, Bees, and Other Creatures

The last word in ignorance is the man who says of an animal or plant, "What good is it?"
If the land mechanism as a whole is good, then every part is good, whether we understand it or not.
If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts?
To keep every cog and wheel is the first precaution of intelligent tinkering.

~ Aldo Leopold, Sand County Almanac

Section 1

About this session

So far, we've learned that planting a diversity of native plants and using earth-friendly gardening practices will provide a healthy habitat for many kinds of creatures.

These earth-friendly practices — especially limiting or preferably eliminating the use of pesticides — will help all kinds of wildlife and humans, too.

In this session, we'll learn first about some specific habitat features that can benefit many kinds of creatures and make your landscape especially enjoyable for people.

Then we'll present ways you can consider the specific needs of particular kinds of creatures: birds, pollinators, butterflies and moths, other insects, amphibians, and mammals.

We'll also learn about conservation measures we can take to make our habitat and the world beyond safer for wildlife.

These articles aren't a complete guide to any one type of creature. Rather, they suggest some of the less commonly-known habitat elements and will help get you started. But there's always more to learn as your habitat garden grows.

Read some of the more detailed articles to learn how to provide or improve habitat for your focus creatures. Think about the steps you could take to implement these in your landscape.

IMPORTANT NOTE

This session has two main parts.

As we said above, the first part describes some special habitat features that benefit a range of creatures that might visit your yard. The second part provides species-specific habitat and conservation information.

There's a lot of material here. Don't be overwhelmed!

After reading the core articles in each of the two parts, just choose other resources that will help you provide habitat for creatures you're especially interested in. You can save the rest of the materials to read later.

Opening

If your group chooses to have this role, the Opener starts the session with an opening, *not more than two or three minutes,* about their relationship to the natural world.

Circle question

Which creature do you most enjoy having in your yard? What habitat features in your yard attract it?

Reminder to the Facilitator: The circle question should move quickly. Elicit an answer from each participant without questions or comments from others.

Discussion questions

1. Did one or two ideas from the articles or videos especially resonate with you? Briefly share why.

2. Which habitat elements do you currently have in your yard? Which important elements are missing?

3. Which of the special habitat features mentioned (hedgerows, flowerbeds, brush piles, water feature, or “dead stuff”) are you planning to implement in your landscape now or in the future?

4. Which conservation practices mentioned in the articles will you be able to implement?

5. Which previously unwelcome creatures might you reconsider inviting or at least tolerating in your landscape?

6. Which creatures would you especially like to have or have more of in your yard? Which features can you add to make an especially attractive habitat for them?

Putting it into practice

Here are just a few suggestions for putting what you've learned into practice in the coming days, weeks, months, and years.

- Add a source of water — maybe a bird bath, maybe a pond.
- Create a habitat hedgerow with a variety of native shrubs and herbaceous plants.
- Leave some "dead stuff" — some leaf litter, some logs, a small dead or dying tree, even a larger tree modified for safety.
- Buy certified Bird-Friendly coffee.
- Build a brush pile.
- Share your enjoyment of wildlife with friends and neighbors; invite them to sit with you in your yard as you spot various birds and other creatures of interest.
- If you have a cat, create a "catio."
- Explore your yard to see whether you've left natural materials — even some mud — for birds to use in building their nests.
- Learn to distinguish between house and true sparrows.
- Choose one of many citizen science projects about species you're especially interested in.

If you're lucky, dragonflies, such as this Common Green Darner, will find your yard. They're beautiful and very beneficial, too.

-

Section 2

Habitat is home

What is habitat?
by Leslie McCasker / Loudoun Wildlife Conservancy

In a previous session, we briefly described the habitat basics: food, water, cover, and a place to raise young.

This article expands on these ideas and considers habitat from an individual animal's point of view.

It also considers the role of habitat in the rate of extinctions.

Please read:

https://loudounwildlife.org/2000/10/what-is-habitat/

Create the habitat and the animals will come
by Anne Owen / Loudoun Wildlife Conservancy

How adding habitat changed one person's yard.

https://loudounwildlife.org/2017/04/create-habitat/

In exchange for some habitat, a toad (a nocturnal creature) will eat up to 3,000 bugs, slugs, and other garden pests a MONTH!

Some special wildlife-friendly habitat features

There are a few special landscape features that can provide many of the essential habitat elements for a variety of creatures: **hedgerows**, **native flowerbeds**, **brush piles**, and **ponds**. And as we learned earlier in the course, **“dead stuff”** like snags and leaf litter also have many habitat benefits.

Tweaking these features to make them not solely decorative but also earth- and wildlife-friendly can add a lot to your landscape.

Simple stone walls also provide habitat for some creatures.

Habitat hedgerows

A “citified” version of the traditional rural hedgerow creates habitat for wildlife in gardens of any size.

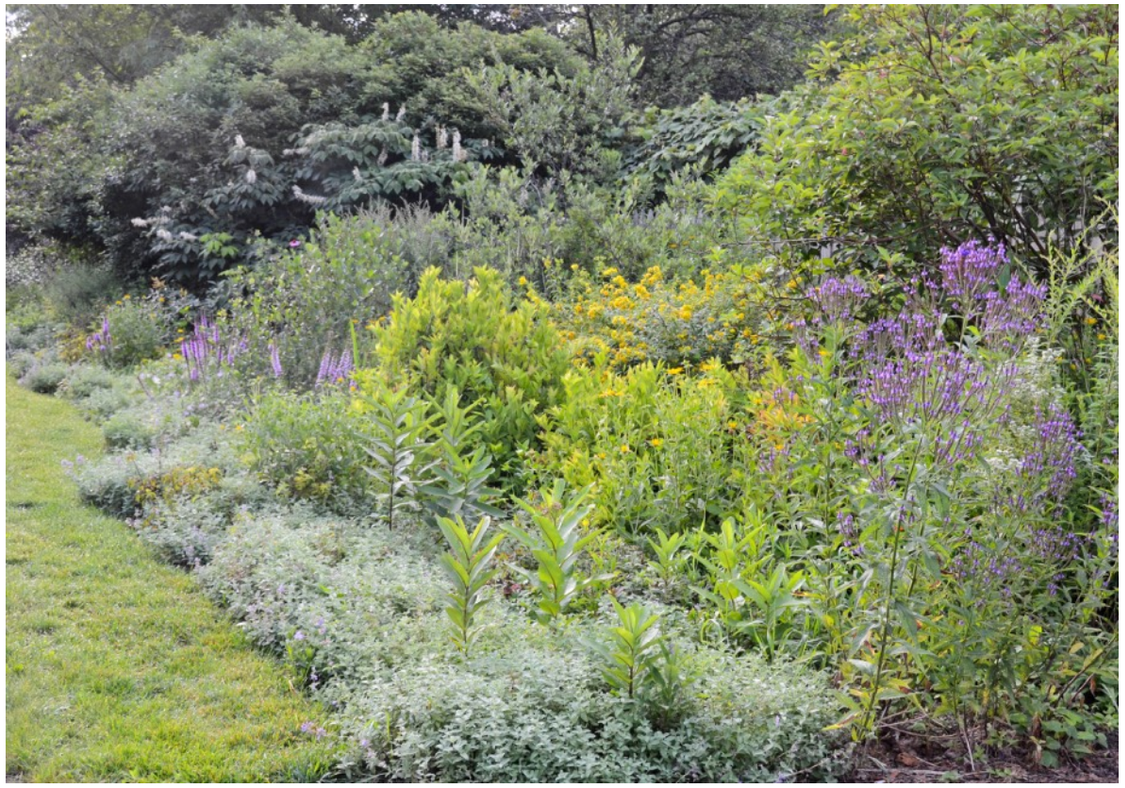
This habitat hedgerow (pictured throughout the seasons on the next pages and also featured in the article below) provides a variety of food, cover, and places to raise young for different creatures. But it also screens the backyard from the street and helps prevent deer from entering the back yard, not to mention providing an ever-changing seasonal display.

Habitat hedgerows
by Kris Wetherbee / The American Gardener

Attract and sustain beneficial wildlife in your garden with a versatile hedgerow composed of plants that provide food and cover year round.

Note that this article is not written specifically for any particular ecoregion, so check the recommended plants to see if they’re suitable for your region.

Please download the PDF and read “Habitat Hedgerows” at :
https://ahsgardening.org/wp-content/pdfs/Habitat_Hedgerows_TAG_MJ16.pdf



Re-introducing hedgerows to residential landscapes: Why we still need a side order of messy
by Rebecca Lindenmeyr / Ecological Landscape Alliance

In Session 5, we'll discuss ways we can make our natural landscapes less "messy" and more acceptable in our neighborhoods. But in this article, Lindenmeyr contends that we may actually need some "mess" to preserve the biodiversity we need.

OPTIONAL, but to think more deeply about hedgerows, read this longer article:

https://www.ecolandscaping.org/04/designing-ecological-landscapes/landscape-design/re-introducing-hedgerows-to-residential-landscapes-why-we-still-need-a-side-order-of-messy/

Flowerbeds

If someone does any gardening at all, they're likely to have a flowerbed. Even businesses, municipalities, and institutions likely have flowerbeds. *But not all flowerbeds will benefit wildlife!*

This parking lot flowerbed may be superficially "pretty" but its non-native flowers provide little for wildlife. (And although it's colorful, it's pretty boring!) The bed was filled with wax begonias in the summer and then "redecorated" with mums for fall.

Create your garden plan by Wild Ones

Use these design basics to create a gorgeous home landscape.

Please read:

https://nativegardendesigns.wildones.org/create-your-garden-plan/

OPTIONAL: https://nativegardendesigns.wildones.org/designs/

An informal mix of native flowers provides nectar and pollen, and when the flowers die, seeds for birds. It also provides cover for a variety of small creatures and places for butterflies to raise their young. And, of course, it's an ever-changing scene of beautiful flowers for people to enjoy.

A native plant example: Joe-pye weed (*Eupatorium* aka *Eutrochium*) provides for many creatures: a source of insects for a warbler, nectar and pollen for a bee, nectar for a swallowtail butterfly, and seeds for a little flock of goldfinches.

Backyard ponds

Creating a pond adds another dimension to your habitat that can benefit birds, amphibians, and insects and create an enjoyable landscape feature for people, too.

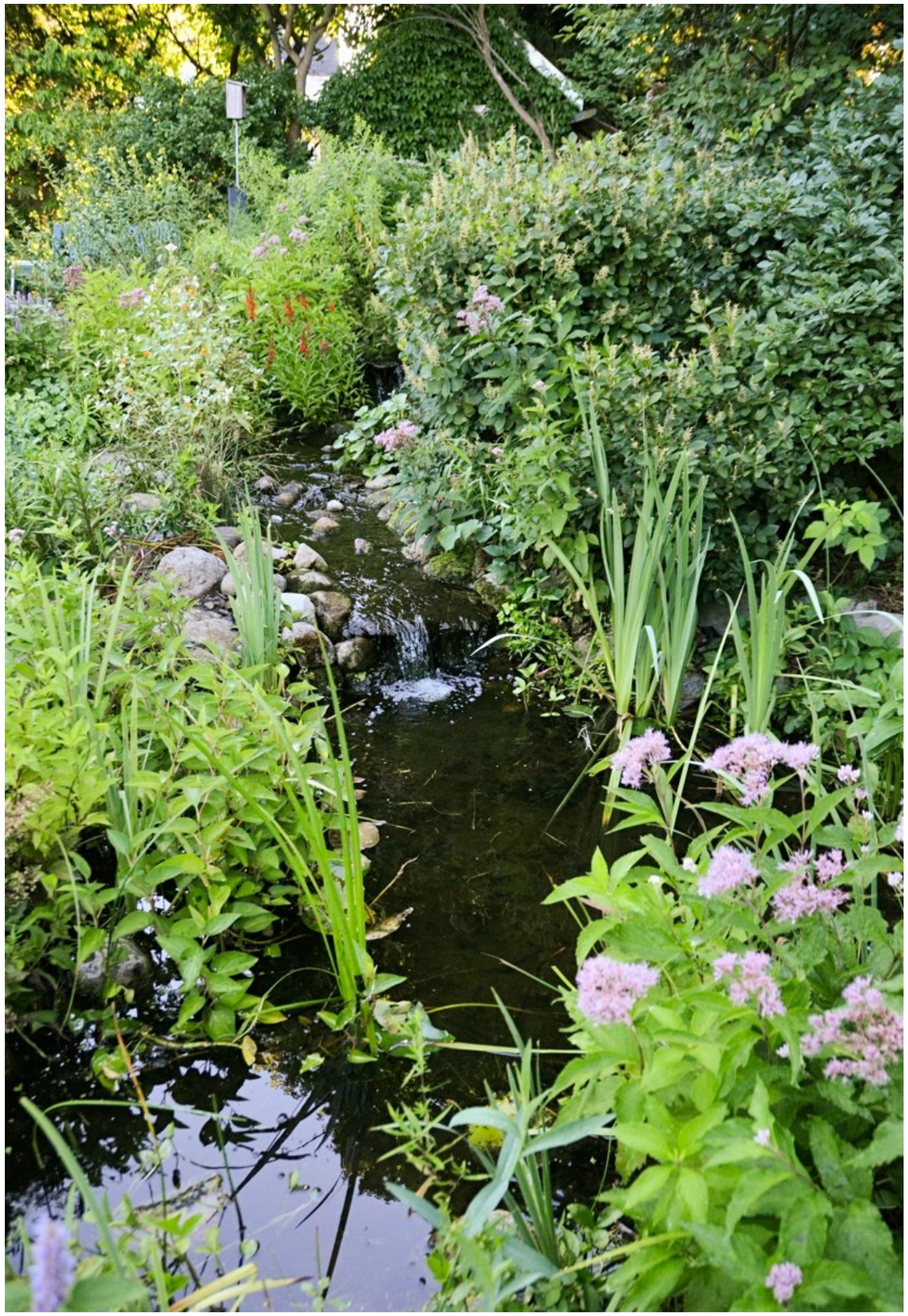
Backyard ponds are popular, but unfortunately they're frequently designed for ornamental purposes rather than as habitat.

First, many are lined with what becomes a wall of stones. This makes it difficult for wildlife to reach the water for a drink or to climb out if they should fall in. Wildlife-friendly ponds have beaches, not walls.

Another popular practice is adding non-native koi or goldfish. Ironically, articles on backyard ponds often feature questions from people worrying whether eating our native toad and frog tadpoles will harm their pet koi! The bottom line: koi and goldfish don't belong in a wildlife-friendly backyard pond.

Mosquitos are an understandable concern when water is involved. Note that the National Wildlife Federation article (below) indicates that mosquitos are rarely a problem in properly balanced ecological ponds. After all, these ponds are full of life; they're not just standing water!

Birds enjoy getting a drink or taking a bath. They also can find essential nesting materials, such as mud, moss, or sodden grasses from pond edges.



Backyard pond
~ National Wildlife Federation

A short summary of how to design and care for a wildlife pond.

OPTIONAL:
https://www.nwf.org/Garden-For-Wildlife/Water/Backyard-Ponds.aspx

---

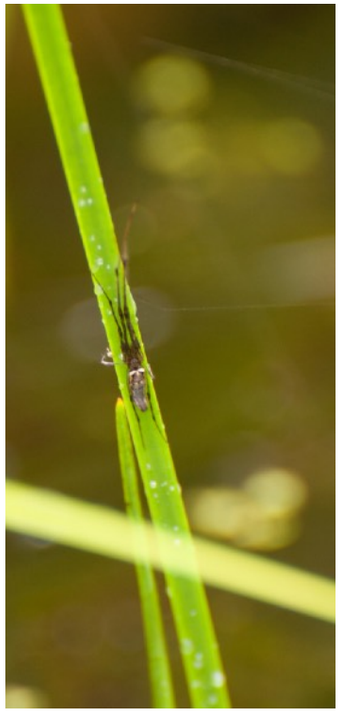
DIY natural backyard pond
~ Mother Earth News

Describes how to create a low-maintenance, natural pond in your backyard by:

- Providing surfaces for beneficial microorganisms to grow,
- Preparing plenty of space for plants,
- Restricting sunlight from the surface of the water to reduce algae growth.

OPTIONAL:
https://www.motherearthnews.com/diy/garden-and-yard/backyard-pond-zm0z15onzmar

A chipping sparrow finishing its bath



If you observe closely, you can enjoy many water-related invertebrates, too.

There's lots to see in a backyard pond

A blue jay getting a drink

A water beetle

A green frog, happily eating a dragonfly (note its wings it his mouth)

Vernal ponds … and swimming pools

If you have a large enough piece of land, a vernal pond — i.e. a temporary wetland — is valuable habitat for beneficial wildlife.

Vernal ponds: Seasonal habitats for wildlife
~ Penn State Extension

This fact sheet focuses on recognition, ecological importance, and protection of vernal ponds.

OPTIONAL:
https://extension.psu.edu/vernal-ponds-seasonal-habitats-for-wildlife

A vernal pond at a local state park.
Think of all the amphibians this temporary pond can produce!

The vernal pond
~ Riddle in a Bottle / Sisbro Studios

If you don't object to talking animals, this beautifully done video is a nice description of this special habitat – a vernal pond.

OPTIONAL 4-minute video at:
https://www.youtube.com/watch?v=kzW_6iK82CQ

What is a vernal pool?
~ Vernal Pool Chronicles

This is a more scientific approach than the previous video.

OPTIONAL 7-minute video at:
https://www.youtube.com/watch?v=kXSgg1i-EMA

Wildlife and swimming pools: Can they coexist?
~ Nancy Lawson / The Humane Gardener

Each year millions of animals hop, crawl, slither, fly or fall into pools. Most don't make it out.

OPTIONAL:
https://www.humanegardener.com/wildlife-and-swimming-pools/

Dead stuff

“Dead stuff” is important to a many kinds of wildlife and especially to the many organisms that create and maintain healthy soil. These no-longer-living materials are a fundamental part of healthy ecosystems that are full of life.

Although you wouldn’t want dead tree limbs and decaying leaves left on your lawn, they can safely remain in many areas of your yard.

Some dead trees among abundant leaf litter on the forest floor of a local state park. This park’s naturalist said she often gets questions from park visitors about why the park doesn’t remove these unsightly dead trees!

Snags

This old redbud trunk (located in an out-of-the-way area of the yard) finally collapsed, but not before it had nourished many birds looking for little bugs over the years it stood.

Is its useful life finished? Not at all! It will still provide food, cover, and places to raise young for various little creatures, and will feed tiny soil creatures when it finally decays.

A decaying redbud trunk

Tree death brings new life
by Doreen Cubie / Nat’l Wildlife Fed'n

Native or not, a dead tree supports life – ***a lot of life!***

Please read:

https://www.nwf.org/Home/Magazines/National-Wildlife/2021/Oct-Nov/Gardening/Tree-Snags

Safely retaining dead trees
~ Cavity Conservation

A great resource for learning more about saving “dead” trees.

OPTIONAL:

http://cavityconservation.com/saving-dead-trees/

A second life for a tree
~ Smithsonian Gardens

OPTIONAL:

https://smithsoniangardens.wordpress.com/tag/snag/

This pileated woodpecker found so many delicious snacks in this log lining a backyard path that he lingered for a half hour.

Snags in the home habitat
by Richard and Diane VanVleck

This article, written by a homeowner, has practical information and lots of photos of snags in a home habitat.

OPTIONAL:

http://www.americanartifacts.com/smma/per/snag.htm

Snags or wildlife trees: Cultivate, don’t cart away, dead, dying and hazard trees
by Mary Roach

Her arborist was surprised she didn’t let him cut down and cart away a dying tree. Good photos.

OPTIONAL:

https://awaytogarden.com/snags-wildlife-trees-cultivate-dont-cart-away-dead-dying-hazard-trees/

Video story of a dying tree

~ Cavity Conservation Initiative

This photo/video story is based on a photographer's two-year study of a dying tree and its residents.

OPTIONAL 7-minute video:
http://cavityconservation.com/2016/08/24/our-video-story-of-a-dying-tree/

Even a modest "snag" (a dead 6-ft shrub in this case) is a source of food for this downy woodpecker

These four newly-fledged chickadees enjoyed the little insects they found on this long-dead-but-still-lifegiving dogwood tree

What to do with fallen leaves
by David Mizejewski / Nat'l Wildlife Fed'n

You can help build healthy soil and provide habitat for a wide variety of animals by letting some leaves accumulate.

Please read:
https://blog.nwf.org/2014/11/what-to-do-with-fallen-leaves/

Leaf litter: Love it and leave it
by Doug Tallamy / Homegrown National Park

Put your lease somewhere on your property once in the fall and then leave them there forever. The best place by far is under the tree that created them.

OPTIONAL:
https://homegrownnationalpark.org/doug-newsletter/9zvgygvxvjig0eujsy3ygbkfcy92dn

White-throated sparrows spend a lot of time scratching in leaf litter for insects and seeds.

A towhee foraging among the fallen leaves

But not everything

Some “dead stuff,” is better sent to the trash, though.

Diseased plant material could spread the disease. Non-native noxious weeds can regenerate, sometimes by bits of root or by seedheads that can develop. Don’t take a chance with these.

Noxious waste to the incinerator!

Brush piles help wildlife in your ecosystem garden by Ecosystem Gardener

This article shows how you can make a long-lasting brush pile that provides habitat for a variety of wildlife.

OPTIONAL - You can learn how to create a brush pile at:
https://www.audubon.org/news/build-brush-pile-birds

Discarded Christmas trees make a very simple, temporary brush pile to supplement more permanent brush piles.

Section 3

Is ALL wildlife welcome?

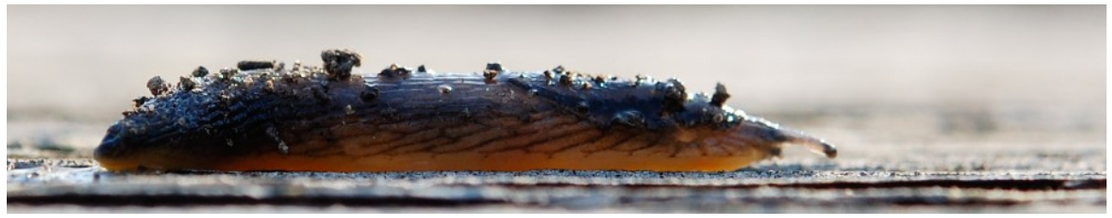
As we've learned in previous sessions, humans have taken a lot of land previously available for wildlife. We've also learned that humans are dependent for our own survival on a healthy ecosystem with abundant biological diversity.

We want to – and must – provide habitat for wildlife in our yards, the sum acreage of which rivals the amount of wilderness left.

But does that mean we must welcome ALL wildlife? What's welcome and what's not?

Some wildlife may be incompatible living in close contact with people. For those creatures we may need to be more careful about preserving wilderness for them instead of building more and more subdivisions — full of ever-larger homes on ever-larger lots — in formerly natural areas.

But we may have been unnecessarily unwelcoming for other creatures. We can learn to co-exist in ways we haven't considered both for their benefit and for ours.



Maybe not everyone's favorite, but even slugs provide ecosystem services

Humane solutions to help your wild neighbors

~ The Humane Society of the US

The Humane Society of the United States works with community leaders and animal care and control agencies to create Wild Neighbors communities, where humane and non-lethal solutions are given priority when addressing conflicts between people and wildlife. Learn more about the innovative and effective approaches you can take to solve any wild animal problems you encounter in your home, yard or garden.

Please read:
https://www.humanesociety.org/resource/wildlife-management-solutions

Wild neighbors guide request form ~The Humane Society of the US

Living with Wild Neighbors in Urban and Suburban Communities: A Guide for Local Leaders is designed to help communities find long-lasting, nonlethal solutions to conflicts with Canada geese, deer, coyotes, beavers, and other urban wildlife. The guide examines how typical conflicts over wildlife develop in local communities.

OPTIONAL:

https://www.humanesociety.org/forms/wild-neighbors-guide-request-form

This rabbit is eating a few vegetables in an unfenced garden. We just plant a few extras to share.

Welcome to my humane backyard by Nancy Lawson /The Humane Society of the US

A description of her yard plus “Top five reasons to have a humane backyard.”

OPTIONAL:

https://www.humanesociety.org/news/my-humane-backyard

Chipmunks are a native mammal that belongs in this ecoregion — unlike any non-native, merely decorative tulips it might eat.

Chapter 2

Getting specific

Let's imagine a goal: that at some time in the future, the value of a property will be perceived in part according to its value to wildlife. A property hedged with fruiting shrubs will be worth more than one bordered by forsythia. One with dry-stone walls that provide passageways for chipmunks will be valued higher than one whose walls are cemented stone. Buyers will place a premium on lots that provide summer flowers and fall crops of seed.

~ Sara Stein, Noah's Garden: Restoring the Ecology of Our Own Back Yards p. 244

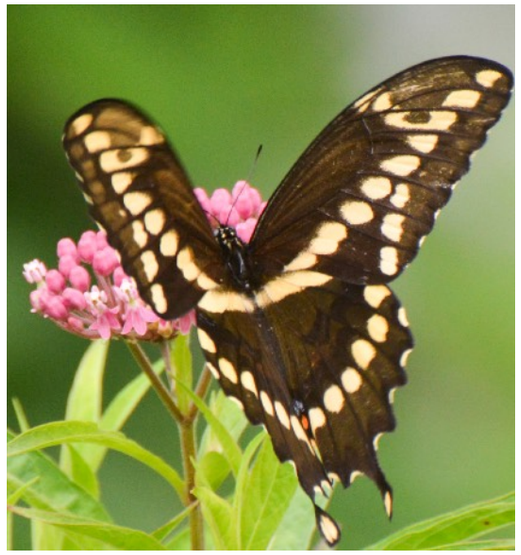
Section 1

Providing homes for various creatures

Creating an earth-friendly yard as we've been discussing will provide habitat for wildlife (and also for people).

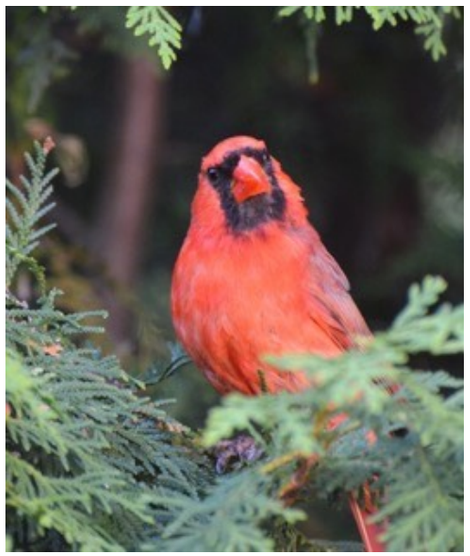
But we can also provide for the special needs of particular kinds of creatures: birds, pollinators, moths and butterflies, insects and other invertebrates, amphibians, and mammals.

Not everyone will be able to (or want to) provide for every kind of creature, but it's good to know a little about the basic habitat requirements of each type of creature.

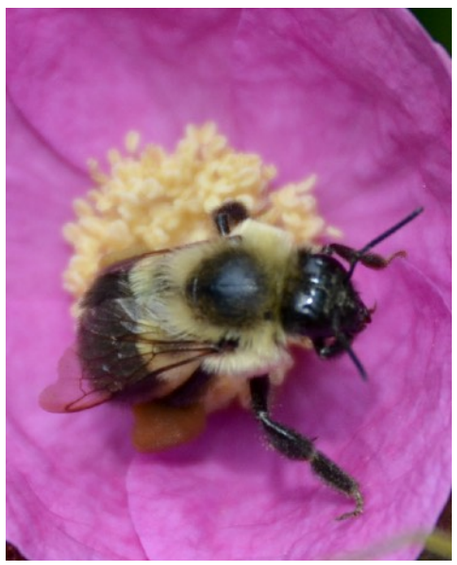


Butterflies, moths, skippers

Other insects & invertebrates



Birds



Pollinators

Amphibians and reptiles

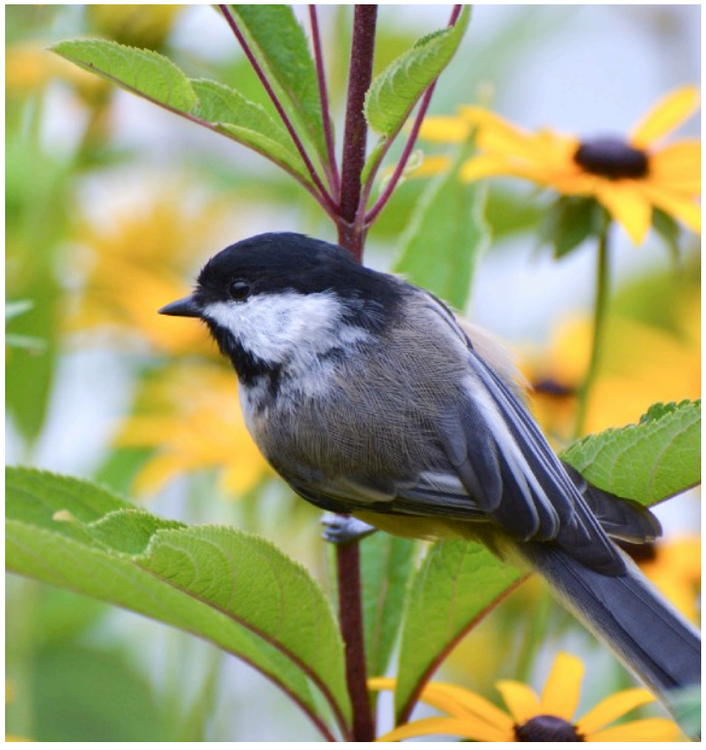
Mammals

Section 2

Birds

Birds are probably most people's favorite kind of backyard creature.

People purchase seeds, suet, nestboxes and an assortment of other items to attract birds.



Many people's favorite bird: the chickadee

We already know that birds depend on native plants because they produce the insects birds need to feed their young as well as nutritious seeds and berries. But what more could a bird want?

The following articles will provide more give you some ways you can not only attract birds to your yard, but ensure that birds will be around for future generations to enjoy.

Attracting birds ~ National Wildlife Federation

Here's a good summary of the habitat basics for birds. If you implement these ideas, you'll have a very bird-friendly yard.

Please read:

https://www.nwf.org/Garden-For-Wildlife/Wildlife/Attracting-Birds.aspx

How to make your yard bird-friendly ~ Audubon

Provide a safe haven for birds in the face of climate change.

OPTIONAL:

https://www.audubon.org/news/how-make-your-yard-bird-friendly-0

Non-native plants: Ecological traps
by John Carey

Offering alluring habitat for songbirds, exotic, non-native plants may actually decrease their long-term survival and fitness.

Please read:

https://www.nwf.org/Magazines/National-Wildlife/2013/FebMarch/Gardening/Ecological-Traps

Native plants help keep the species robust

What do birds do for us?
by Barry Yeoman / Audubon

Yes, most people enjoy watching birds. But do we realize how many other benefits they provide us?

OPTIONAL:

https://www.audubon.org/news/what-do-birds-do-us

A chipping sparrow tackling a caterpillar. Pest control in action!

Backyard birds
by Growing a Greener World (PBS Series)

This video explains how we benefit from backyard birds and gives tips for supporting them. They also travel to Cornell's Lab of Ornithology to see the latest technology for enjoying birds and for participating in citizen science projects.

OPTIONAL 26-minute video at:

https://www.growingagreenerworld.com/bird-watching/

The misunderstood: Hawks and vultures

Hawks

Many people are dismayed when they see hawks at their bird feeders, but hawks are part of a healthy ecosystem, and they have to eat, too. (And note that most humans also eat animals.)

One way to protect songbirds is to put feeders about 10 feet from shrubbery so they can see hawks coming but not be so far they can't quickly escape to the safety of the shrubs.

Another way to protect songbirds is to have a variety of natural foods available in the yard so they don't have to cluster at feeders to find food.

Seedheads left on flowers or grasses, shrubs with berries that remain over the winter, galls and hollow stems that contain tasty insect treats, leaf litter that harbors tasty insects, and so on will help distribute birds throughout the yard in a more natural fashion, making them less of an easy target.

And once you change your thinking about hawks, you'll be able to better appreciate and enjoy these magnificent birds.

Hawks hanging around bird feeders ~ PennState Extension

Hawks capitalize on the abundance of prey attracted to backyard bird feeders. Do they impact song bird populations?

OPTIONAL:
https://extension.psu.edu/hawks-hanging-around-bird-feeders

A hawk looking for a meal in the backyard

Vultures

People often are repulsed by or even fear vultures. But where would we be without their free carcass disposal services? They play an important role in our ecosystems, keeping the place clean.

A turkey vulture

Will a turkey vulture attack my cat or small dog? ~ PetHelpful

OPTIONAL:

https://pethelpful.com/cats/Will-a-Turkey-Vulture-Take-My-Small-Cat-or-Dog-Thats-Out-in-Our-Yard

---

Vulture benefits ~ The Turkey Vulture Society

OPTIONAL - to learn about the valuable services they provide:

https://turkeyvulturesociety.wordpress.com/quick-facts/vulture-benefits/

Birds raising their young

Chickadees show why birds need native plants by Laura Tangley / National Wildlife Federation

Learn how non-native trees in cities and suburbs affect food for birds raising young.

OPTIONAL:

https://blog.nwf.org/2015/04/chickadees-show-why-birds-need-native-trees/

This cedar waxwing baby fell out of the nest, but was put back on a tree branch for the parents to continue feeding it. It's a myth that parents will smell a human's scent and abandon the baby.

Nesting cycle
~ Nestwatch / Cornell Lab of Ornithology

How birds find a place to breed, choose a mate and so on.

OPTIONAL:

https://nestwatch.org/learn/general-bird-nest-info/nesting-cycle/

This downy woodpecker worked for days excavating a cavity in a limb of a maple. It later raised its babies in this cavity. A hairy woodpecker was spotted in early fall investigating this cavity, perhaps for a winter roost.

Where do birds raise their young?

As we learned earlier, cavities in snags are important for cavity-nesting birds, but currently there aren't enough snag cavities available. And not all birds nest in cavities.

Subirdia
by John Marzluff

"A few years ago my driveway was crowded with the remains of two great snags felled by a neighbor out of fear or for aesthetic reasons. I had often watched flickers, hairy woodpeckers, and pileated woodpeckers work these very trunks. … The actions of my neighbor are typical and in some situations justified, but our intolerance of dead vegetation severely limits one of the most creative forces in subirdia."

📖 **~ WELCOME TO SUBIRDIA, P. 53**

Nest boxes

All About Birdhouses: How to make a safe, successful home for our feathered friends
~ All About Birds / Cornell Lab of Ornithology

LOADS of information about nest boxes and structures for specific kinds of birds, features of a good nest box, plans for building them etc. etc. — even how to install a nest box camera!

OPTIONAL Resource:
https://nestwatch.org/learn/all-about-birdhouses/

This nest was spotted high up in a sugar maple tree

Trees, shrubs, grasslands, and more

Not all birds nest in cavities. Some birds nest in trees and shrubs; some in grasslands; some in other locations — even on the ground.

For many of these locations, native plants again make a difference. Not only do the parents have a readily available source of food very close by — i.e. the caterpillars on the native host plants — but research indicates that there is less predation on nests built in native trees and shrubs (as noted in the *Ecological Traps* article a few pages back).

Catbird babies were raised in a nest built in the center of a dense shrub such as this.

Nesting materials

What about building materials needed to build nests in nest boxes, shrubs and trees, or snags? Suburbs comprised of turf grass and asphalt have little to offer.

Strong fibers from last year's swamp milkweed stalks make a good nest material for this Baltimore oriole — IF the stalks aren't cut down in fall cleanup.

The next few articles suggest ways you can provide nesting materials, which can be helpful if nothing else is available.

A chickadee gathering moss

But once you establish a vibrant habitat garden, these materials will most likely be present without your deliberate intervention.

This chickadee nest (removed from a nestbox after the babies had fledged) included moss — and even bits of fur from a dead squirrel.

Providing nest materials for birds: Dos & Don’ts ~ All about birds

Please read about nesting materials at:

https://www.allaboutbirds.org/news/providing-nest-material-for-birds-dos-donts/

This female cardinal returned many times to gather last year’s flowering Clethra twigs for her nest.

How to offer bird nesting materials in your garden by Roger DiSilestro / National Wildlife Federation

You can provide nesting material of a wide variety of types that appeal to a wide variety of birds, attracting avians to your garden as surely as you would with a feeder.

OPTIONAL:

https://blog.nwf.org/2014/04/how-to-offer-bird-nesting-materials-in-your-garden/

Robins need mud and dead plant material to build their nest. How much mud is available in most lawn- and asphalt-filled neighborhoods?

This wren had to turn his head in exactly the right direction to get this stick through the hole. It took a few tries before he made it!

A piece of dried grass will become part of this catbird's nest

Bird Conservation

Providing habitat elements isn't enough. We have to ensure our habitat and the world beyond is free of man-made hazards. Birds didn't evolve in the modern world and they have no natural defenses against these dangers:

- lawn and garden chemicals
- domestic cats,
- non-native competitors,
- windows and buildings,
- loss of neotropical migrants' winter habitat, and
- climate change

Cap open pipes to save birds
~ NestWatch / Cornell Lab of Ornithology

Birds are curious about any cavity they come upon since they're potential nest sites or roost. There's a man-made danger associated with this behavior: open pipes or bollards, such as you might find supporting a gate or an umbrella stand. They birds enter the cavity and can't get out.

Holes such as this old outdoor umbrella stand are a danger to birds. Cap them!

The simple solution: Cap these holes! A simple fix is placing a big rock, piece of wire mesh, or other homemade "cap" on top of the post.

OPTIONAL: Read more and see a video of a bluebird trapped in one of these holes being rescued:

https://nestwatch.org/connect/news/an-easy-way-to-save-birds-cap-open-pipes/

Lawn and garden chemicals

Previously, we noted the impact of lawn and garden pesticides on soil organisms, water, pets, wildlife, and on people — especially children.

These products can specifically affect birds in three ways:

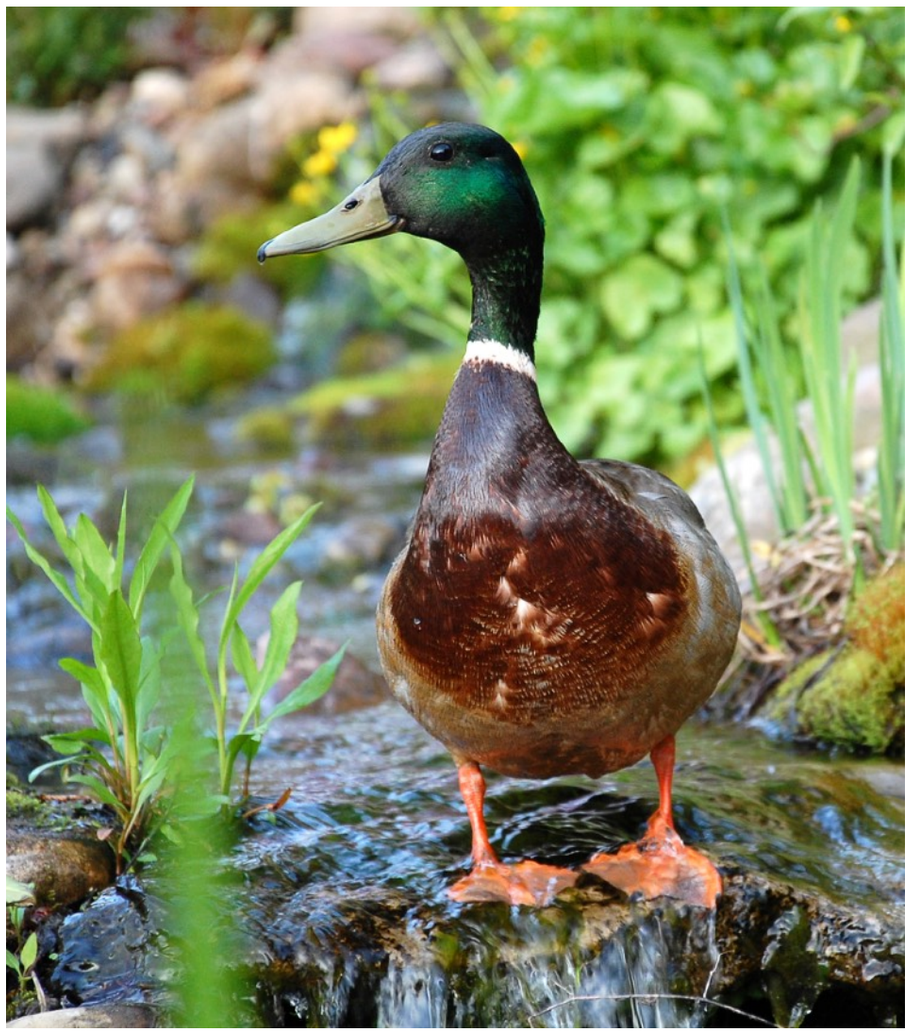
- directly — when ingesting, inhaling, or being covered with them
- indirectly — when they eat insects that have pesticides in or on them
- by eliminating a prime source of bird food: insects.

Is the caterpillar this wren is bringing to feed its babies free of

When it comes to pesticides, birds are sitting ducks
by Mary Deinlein / Smithsonian Migratory Bird Center

OPTIONAL:

https://nationalzoo.si.edu/migratory-birds/news/when-it-comes-pesticides-birds-are-sitting-ducks



Birds are sitting ducks when it comes to pesticides.

Popular pesticides linked to drops in bird populations
by Helen Smith / Smithsonian.org

Neonicotinoids harm not only bees but other wildlife as well, including birds.

OPTIONAL:

https://www.smithsonianmag.com/science-nature/popular-pesticides-linked-drops-bird-population-180951971/

Impacts of pesticides on birds
~ Beyond Pesticides

A brief summary of the research on birds and pesticides.

OPTIONAL:

https://www.beyondpesticides.org/programs/wildlife/birds

Domestic cats

Cat predation is the largest human-caused mortality threat to birds. Domestic cats kill **more than 2 billion** birds each year in the U.S. alone.

Domestic cats are a non-native species. Birds didn't evolve with them and so have few defenses against this relatively new threat.

Catbird or cat food? This catbird was one of the lucky ones, escaping intact except for his tail feathers. Most birds encountering cats aren't so lucky. (This bird's tail did grow back, but if the follicles are damaged they may not.)

Cats Indoors: Better for cats, better for birds, better for people
~ American Bird Conservancy

Cats predation is the largest human-caused threat to birds.

Please read:

https://abcbirds.org/program/cats-indoors/

All that remains of a bird simply getting food

‘Catios’ bring cats outdoors
by Jennifer Kingson / New York Times

A very practical solution to the problem. Great photos in the slideshow! (Note: NYT offers ten free articles a month.)

OPTIONAL:
https://www.nytimes.com/2010/06/17/garden/17catio.html

and a related slideshow of catios at
https://www.nytimes.com/slideshow/2010/06/17/garden/20100617-catio-slideshow.html

---

The evil of the outdoor cat
by Richard Conniff / New York Times

Conniff’s experiences led to his decision to never have an outdoor cat again.
OPTIONAL:
http://www.nytimes.com/2014/03/22/opinion/sunday/the-evil-of-the-outdoor-cat.html

A trespassing neighborhood cat waiting for birds and small mammals

Non-native (and native) avian competitors

No, it’s not the house sparrows’ or the starlings’ fault. We imported them into our country where they did not belong. But now the problem is ours to correct.

A male house sparrow at left and a European starling at right

Not only do house sparrows and starlings rob nesting places and even kill native birds in their nests, but they also outcompete native birds for food resources.

Managing house sparrows and European starlings ~ NestWatch / Cornell Lab of Ornithology

OPTIONAL:
https://nestwatch.org/learn/all-about-birdhouses/managing-house-sparrows-and-european-starlings/

IMPORTANT: Don’t confuse house sparrows with native sparrows or finches!

Despite their name, house sparrows are not true sparrows. They’re weaver finches.

Our true native sparrows, such as white-throated sparrows, chipping sparrows, song sparrows and the like are charming birds, but could easily be mistaken for house sparrows if you don’t look carefully. Our native sparrows and finches are to be encouraged (and — unlike house sparrows — are legally protected). Make sure you know the difference between house sparrows and true native sparrows and finches!

Some examples of native sparrows

Native sparrows are sometimes called “LBJs” for “little brown jobs” due to the difficulty people sometimes have of distinguishing among them at first.

With familiarity, they become quite distinctive and each is charming in its own way.

Note that juveniles or females may not be quite so distinctive and more be more easily confused with the non-native house sparrows, especially with the female house sparrow.

Song sparrow

White-crowned sparrow

White-throated sparrow

Chipping sparrow

These charming native sparrows are distinct from house sparrows — once you become familiar with them. But if you’re a beginner, it’s easy to misidentify these as house sparrows. Be observant!

White-throated sparrow

Cowbirds

Cowbirds, unlike starlings and house sparrows, are native birds, but due to modern man-made changes in habitat, they've spread beyond their original ranges. Now are more likely to parasitize birds that didn't evolve with them and therefore has few defenses against them.

The origin of the cowbird's name
by Mike O'Connor

An enjoyable and informative article

OPTIONAL:
http://www.birdwatchersgeneralstore.com/BuffaloCowbird.htm

Cowbirds: male (at left) and female (at right)

Cowbird eggs
by Mike O'Connor

This also discusses another imported bird: the house finch.

OPTIONAL:
http://www.birdwatchersgeneralstore.com/Cowbirds05.htm

A small song sparrow adult feeding a juvenile cowbird

The small chipping sparrow adult is feeding a much larger cowbird juvenile

Windows: A clear and present danger

Windows can be fatal for birds. We can prevent this!

It's easy to see that a bird would think this reflection is the real thing — a clear flying path

Each year, some estimate **365 to 988 million** birds die from crashing into windows in the U.S.; others estimate **100 million to 1 billion**. Many homes, especially contemporary designs, feature large windows, sometimes in opposite walls, making it appear to be a clear path through.

NOTE: Some windows are more problematic than others. Focus your efforts on those.

FLAP: Fatal Light Awareness Program

This Canadian organization specializes in an important issue: the large numbers of migrating birds being killed by buildings and lighting, both commercial and residential.

OPTIONAL but excellent resource!

Includes options that do and that do **not** work:

https://birdsafe.ca/homes-safe-for-birds/

Something that does NOT work:
One — or even a few — hawk decals!

Birds flying into windows? Truths about birds and glass collisions
~ American Bird Conservancy

Please read:

https://abcbirds.org/blog/truth-about-birds-and-glass-collisions/

Death trap designed into the house

Throughout this modern architecture home being built, there are many apparent “fly through” areas, including corner windows.

Just three of many are indicated with green arrows.

Acopian BirdSavers aka “Zen Wind Curtains” ~ Acopian BirdSavers

Some quick and simple measurements are all that are needed for you to order custom, hand-made, cool looking Acopian BirdSavers for your windows. *Or you can even make your own; instructions are included on the website.*

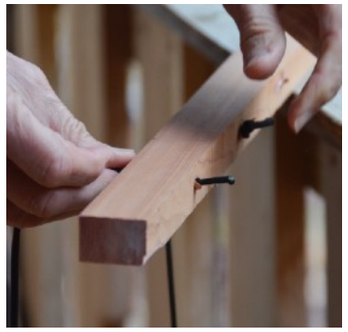
NOTE: These can be used to comply with the US Green Building Council’s LEED Credit Bird Collision Deterrence

OPTIONAL to learn more, order them, or get DIY instructions:
https://www.birdsavers.com/
NPR interview about the BirdSavers
https://www.birdsavers.com/interview-from-you-bet-your-garden/

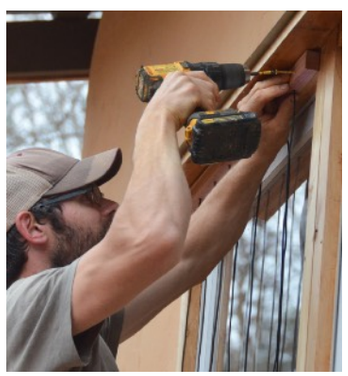
Ithaca NY’s Cayuga Bird Club article:
http://cayugabirdclub.blogspot.com/2014/11/zen-wind-curtains-reduce-bird-window.html

Making an Acopian (Zen) curtain: One example

Buy parachute cord and cut to window length plus a little. Seal one cut end by burning with a candle.



Drill holes in a piece of wood the width of the window.



Attach wood to top of the window (or see another option to the right).

Cut each cord to be even with the bottom of the window and seal by burning. You're done!

Another option:

If you don't want to drill holes in your window frame, you can use these stick-on hooks.

This homeowner created a Zen curtain

Clean problematic windows less often

Leaving the outside surface less-than-clean reduces reflections and could reduce bird collisions.

Not a complete solution, but it may help a bit.
If you still have bird collisions, please try the Acopian curtains or other measures!

A window left less-than-clean solved the problem of finding dead birds underneath it.

No screen

Screen on outside

A window screen installed on the OUTSIDE of the window not only reduces reflection but also makes any collision that does happen more survivable. Compare the two windows.

Simple bird netting helps break up the reflection

If screens can't be installed on the outside, bird netting can help.

Commercial buildings, too

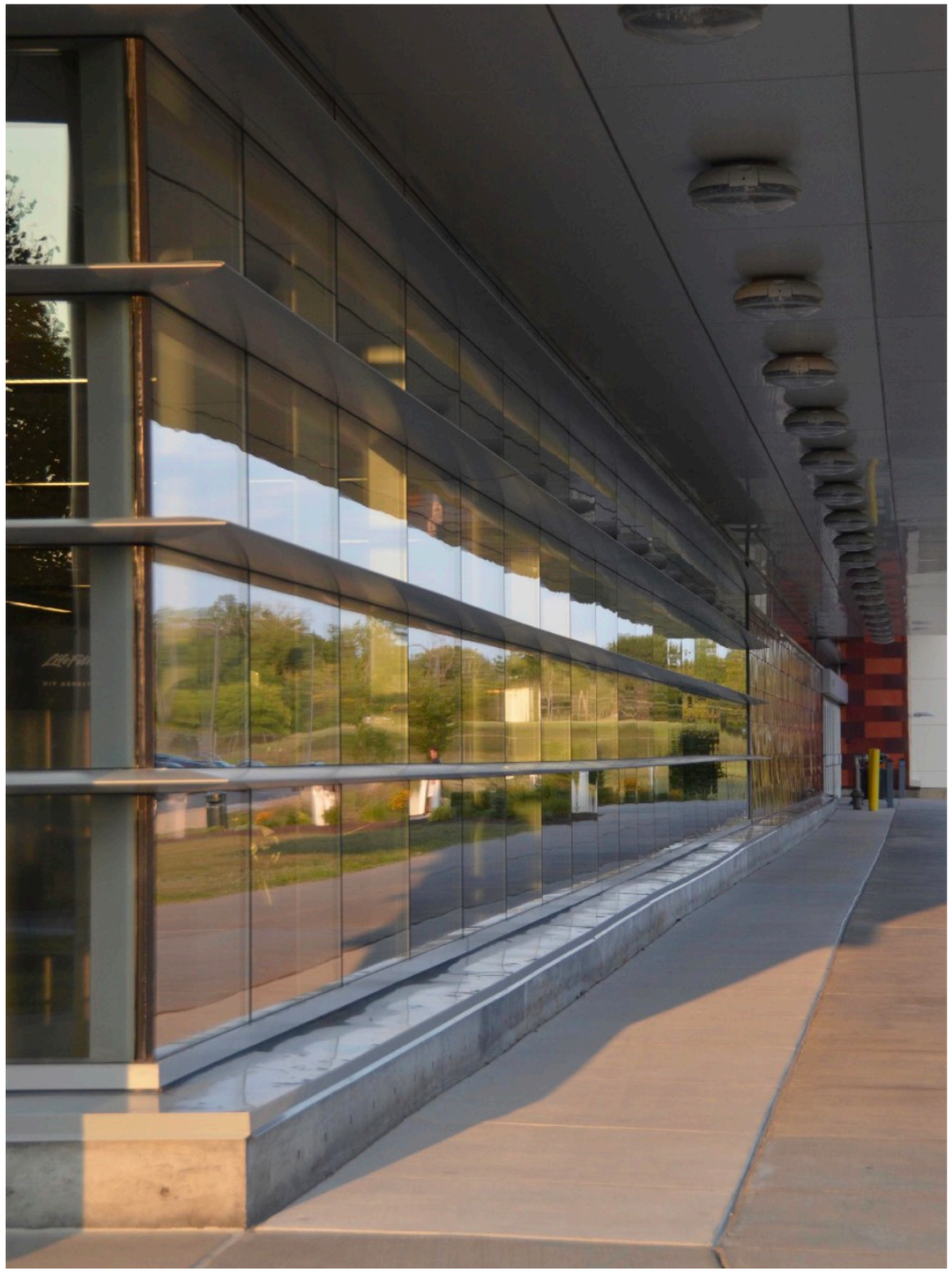
For non-residential buildings, see the many options available:
https://abcbirds.org/threat/bird-strikes/

Attention architects!

The plastic wrap familiar on buses, also is one of many ways to make buildings more bird-friendly. There are many other options, but it's easiest and most effective to build bird-friendliness into the design from the beginning.

This is how the window appears from the inside. People in the building have a clear view outside.

This is how the window appears from the outside. Birds see this opaque view.



The windows in this recently-constructed building reflect trees and sky

Migration

Birds face many dangers as they make their long migrations in spring and fall.

How could we drive from New York to Florida without some gas stations along the way? Without a place to rest and recharge our energy?

Birds face a similar dilemma. Without food resources where they can “tank up,” without a place to rest up for the rest of the journey, they won’t have the energy to reach their destination.

This tiny ruby-throated hummingbird will be traveling all the way from the Northeast to Central America.

Travel alert for migratory birds: Stopover sites in decline
by Mary Deinlein / Smithsonian Migratory Bird Center

This article discusses the importance of stopover habitat for birds and offers ways we can help them on their journey.

OPTIONAL:
https://nationalzoo.si.edu/migratory-birds/news/travel-alert-for-migratory-birds-stopover-sites-decline

Bayberry (Myrica pensylvanica) berries are high in fat, helping to fuel the migration

Spicebush (Lindera benzoin) berries are also high in fat.

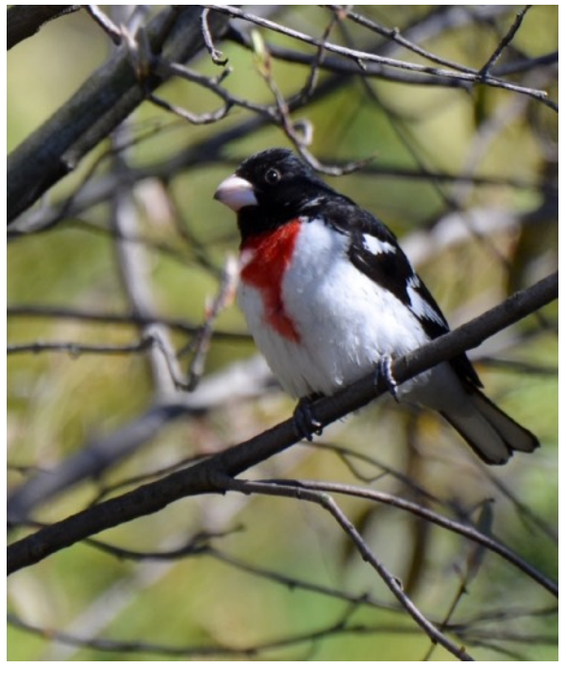
Your coffee choice will determine what birds find at the end of their long fall migration

What can be better than enjoying a cup of coffee while watching birds in your yard?

Many people work hard to provide habitat in their yards for birds' summer homes. If you enjoy birds such as hummingbirds, catbirds, warblers, or rose-breasted grosbeaks who migrate to Central or South America for the winter, make sure there's a winter home waiting for them when they arrive after their long journey!

We're waking up to the fact that the coffee we buy can either help our migratory birds survive the winter … or cause their decline.

Choose certified "Bird-Friendly" coffee to protect birds' winter home



The rose-breasted grosbeak is one of many birds needing a winter home in coffee production areas.

Birds and coffee plantations
by Julie Craves / Coffee and Conservation

A good overview of this issue.

Please read:

http://www.coffeehabitat.com/2006/02/birds_and_coffe/

What is shade-grown coffee?
by Julie Craves / Coffee and Conservation

There are different levels of shade – some more helpful to birds than others.

OPTIONAL:

http://www.coffeehabitat.com/2006/02/what_is_shade_g/

Why migratory birds are crazy for coffee
by Robert Rice / Smithsonian Migratory Bird Center

The Smithsonian Migratory Bird Center has created a certification that will ensure that the coffee you buy provides winter habitat for our birds and year-round habitat for resident birds.

OPTIONAL:

https://nationalzoo.si.edu/migratory-birds/news/why-migratory-birds-are-crazy-for-coffee

The ecological benefits of shade-grown coffee by Robert Rice / Smithsonian Migratory Bird Center

OPTIONAL:
https://nationalzoo.si.edu/scbi/migratorybirds/coffee/bird_friendly/ecological-benefits-of-shade-grown-coffee.cfm

Where to find it

The Birds & Beans brand is available online, and some chains carry it, too. BUT you'll have to check the label yourself! *The stores' staffs rarely know that the coffee they carry has this special certification or know its importance.*

Wegmans Organic Guatemalan coffee and **Whole Foods Allegro Organic Early Bird Blend** are two brands certified as Bird-Friendly by the Smithsonian Migratory Bird Center. And the Wegmans coffee is also **Fair Trade** and **Organic** certified!

Survival by degrees ~ Audubon

Two-thirds of North American birds are at increasing risk of extinction from global temperature rise.

Please sample some of these resources:
https://www.audubon.org/climate/survivalbydegrees

Climate change could threaten half of North American birds by the end of the century.

Citizen science is for the birds

You can make a valuable contribution by collecting information that can be obtained **only** by large numbers of volunteers. They also sharpen your observation skills — and are just great fun!

I make my own customized datasheets or you can use the ones provided.

Here are a few to try:

Great Backyard Bird Count

This annual 4-day event is a good project for beginners and a good family project.

https://www.birdcount.org/

Project FeederWatch

A winter project from November to April.

https://feederwatch.org/

eBird

A good way to contribute to conservation and keep track of your bird sightings. This can be done year-round! An app is also available, making it convenient to count birds wherever you go.

https://ebird.org/home

General information about birds and habitat

Cornell Lab of Ornithology

https://www.allaboutbirds.org/

Audubon Bird Conservation

https://www.audubon.org/conservation

Audubon Native Plants Resource

Planting native plants is one of the most important things you can do to help birds. You can find bird-friendly native plants and sources for these plants at

https://www.audubon.org/native-plants

Cornell Lab of Ornithology's Bird Academy

Interactives, videos, field clips, articles, and more~

Fascinating short pieces on various aspects of birds and their behavior.

https://academy.allaboutbirds.org/media-library/

Regional information about bird habitat

Southeast

Managing Backyards and Other Urban Habitat for Birds
~ North Carolina State University
https://content.ces.ncsu.edu/managing-backyards-and-other-urban-habitats-for-birds

Bird identification help

Merlin Bird ID / Cornell's All About Birds

Need help identifying birds? This app, the website, and the Beta photo ID version are surprisingly accurate. And a Photo ID version is available as a FREE app for your phone.

https://merlin.allaboutbirds.org/

Just answer a few questions and you get a list of possibilities — surprisingly accurate!

Books

Laura Erikson – **101 Ways to Help Birds**

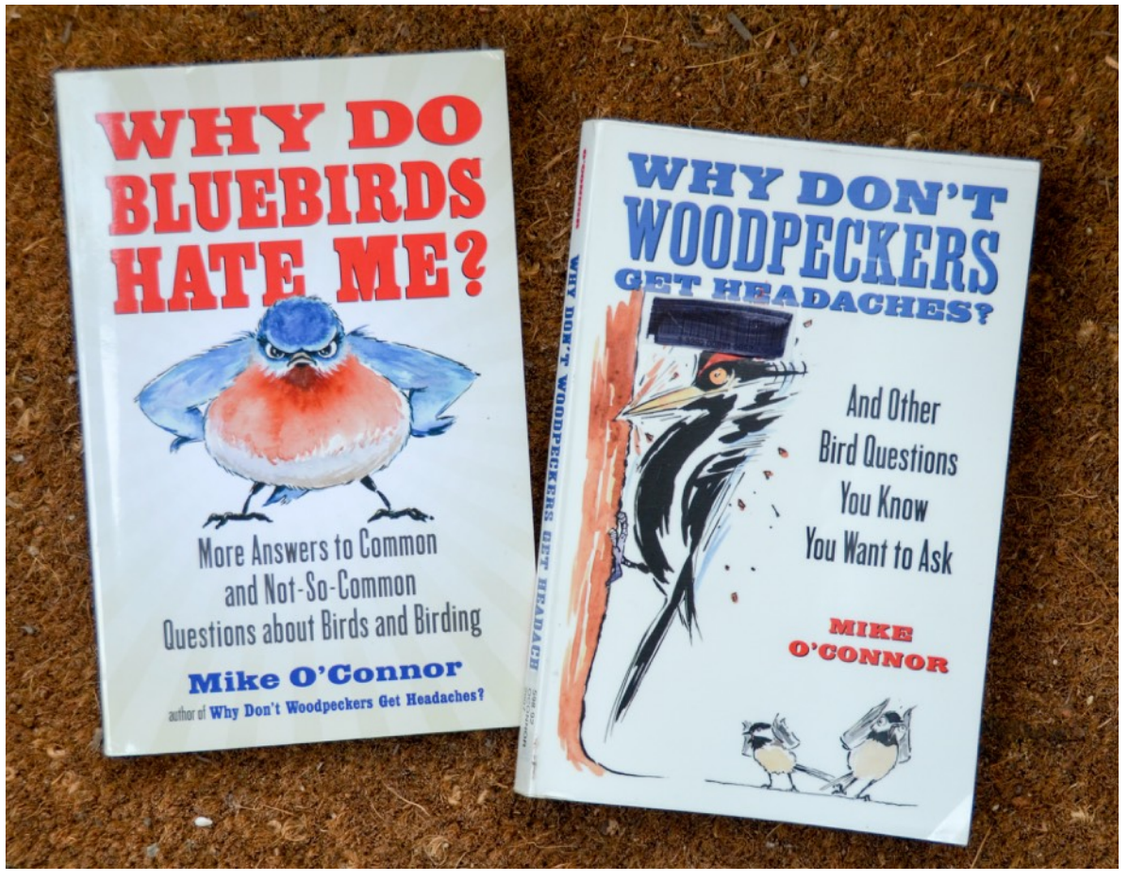
Excellent! Much more substantive than a simple list.

Mike O'Connor books and articles

Do you like Car Talk? Do you like birds? You'll love these books and articles! Well-written, very entertaining, and informative.

- **Why Do Bluebirds Hate Me?:** More answers to common and not-so-common questions about birds and birding
- **Why Don't Woodpeckers Get Headaches?** And other bird questions you know you want to ask

Articles by Mike O'Connor at
http://www.birdwatchersgeneralstore.com/articles.htm



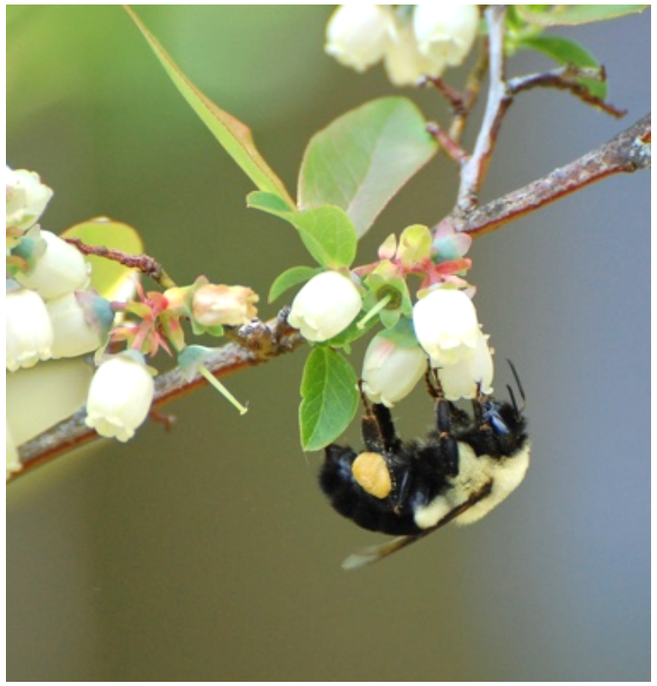
If you like Car Talk, you'll love these! Good information with lots of humor.

Section 3

Pollinators

Hummingbirds, butterflies and moths, beetles, as well as bats are all pollinators, but the most important pollinator is native bees.

When you provide habitat for native bees, you're not only supporting the bees themselves, but you're protecting our food system now and in the future.



This bumble bee is pollinating blueberries in a home garden, but native bees such as this bumble bee are essential for plants in the wild, too.

But there's more.

Just as important as our food plants are the plants in the wild, sustaining a healthy planet for wildlife and for people.

More than three quarters of plants in the wild need pollinators, some of which are specialized for particular plants. Without their pollinators, plants can become extinct; without their plants, pollinator specialists can become extinct.

The great and noble service that
gardeners can provide for
all pollinating insects
is to give them asylum
— to make the garden a sanctuary
for some of the insects
that help run the world.

~ Eric Grissell

This is what your grocery stores looks like without honeybees
~ Whole Foods

From: https://media.wholefoodsmarket.com/bees

This 2013 article was the first in an annual series. Note that the title of the article says “honeybees.” In subsequent years, they have used the more proper term “pollinators” since honeybees aren’t the only — or even the best — pollinators.

These are some of the products removed because they depend on pollinators:

Apples	Onions	Avocados	Carrots	Mangos
Lemons	Limes	Honeydew	Cantaloupe	Zucchini
Summer squash		Eggplant	Cucumbers	Celery
Green onions		Cauliflower	Leeks	Bok choy
Kale	Broccoli	Broccoli rabe	Mustard greens	

Sure, Whole Foods is promoting organic foods (which you can buy at their store) but it is indeed true that by buying organic foods, you’re supporting pesticide-free agricultural practices that are safer for bees (and for people).

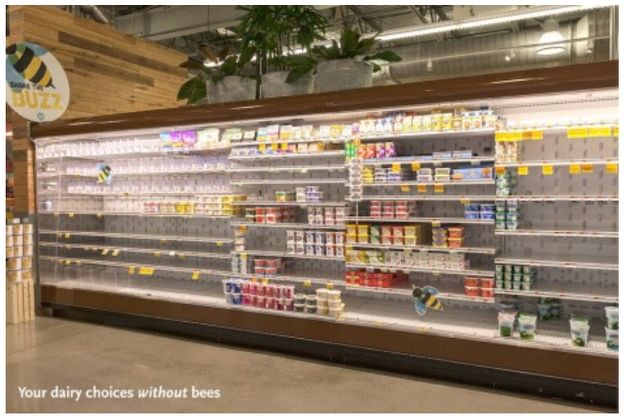
A Whole Foods experiment for National Pollinator Week in which they removed all produce that depends on pollinators

Give bees a chance—the dairy aisle needs pollinators, too
~ Whole Foods

From: https://media.wholefoodsmarket.com/give-bees-a-chance-the-dairy-aisle-needs-pollinators-too

Cows don't have to be pollinated, so why do we have fewer dairy choices without pollinators? Because cows need to eat plants such as clover and alfalfa, which must be pollinated.

And — horrors! — without the cacao pollinator chocolate would disappear!



The dairy case without bees
Photo by Whole Foods

Pollinators – Chocolate midge
~ U. S. National Park Service

Learn how a tiny midge creates the "food of the gods" (and also why the U.S. National Park Service is involved ...) You'll also see a similarity between modern cocoa and coffee production.

OPTIONAL:
https://www.nps.gov/articles/chocolate-midge.htm

Protecting pollinators
~ Whole Foods and Pollinator.org

These entertaining 30-second mini-videos make an important point about the contribution of pollinators for the foods we enjoy every day but take for granted.

OPTIONAL mini-videos:
What would guacamole, apple pie, marinara sauce, and smoothies be without pollinators?:
https://www.youtube.com/watch?v=OfNwsBSufNU
https://www.youtube.com/watch?v=j95u47XYMzE
https://www.youtube.com/watch?v=fRYVjXC1ZmU
https://www.youtube.com/watch?v=acAo8r5nVSk

Bumble bees, with their special "buzz pollination" ability, are expert tomato pollinators. Honey bees can't do that!

The plight of the bumble bee: Conserving imperiled native pollinators by Matt Miller / The Nature Conservancy

Not just honey bees, but native bees are in trouble, and a decline in these important pollinators will impact not only our food system, but the broader ecosystems we depend on.

Please read:
https://blog.nature.org/science/2014/03/19/plight-of-bumble-bee-native-pollinators-ecosystem-services/

You can purchase a similar sign from The Xerces Society at https://gifts.xerces.org

Ghost in the making: The rusty-patched bumble bee ~ Day's Edge Productions

A beautifully produced mini-documentary about a previously common bumble bee that is now at risk. ***Highly recommended!***

"This elegant film delivers wonder in every frame. Blending expert science with the exuberance of a bug-loving kid, Bolt takes us on a journey of discovery." ~ National Wildlife Magazine

NOTE: As of Jan. 2017, this bee became the first bee to be federally protected under the Endangered Species Act.

Please watch this 19-minute video:
http://www.rustypatched.com/the-film/

A once-common bee is no longer common — and that should alarm us.

It's easy to bring back the pollinators with these four simple steps
~ The Xerces Society

Although pollinator conservation is a big task, it all begins with each of us adopting four simple steps:

- Grow pollinator-friendly flowers,
- provide nest sites,
- avoid using pesticides, and
- spread the word.

This short article provides links to more information on these topics.

OPTIONAL:
https://www.xerces.org/bring-back-the-pollinators

Bringing bees back
~ Growing a Greener World Episode 610

This video talks about current threats to native bees and what we can do to make a difference in our own yards.

OPTIONAL 26-min video:
https://www.growingagreenerworld.com/bringing-bees-back/

Providing nest sites for pollinators
~ The Xerces Society

Most people know that pollinators need plants for pollen and nectar, but they need nesting sites, too. This article shows ground nests and wood tunnel nests and has links to more information about these.

Please read:
https://www.xerces.org/pollinator-conservation/nesting-resources

This bumblebee nest site was under logs edging a path in a backyard. As is common, the nest was in an area formerly occupied by a shrew or other rodent. The bees and people coexisted peacefully for the summer! Once fall arrives, only the new queens survive, hibernating through the winter to start a new colony in a new location the next summer.

Tiny pollinators need wildlife corridors, too
by Michelle Nijhuis / The Atlantic

Describes a pollinator garden twelve feet wide and a mile long.

“This isn’t about the future of farming,” Bergmann says. “It’s about the future of nature.”

OPTIONAL, but recommended:
https://www.theatlantic.com/science/archive/2017/01/pollinator-pathway/513395/

The case against honeybees
by Cara Giaimo / Atlas Obscura

This article ponders whether we can move beyond the honeybee and even move beyond thinking of pollinators simply as creatures we need to save so they can pollinate our food.

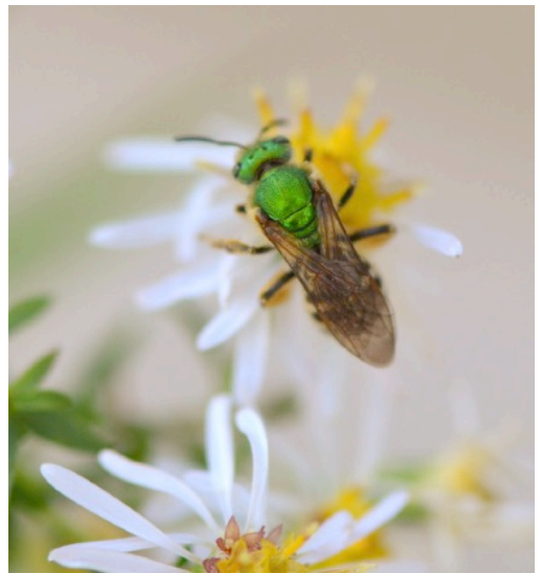
It’s an optional reading since it’s fairly long, but it presents a number of interesting ideas that are worth thinking about.

OPTIONAL:
https://www.atlasobscura.com/articles/the-case-against-honeybees

Stop imagining bees as dangerous and aggressive and think of them as watchable wildlife.

~ Stephen Buchmann, coordinator of the Pollinator Protection Campaign

A leafcutter bee carrying a leaf it cut to create cells for its eggs in the log



A harmless sweat bee

Bee Basics: An introduction to our native bees by Beatriz Moisset and Stephen Buchmann / USDA Forest Service and Pollinator Partnership

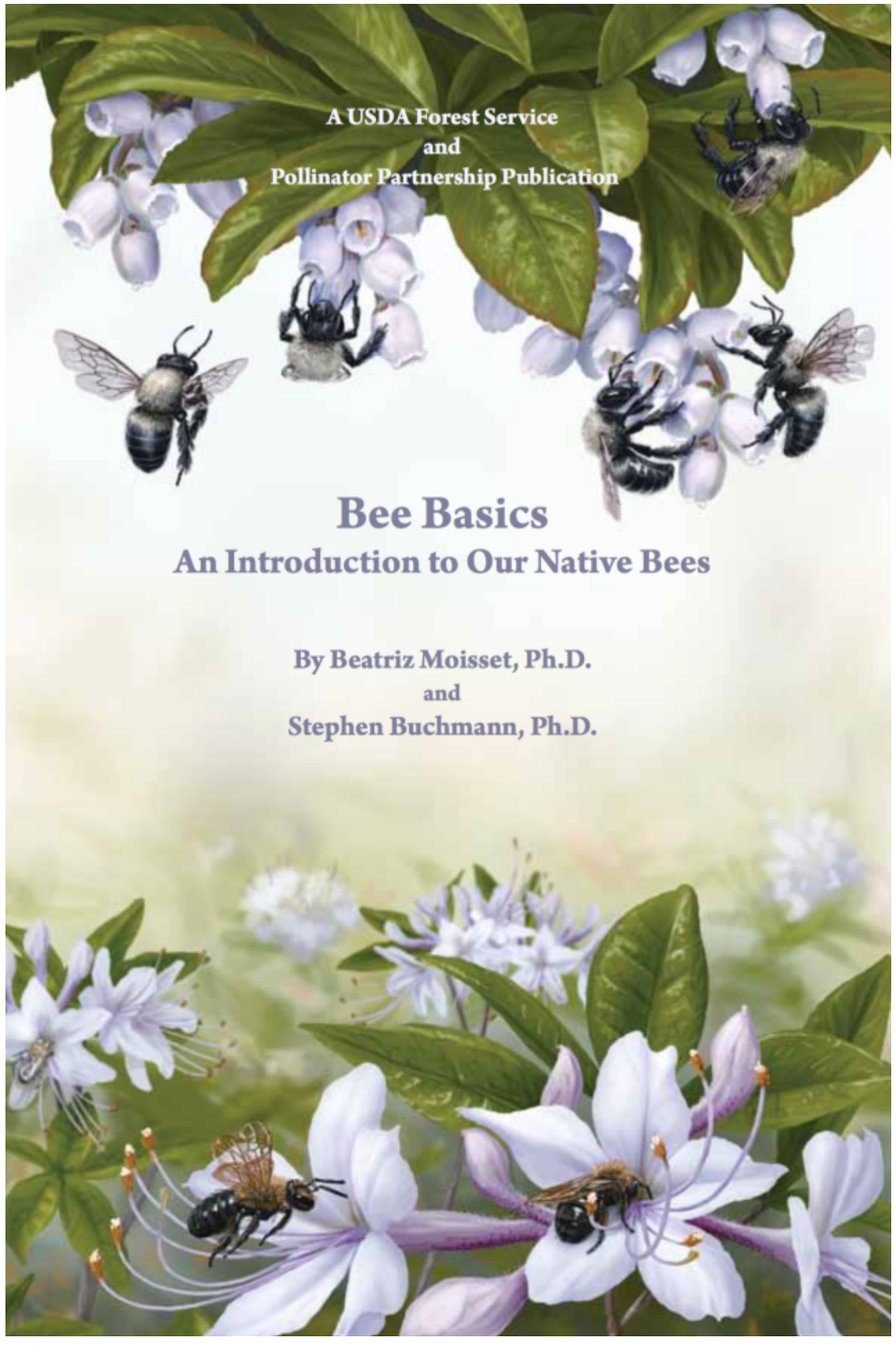
An excellent free 40-page booklet in PDF format from two pollinator experts about native bees.

It covers bee biology, nesting, foraging needs, describes different kinds of bees (sweat bees, leafcutters etc), conservation needs, and what you can do.

Beautiful illustrations! Well worth browsing and reading parts of interest to you.

OPTIONAL: You can download this free PDF at:
https://www.fs.fed.us/wildflowers/pollinators/documents/BeeBasics.pdf

You can also purchase this beautifully illustrated book at:
https://bookstore.gpo.gov/products/bee-basics-introduction-our-native-bees-pamphlet



Neonicotinoids

Neonicotinoid pesticides, sometimes called “neonics” for short, are widely used on farm crops, ornamental landscape plants, and trees. Neonics are **systemic chemicals,** meaning that they’re absorbed by the plant, making the plant itself toxic to insects.

Scientists are concerned because neonicotinoids can be present in pollen and nectar even if the initial application is made outside of the bloom period. In addition, these chemicals persist **in the soil and in plants for very long periods of time.**

Neonicotinoids: The new DDT?
~ Earth Focus Episode 69

Produced by Earth Focus, the documentary investigates the science and controversy behind neonciotinoids, insecticides used on some 200 million acres of U.S. cropland as well as in common home and garden products.

It features interviews with scientists, policy makers, and advocates, including Scott Hoffman Black of the Xerces Society, Prof. Dave Goulson of the University of Sussex, Congressman Earl Blumenauer, and David Fischer of Bayer CropScience.

OPTIONAL 27-min video from Link TV:
https://www.youtube.com/watch?v=EWLPORypiB8

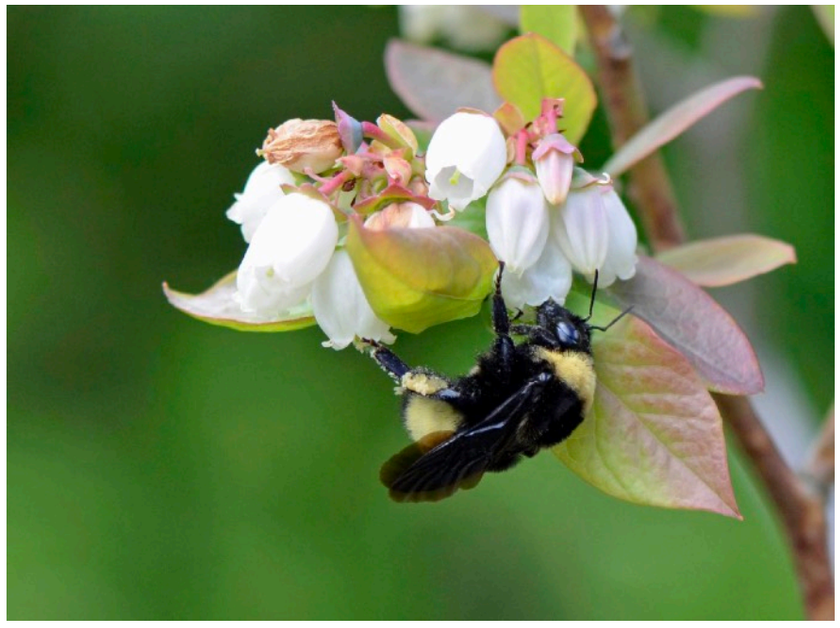
How neonicotinoids can kill bees
~ The Xerces Society

This article summarizes the major findings of a report on the effect of neonicotinoids on bees. More research is being done all the time. (Check Beyond Pesticides for updated information.)

The article also lists some **common brand names** of products containing these pesticides. A neonicotinoid is an ingredient; not a brand. You may have been purchasing them without knowing it.

These products are more common than you think. You may even have some in your garden shed.

OPTIONAL:
https://www.xerces.org/publications/scientific-reports/how-neonicotinoids-can-kill-bees



The beautiful black and gold bumble bee pollinating blueberries.

More resources on pollinators

POLLINATOR ORGANIZATION WEBSITES

The Xerces Society

The Xerces Society is a leading invertebrate conservation organization. An excellent source of information.
https://www.xerces.org/pollinator-conservation

The Pollinator Partnership

Pollinator Partnership's mission is to promote the health of pollinators, critical to food and ecosystems, through conservation, education, and research.

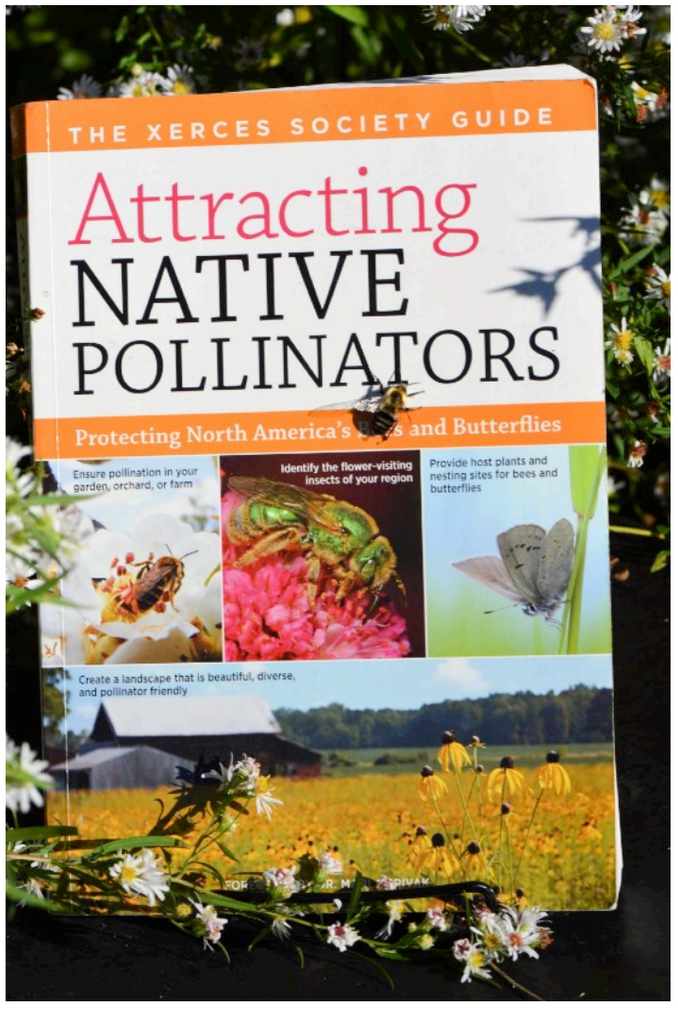
Important note: Besides university and government partners, this partnership includes *unnamed* corporate partners. In the past this included pesticide companies, but current corporate partners are not revealed.

https://www.pollinator.org/

BOOKS

Attracting Native Pollinators book

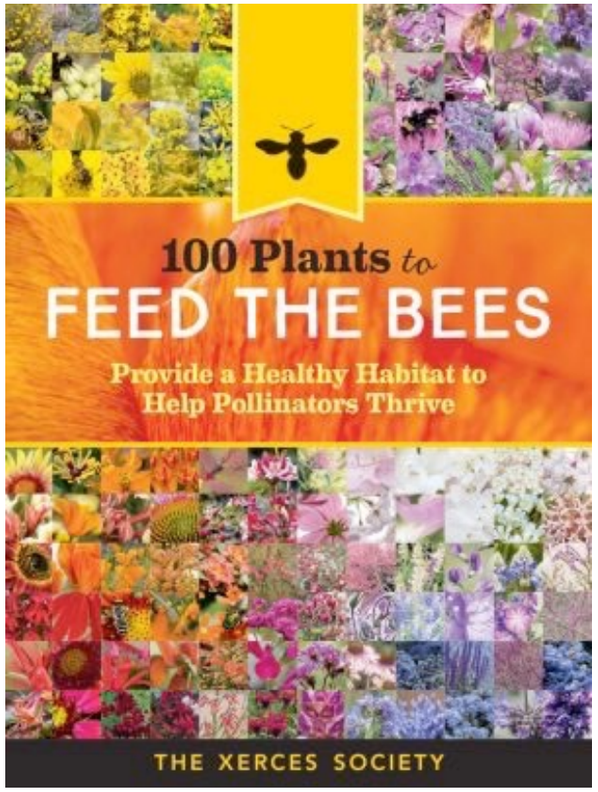
~ The Xerces Society



An excellent book to learn more about native pollinators and how to conserve them. Beautifully illustrated. **Highly recommended!**

Available from The Xerces Society at https://www.xerces.org/publications/books/attracting-native-pollinators, from bookstores, or at most public libraries. EXCELLENT!

100 Plants to Feed the Bees: Provide a Healthy Habitat to Help Pollinators Thrive
~ The Xerces Society



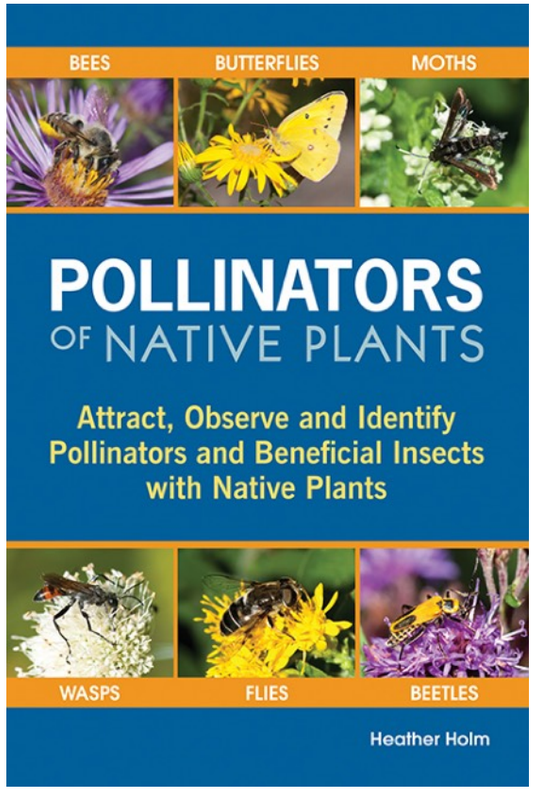
From the Xerces website:

The first simple step toward protecting our pollinators is to provide the flowers they need, using no pesticides.

This field guide identifies the plants that honey bees and native bees — as well as butterflies, moths, and hummingbirds — find most nutritious, including flowers, trees, shrubs, herbs, and pasture plants.

Available from The Xerces Society at https://www.xerces.org/publications/books/100-plants-feed-bees

Pollinators of Native Plants:
Attract, Observe and Identify Pollinators and Beneficial Insects with Native Plants
by Heather Holm



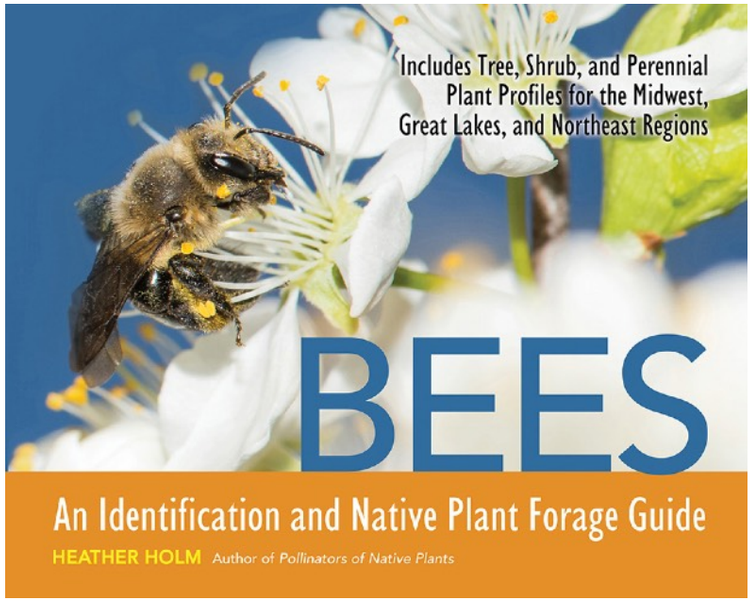
From the description on Amazon.com:

... illustrates the specific relationships between native pollinators and native plants. Organized by plant communities, the book profiles over 65 perennial native plants of the Midwest, Great Lakes region, Northeast and southern Canada and the pollinators, beneficial insects and flower visitors the plants attract.

With its easy-to-use format, the book provides the reader with information on how to attract, plant for and identify pollinators with native plants.

Beautifully designed and illustrated with over 1600 photos of plants and insects, the book includes information on pollination, types of pollinators and beneficial insects, pollinator habitat and conservation as well as pollinator landscape plans.

BEES: An Identification and Native Plant Forage Guide by Heather Holm



Caption

From Pollinators and Native Plants website:

This well-illustrated guide captures the beauty, diversity, and engaging world of bees and the native plants that support them.

... Extensive profiles for twenty-seven bee genera, plus twelve mini profiles for uncommon genera, and approximately one hundred native trees, shrubs, and perennials for the Midwest, Great Lakes, and Northeast regions.

With over 1500 stunning photographs, detailed descriptions, and accessible science, environmental educator and research assistant Heather Holm brings to light captivating information about bees' life cycles, habitats, diet, foraging behaviors, crops pollinated, nesting lifestyles, seasonality, and preferred native forage plants.

Explore your yard early in the morning. You might find a bee still asleep under a flower!

Section 4

Butterflies, moths, and skippers

People love to see beautiful butterflies, and many people plant butterfly gardens designed to attract them.

Generally, these gardens feature nectar-rich flowers, situated in a sunny place protected from strong winds.

So far, so good. But butterflies need more than nectar!

The butterfly we enjoy seeing, fluttering around our gardens visiting flowers for nectar, is just the adult phase. To have the adult butterflies we love, we must provide habitat for all its life phases — even for the caterpillars whose food is our plants' leaves.

And don't forget the other lepidoptera! Butterflies get most of the attention, but native moths and skippers are important members of our ecosystems, too. Many are quite beautiful as well. But beautiful or not, they're still important parts of the web of life.

A question mark butterfly -- and yes, that's its actual name, given for the question mark-like shape found on the lower surface (ventral side) of its wings.

Welcome the caterpillars!

Remember when we were kids? We'd find a caterpillar, put it in a glass jar, stuff the jar with nearby leaves so it would have something to eat, and cover the jar with a lid with holes so it could breathe. Despite our good intentions, though, very often the caterpillar died.

This monarch caterpillar is eating a milkweed leaf -- the ONLY kind of plant it can eat!

Why? Unless the leaves we provided were leaves from its host plant, it simply couldn't eat them. Just as humans aren't adapted to eat things such as rhubarb leaves regardless of how hungry we may be, caterpillars aren't adapted to eat any leaves other than the host plants they evolved with.

When it comes to producing the next generation, the female butterfly needs a special place to lay her eggs – the specific host plants the species evolved with. These caterpillar food plants might be herbaceous plants, such as native asters, but quite often they are woody plants, such as native oak or cherry trees.

A butterfly garden should include the host plants needed by the butterflies that are in your region.

For example, if you live in the Northeast, even though you might provide the complete, perfect habitat needed by the Northwestern Fritillary butterfly, you would be unlikely to ever find one in your yard. They live in the Northwest, not the Northeast.

On the other hand, if you live in the Northeast, and you provide habitat for the Northeast-native Great Spangled Fritillary, chances are good some will find their way to your yard.

And yes, if you successfully attract butterflies to lay eggs in your landscape, some leaves will be eaten, but not a noticeable number. Doug Tallamy notes that a single spicebush swallowtail caterpillar needs to eat the equivalent of just three leaves to become an adult butterfly!

A spicebush swallowtail caterpillar a day or so before it pupates

Remember: Host plants are key!

No host plants,

no caterpillars.

No caterpillars,

no butterflies!

Plants only for “pretty” butterflies?

In previous sessions, we questioned whether a plant’s beauty was the most important thing. What about wildlife?

“Pretty” or not, it’s still part of an ecosystem

Some have said they’re willing to plant butterfly host plants (that hopefully WILL get eaten) **IF** the butterfly involved was “pretty enough.”

What about the birds that depend on the caterpillars?

The relationship of that plant to the whole ecosystem? Is our enjoyment of a beautiful butterfly the only measure of its worth?

Don’t throw them out in the trash!

Now that you’ve given the caterpillars something they can eat, make sure they’re able to survive to adulthood so they can produce the next generation.

This generation of the black swallowtail overwinters in this stage. It’s well-camouflaged to blend in with dead leaves and sticks. Yet another good reason to go easy on “fall cleanup.”

Butterflies overwinter in one of their life phases – some species as eggs, some as caterpillars, some as pupae, and some as adult butterflies.

When you rake up leaves and other fall “debris,” you may also be raking up butterflies in one of their life stages.

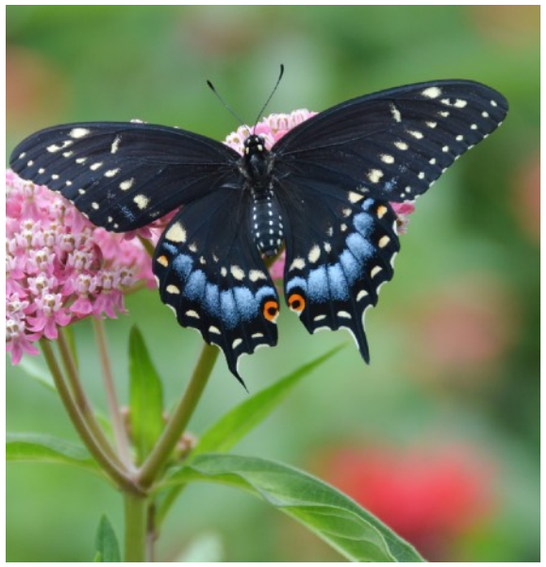
Leave the leaves (as we learned in Session 2) and you’ll create healthy soil full of life – and some of that life may be the butterflies, moths, or skippers you and future generations can enjoy next spring and summer and beyond.

Attracting butterflies ~ National Wildlife Federation

This lists the habitat requirements of butterflies, including a list of host plants for some common butterflies. (Confirm that the butterflies and the plants are native to your area first.)

Please read:

https://www.nwf.org/Garden-For-Wildlife/Wildlife/Attracting-Butterflies.aspx



A black swallowtail butterfly nectaring at a swamp milkweed

The Atala butterfly story in Florida by Doug Tallamy

Perhaps the most important point about making a butterfly-friendly landscape is that it works – big time! This short excerpt from a full-length Tallamy presentation shows home landscapes' potential in conserving butterflies (as well as our power to cause extinctions).

OPTIONAL 3-minute video:
https://www.youtube.com/watch?v=iZHY_xG-Spo

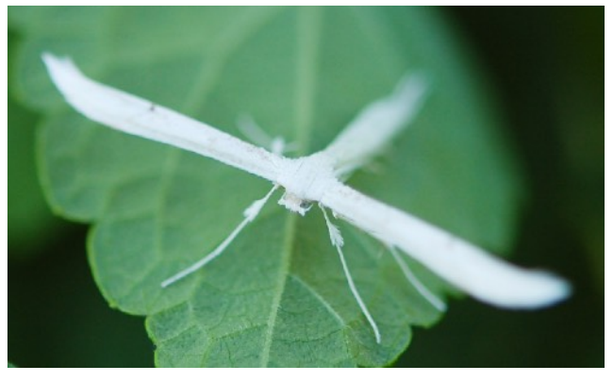
Butterflies and skippers in YOUR county ~ BAMONA

Do you want to know which butterflies and skippers are present in your county? Go to the Butterflies and Moths of North America (BAMONA) website at
https://www.butterfliesandmoths.org/checklists
and enter your Region, then state, then county and it will provide a list. Click any of the butterflies or skippers listed to find out more, including their host plant, as well as photos.

Moths are interesting, too

Most moths are nocturnal, so we're not as familiar with them, but you can spot some during the day. The sphinx moth (sometimes mistaken for a baby hummingbird) are one of the few diurnal moths.

Plant some monardas or other native nectar plants and you might be rewarded with these beautiful moths.

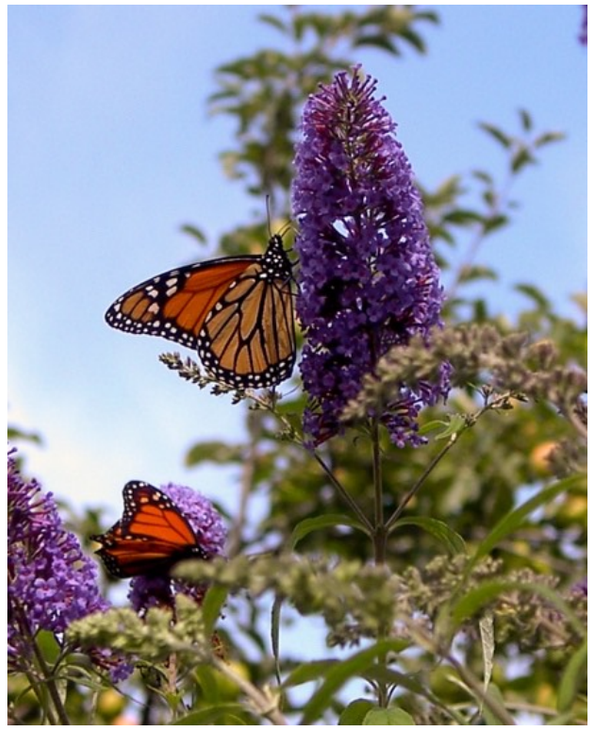


Plume moth

Sphinx moth

Buddleia aka “butterfly bush”

Almost every conventional butterfly gardening list includes butterfly bush. What could be a more obvious choice for a butterfly garden?



Buddleias undeniably attract butterflies just as surely as kids are attracted to candy, but would we want our kids to eat mostly candy?

True, it’s a butterfly magnet. This is fun for the homeowner, but is it good for the butterfly? Instead of whiling away their limited lifespan (often just a few weeks) at this nectar bar, they should be out laying eggs on host plants.

Even worse, these non-native plants seed prolifically, often in natural areas. Yes, pro-buddleia enthusiasts recommend strict deadheading to prevent this, but any gardener knows that such a recommendation is more of an aspiration than something they can count on doing.

Furthermore, even if they’re seedless as some cultivars are claimed to be (though this is debatable), these non-native plants aren’t host plants for any butterfly species.

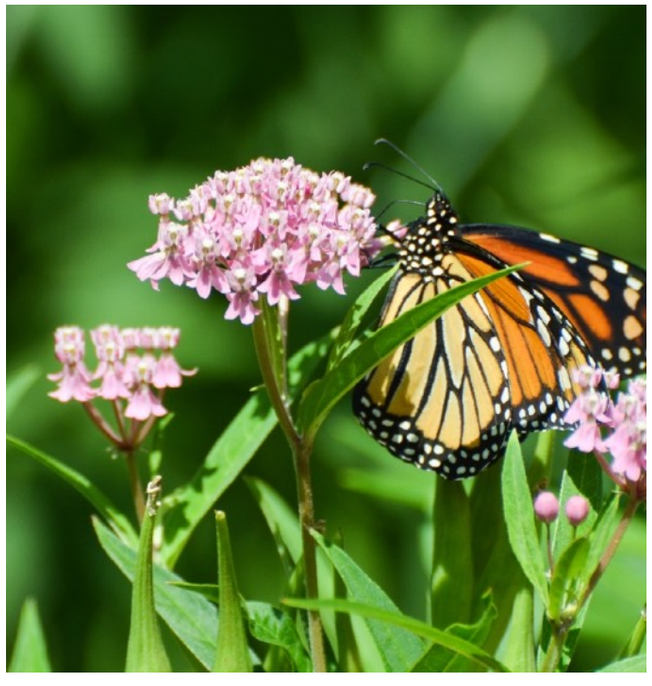
Here are some beautiful alternatives to buddleia:

- Milkweeds (*Asclepias*) such as *A. incarnata* or *A. syriaca*
- Blazing star (*Liatris*) esp. *(L. ligulistylus)*
- New York ironweed *(Vernonia noveboracensis)*
- New Jersey tea (*Ceanothus americana*)
- Summersweet (*Clethra alnifolia*)
- Bush honeysuckle (*Diervilla lonicera*)
- St. John's wort (*Hypericum* spp.)
- Sweetspire (*Itea virginiana*)
- American beautyberry (*Callicarpa americana*)

Plants such as this New Jersey tea provide nectar but also are host plants for caterpillars

The monarch butterfly

The monarch is most people's favorite insect. One reason is that it's a beautiful, large butterfly that floats through our yards slowly enough for us to enjoy it.



A monarch getting nectar from a swamp milkweed; despite its name, it grows well in ordinary garden soil as well as wetter areas.

Another reason is its awe-inspiring migration to Mexico each fall.

But now this migration is at risk. After being demonized as a "weed" and steadily eradicated, the monarchs' essential host plant – various species of milkweed – is less and less common, especially in its traditional Midwest breeding grounds. Much of the midwest has been converted to agriculture, often growing genetically-modified crops unaffected by herbicides — unlike milkweeds, which previously had grown in agricultural fields.

Added to that is illegal logging in its winter home in Mexico as well as climate change. The monarch is indeed facing great challenges.

You can find more information about monarch butterflies and about how you can help at:

- Monarch Joint Venture — https://monarchjointventure.org
- Monarch Watch — https://monarchwatch.org
- Wild Ones "Wild for Monarchs" brochure — https://monarchjointventure.org/images/uploads/documents/WFM_Brochure_final.pdf

Some examples of other native milkweeds

In addition to the swamp milkweed (*Asclepias incarnata*) pictured at left, the milkweeds below are native to much of the US, but check the resources above for your specific area.

Common milkweed (A. syriaca) - very fragrant, spreads

Butterflyweed (A. tuberosa) is tap-rooted, so it grows in poor, dry soil

Choose NATIVE milkweeds!

Most people think milkweed is just one kind of plant. Most likely, they're thinking of common milkweed (*Asclepias syriaca*) because it's so, well, common — or at least it was in the past.

But did you know there are over 100 species of milkweed (the genus *Asclepias*) growing in North America? Not every kind grows everywhere and monarchs prefer certain species more than others. But anywhere you traditionally expect to see monarchs, you'll find at least one species of native milkweed. And despite the unfortunate "weed" part of its name, the various species of milkweeds are generally quite attractive.

So why are people planting tropical milkweed? Sure, it's "pretty" and the monarchs use it, but the scientists studying monarchs and working to preserve the migration strongly recommend that we plant native milkweeds, not the tropical species.

Why? Because the presence of tropical milkweed allows monarchs to breed throughout the winter and it fosters the transmission of the debilitating parasite Oe.

The solution? Plant milkweed species native to your region!

OPTIONAL - More about tropical milkweed and monarchs: http://monarchjointventure.org/images/uploads/documents/Oe_fact_sheet.pdf (a PDF download)

And the monarch adults need nectar plants!

Milkweeds are the essential food for monarch caterpillars, BUT the adult butterflies need fuel to make the long journey to Mexico. Just as the decline of milkweeds has impacted the number of monarchs being produced, the decline of native nectar plants has impacted the ability of monarchs to reach their overwintering grounds.

The Xerces Society, Monarch Joint Venture, and the National Wildlife Federation have developed lists of monarch-specific nectar plants for each region of the country.

These Nectar Plant Guides are available at
https://www.xerces.org/monarchs/monarch-nectar-plant-guides

They note that *"...not all species will work for a given site; we encourage you to use additional references when making final species determinations for your location."*

You can check the native range of each plant for your particular area using The Biota of North America Program at http://www.bonap.org.

For example, the list of nectar plants for the Great Lakes region included *Liatris punctata,* which is native to much of the region, but not specifically to Central New York.

An adult monarch on its long journey to Mexico, nectaring at this late boneset (Eupatorium serotina), one of the recommended nectar plants for some regions.

Gardening for Moths
~ The Xerces Society

Moths also belong in our gardens!

OPTIONAL:

https://www.xerces.org/blog/gardening-for-moths

More resources on butterflies

Gardening for Butterflies
~ The Xerces Society

Protect and nurture the best-loved of garden guests: butterflies, nature's kaleidoscopes with wings. The Xerces Society introduces you to a variety of butterflies who need our help, and provides suggestions for native plants to attract them, habitat designs to help them thrive, and garden practices to accommodate all their stages of life.

OPTIONAL but an EXCELLENT resource:
https://gifts.xerces.org

The beautiful giant swallowtail butterfly

Section 5

Other insects and invertebrates

Along with the pollinators and butterflies described previously, other native insects play an important role in ecosystems.

Contrary to what many people think, most cause no problems in our landscapes and are actively beneficial. (Of course, non-native insects, such as the Japanese beetle, which didn't evolve with our ecosystems, can be very destructive.)

But, sadly, an internet search of almost any invertebrate will yield search results mostly about how to exterminate them.

This is very short-sighted of us!

> *"If all mankind were to disappear, the world would regenerate back to the rich state of equilibrium that existed ten thousand years ago. If insects were to vanish, the environment would collapse into chaos."*
>
> *~ E. O. Wilson, Biologist and author*

Ants are one of the creatures that run the world. The twinleaf seed pictured relies on ants to find a good location to germinate. Ants are attracted to the seed's fatty appendage, called an elaiosome, and carry it back to the nest to feed its larvae.

They discard the seed in a waste area of the nest, which happens to provide the ideal conditions for the seed to germinate. More than 3,000 species of plants in the world rely on ants in this way.

Vanishing act: Why insects are declining and why it matters
by Christian Schwägerl / Yale Environment 360

OPTIONAL:

https://e360.yale.edu/features/

insect_numbers_declining_why_it_matters

Insects are in serious trouble

by Ed Yong / The Atlantic

Research done in western Germany shows populations of flying insects have fallen by around 80% in the last three decades.

https://www.theatlantic.com/science/archive/2017/10/oh-no/543390

The “windshield phenomenon”: We have so few insects, we don’t have to clean our windshields after a trip as in the past

It’s surprisingly easy to help insects
by Janet Allen

Just having an earth-friendly yard will go a long way toward supporting a healthy insect population. (And your efforts to help birds, amphibians, and other creatures will keep it all in balance.)

Here are simple things to do:

1) **Stop using insecticides!** “Insect” + “cide” = killing insects! (You’ll also be protecting the health of other wildlife, our pets, *and our children*.)

2) **Less lawn; more native plants:** herbaceous plants, but also trees, shrubs, and others. In other words, provide a diverse, layered landscape.

3) **Provide places for them to raise their young**. This could be a patch of bare ground, rotting wood, native plants (yes, some eat the leaves), leaf litter, and some dead stalks.

4) **Don’t purchase insects to release.** Provide habitat and they will come.

5) **Afflicted by insectophobia aka entomophobia?** It’s *“characterized by an excessive or unrealistic fear of one or more classes of insect”* (Wikipedia). Note: “excessive”; “unrealistic”. Observing these creatures — even at a distance — and learning more about them can help!

Giving them names
by Janet Allen

No, you don't have to name the spider living near your backdoor "Gertrude," but is easier to appreciate and learn about invertebrates when you know what they are.

A good field guide is helpful, but if you can snap a photo, you can send an ID Request to Iowa State University's BugGuide or simply scroll through the photos collected in this database to find a likely match.

Identified at BugGuide.net

Toxomerus marginatus, a hoverfly.

With any luck at all, your yard will have too many insects to identify them all. But if you're like me, certain ones will catch your attention and you'll want to learn more about them. BugGuide has been invaluable in my quest to name those insects that I find especially interesting.

Once you can "put a name to a face" you're more likely to notice them in subsequent years, and they'll appear again as old friends, quite often on the same group of plants.

Find its name at BugGuide.net
~ Iowa State University

You can explore photos and other content, but if you want to submit an ID request, you must register. This is a simple process, requiring just a username and email address. You generally can get a response within a few hours! An amazing volunteer effort.

OPTIONAL resource:
https://bugguide.net

A planet
without insects
is a planet
without people

Snap! Crackle! Pop! Electric Bug Zappers are Useless for Controlling Mosquitoes ~ Science Daily

Bug zappers kill lots of insects, but ironically, they're too often the beneficial insects. They aren't effective against mosquitoes, which is usually the "target insect" people buy them for.

OPTIONAL:
https://www.sciencedaily.com/releases/1997/07/970730060806.htm

The sounds of bugs getting "zapped" is quite unpleasant for neighbors, too!

Fireflies

How can I make my yard more firefly-friendly by Sara Lewis / Silent Sparks

Find out how to create an inviting habitat and how to bring back the night. You already know the third important way: Reduce pesticide use!

OPTIONAL:
https://silentsparks.com/2016/07/10/how-can-i-make-my-yard-more-firefly-friendly/#more-1515

The loves and lives of fireflies by Sara Lewis / TED talk

OPTIONAL 14-minute video:
https://www.ted.com/talks/sara_lewis_the_loves_and_lies_of_fireflies

---

Firefly Watch ~ Mass Audubon and Tufts Univ.

Anyone can participate in this citizen science project:
https://www.massaudubon.org/get-involved/citizen-science/firefly-watch

Dragonflies and damselflies

Most people are familiar with dragonflies and damselflies only through the myth that they were told as kids: that they will sew your mouth shut.

Hopefully most adults realize this was told to kids in jest (though not a very funny joke). But they still may know little more about these very beneficial insects than they did as children.

Meadowhawk dragonflies mating

Backyard Ponds: Guidelines for creating and managing habitat for dragonflies and damselflies by Celeste Mazzacano / The Xerces Society

f you're especially interested in providing habitat for the many species of beautiful, beneficial dragonflies and damselflies, this 20-page booklet will tell you everything you need to know. It's beautifully illustrated and comprehensive.

OPTIONAL:
You can download this booklet as a PDF at:
https://www.xerces.org/publications/guidelines/backyard-ponds

The "exuvia" (what's left after the dragonfly has emerged) is often found on emergent vegetation in ponds

Saddlebags dragonfly

An ebony jewelwing is one of the many beautiful and beneficial dragonflies that can visit a backyard pond

Spiders (but not actually an insect!)

Spiders aren't a symbol of Halloween for nothing! Many people are afraid (or even terrified) of spiders. But most spiders and related creatures people see in their yards in most parts of the country are not only harmless, but beneficial.

One myth is that spiders are insects. They aren't! They're arachnids and have eight legs. (Insects have six legs.)

This orb weaver spider, like most spiders, is timid and harmless. It rebuilds its web each night and is fascinating to watch as it waits for prey.

The most misunderstood spiders
~ BugGuide.net / Iowa State University

OPTIONAL:
https://bugguide.net/node/view/240451

And their webs are a habitat resource

Hummingbirds will thank you for leaving spider webs in your yard. These webs are an important nest building material — a strong yet flexible fiber.

One of the many types of spider webs you can find in your yard

A funnel weaver spider sitting in its funnel

Other interesting insects

There's a lot to see when you look!

This is NOT a spider! This harvestman, sometimes called daddy long legs, is not only harmless, but is a beneficial predator and scavenger. They're also interesting to watch.

Just hatched

Later stage larva

Adult form (an Asian)

Insects look different at different stages. Here are three life stages of a lady bug (technically known as a lady beetle).

Oblong-winged katydid

Cicada

Start looking around your yard and you'll see lots of insects.

Section 6

Amphibians and reptiles

What's the difference between amphibians and reptiles?

Amphibians are salamanders, toads, and frogs. Amphibians normally hatch from eggs laid in or near water and began life as aquatic larvae with gills. During adulthood, amphibians live mostly on land, often returning to the water to breed and hibernate.

Reptiles are snakes, turtles, and lizards.

Attracting amphibians ~ National Wildlife Federation

Here's a brief overview of some amphibian habitat basics.

Please read:

https://www.nwf.org/Garden-For-Wildlife/Wildlife/Attracting-Amphibians.aspx

Frogs and toads: What's the difference?

A toad is actually a type of frog. In other words, all toads are frogs, but not all frogs are toads.

Toads are generally brown and have wart-like skin and short legs. Except during spring breeding season, they're usually seen on land. Many frogs seen in yards are green, have smoother skin and longer legs, and stay around water.

Once you become accustomed to them, toads and other frogs have a certain charm, and they undeniably are beneficial in your yard, eating many insects, slugs, and the like that would otherwise be eating your plants.

Helping amphibians and reptiles ~ Northeast Partners in Amphibian and Reptile Conservation

A nice summary for the Northeast.

OPTIONAL:
www.northeastparc.org/products/pdfs/NEPARC_backyard.pdf

A green frog living in a backyard wildlife pond

Reptiles and amphibians in your backyard ~ North Carolina State University

Much of the information is general enough for areas outside the Southeast.

OPTIONAL:
https://content.ces.ncsu.edu/reptiles-and-amphibians-in-your-backyard

---

Inviting reptiles to your backyard ~ North Carolina Wildlife Resources Commission

A nice 2-page summary of ways you can help

OPTIONAL:
https://www.ncwildlife.org/Portals/0/Conserving/documents/InvitingReptilestoYourBackyard.pdf (a PDF download)

Turtles

If you're lucky enough to have turtles in or near your yard — or even in your community — here's some useful information

Turtle in my yard
~ Turtle Rescue League

OPTIONAL:

http://www.turtlerescueleague.com

Then choose the "Turtle in my yard" section.

Box turtles in the garden
by Janet Marinelli / Brooklyn Botanic Garden

OPTIONAL:

https://www.bbg.org/gardening/article/box_turtles

---

8 tips to protect baby turtles in your yard
by David Mizejewski / National Wildlife Federation

OPTIONAL:

https://blog.nwf.org/2014/07/8-tips-to-protect-baby-turtles-in-your-yard/

Snakes

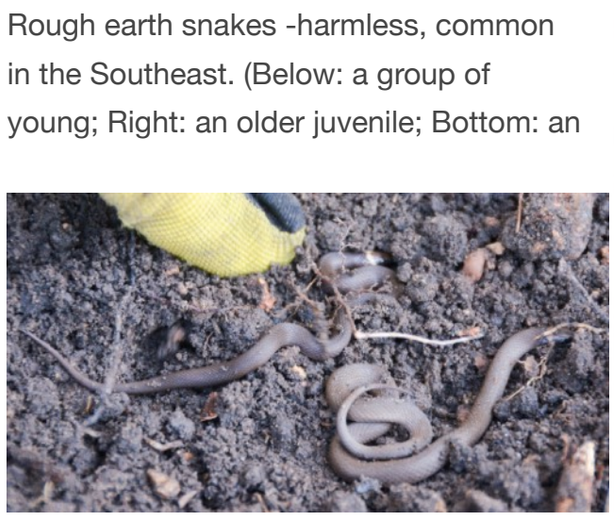
Snakes are probably the most feared and despised of creatures you might see in your yard. But is this reaction always justified?

Eliminating snakes in your yard
by David Mizejewski / National Wildlife Federation

OPTIONAL:

https://blog.nwf.org/2014/07/eliminating-snakes-in-your-yard/

Rough earth snakes -harmless, common in the Southeast. (Below: a group of young; Right: an older juvenile; Bottom: an



Section 7

Mammals

Mammals in the home landscape are sometimes thought of in terms of the damage they can do.

Mammals become a problem when we have lawn-dominated landscapes that must not show any tunneling, and especially when we've removed predators so populations are out of balance with the land that is available to support them.

Yes, mammals can be destructive. Just think of what we human mammals have done! We've filled our landscapes with plants that have no relationships with other plants and animals; our land now serving as mere decoration rather than supporting life.

We've covered large areas of soil with asphalt, clearcut forests, polluted air and water, turned living soil into dirt, and disrupted even the climate itself.

Attracting small mammals ~ National Wildlife Federation

Please read this article:

https://www.nwf.org/Garden-For-Wildlife/Wildlife/Attracting-Small-Mammals.aspx

Chipmunks

What to do about chipmunks ~ The Humane Society of the U.S.

Common conflicts and solutions.

OPTIONAL:
https://www.humanesociety.org/resources/what-do-about-chipmunks

About Eastern chipmunks by Andrew Saunders / SUNY College of Environmental Science and Forestry

Interesting observations about chipmunk behavior and lifestyle in the wild.

OPTIONAL:
https://www.esf.edu/aec/adks/mammals/chipmunk.htm

Chipmunks store food for the winter by Mike O'Connor

Relocating chipmunks is a bad idea.

OPTIONAL:
http://www.birdwatchersgeneralstore.com/ChippyCheeks.htm

Carrying nesting materials

Bats

Yes, they're mammals: they have fur, are warm-blooded, and nurse their young with milk. The only mammals that can fly!

Bat Conservation International

BCI is the foremost bat conservation organization. Check out the main menu item called "Why Bats?" to learn why they're important, threatened, misunderstood, everywhere, and ...cool!

OPTIONAL - Here are their directions for bat houses:
https://www.batcon.org/about-bats/bat-houses/

Pennsylvania landowners helping Indiana bat through 'spooky' declines ~ USDA

By providing quality habitat, landowners can help bats survive.

OPTIONAL:
https://www.usda.gov/media/blog/2016/10/26/pennsylvania-landowners-helping-indiana-bat-through-spooky-declines

---

A homeowner's guide to Northeastern bats and bat problems ~ Penn State Extension Service

OPTIONAL:
https://extension.psu.edu/a-homeowners-guide-to-northeastern-bats-and-bat-problems

A pole-mounted bat house. Mounted height, color (which depends on area of the country) and other factors are important. Do your research first!

Opossums

What to do about opossums ~ The Humane Society of the U.S.

A gentle wild neighbor, the opossum is our only marsupial and is rarely guilty of more than “playing ‘possum’.”

OPTIONAL:
https://www.humanesociety.org/resources/what-do-about-opossums

---

Opossums – Killer of ticks by Robert Miller / Cary Institute

OPTIONAL:
https://www.caryinstitute.org/news-insights/media-coverage/opossums-killers-ticks

Good to have around!

Opossums slow the spread of Lyme disease by killing lots of ticks AND they almost never get rabies.

Moles, voles, and shrews

It’s hard to find information about moles other than how to kill them or otherwise remove them from yards. Why? Because they make holes in lawns or (GASP!) even eat our (non-native) tulip bulbs!

BUT is this a problem with moles OR a problem of having too much lawn? (If tulips are necessary, the bulbs can be planted in underground cages.) Holes that occur in naturally landscaped beds of trees, shrubs, and herbaceous plants are hardly noticed.

Ethically “caring for our own piece of the earth” could include increasing our tolerance for these creatures so here are some more positive perspectives to consider.

Mouse, Mole or Vole? Learning Your Adirondack Small Mammals by Ellen Rathbone / Adirondack Almanack

Mice and voles are rodents; moles and shrews aren’t.

OPTIONAL:
https://www.adirondackalmanack.com/2009/10/mouse-mole-or-vole-learning-your-adirondack-small-mammals.html

Moles and voles: the hidden life of small mammals by Anne Murray / The Leader, BC Canada

This article reminds us that these small creatures are essential food for birds of prey.

An abundance of voles make BC's Fraser delta the best location in Canada for numbers and diversity of wintering birds of prey.

OPTIONAL:
https://www.surreynowleader.com/community/moles-and-voles-the-hidden-life-of-small-mammals/

Northern short-tailed shrew ~ BioKids

OPTIONAL:
http://www.biokids.umich.edu/critters/Blarina_brevicauda/

Don't be beastly to moles! They're magical creatures and mole hills are GOOD for your garden, says an expert who's studied them for 30 years by Dr. Rob Atkinson / Daily Mail UK

They contribute to the health of the soil, turning it, draining it and mixing it.

OPTIONAL:
https://www.dailymail.co.uk/news/article-3492468/Moles-good-garden-says-expert-s-studied-30-years.html

---

Much ado about moles by Helga Olkowski / Kitchen Gardener Magazine

Moles are much maligned, delicate creatures that improve the soil, eat many pest insects, and get blamed for damage they do not cause.

OPTIONAL:
https://www.finegardening.com/article/much-ado-about-moles

Woodchucks (aka groundhogs)

Woodchucks can be a challenge for a home landscape – especially for an edible garden.

One solution for the edible garden is a fence that:

- Extends into the ground and angles out to prevent digging under the fence;
- Has a floppy top to prevent climbing over the fence.

Note that woodchucks don't eat every kind of vegetable. It's necessary only to protect their favorites.

What to do about groundhogs
~ The Humane Society of the U.S.

OPTIONAL:

https://www.humanesociety.org/resources/what-do-about-woodchucks

Here's a description of how such a fence was built. It successfully kept woodchucks out of the garden:
http://ourediblegarden.org/gardening/solution.html

Deer

Undeniably cute, but the overpopulation of deer is not only bad for our landscapes and natural areas, but for the deer themselves.

One of the biggest barriers to homeowners who want to add native plants to their landscapes is deer and the damage they cause.

Some possible deer solutions

Physical exclusion is effective, but deer can jump over most short fences or go underneath fences that have gaps at ground level. Furthermore, many kinds of deer fencing are expensive and/or unsightly in a home landscape.

One way of excluding deer is by having a thick row of shrubs around the perimeter of the yard, supplemented by short lengths of deer fencing to fill any gaps between the shrubs.

People have also been experimenting with creating three-dimensional fencing that is provides a less-noticeable barrier and may be as effective as higher fences.

The deer netting extension to this four-foot fence is visible only because of the snow, but the deer know it's there

Sampling some tomatoes in a suburban home garden

Fencing to exclude deer
~ No. Carolina Wildlife Resources Commission

OPTIONAL:

https://www.ncwildlife.org/Learning/Species/Mammals/Whitetail-Deer/Fencing-to-Exclude-Deer

---

An almost invisible deer fence
~ American Rose Society

OPTIONAL:

https://www.rose.org/single-post/2018/03/20/An-Almost-Invisible-Deer-Fence

---

Low-cost deer fence alternative
~ University of Maryland Extension

OPTIONAL 1-min. video:

https://www.youtube.com/watch?v=TmIGg786gOk

Decades ago, courtesy of native predators, deer were in balance with nature's resources. This was healthy for the environment, healthy for the predators, and healthy for the deer themselves. With the elimination of predators, the population is no longer in balance — bad for the environment, bad for deer and obviously devastating for the predators that belong here.

Deer management solutions: It takes a village. Literally. by Meredith Cornett / The Nature Conservancy

Community-based deer management strategies with examples from various communities. Long-range solutions require more than community efforts, though, since state agencies often manage for deer abundance to benefit recreational hunters.

If you're in an area that has a deer problem, please read:
https://blog.nature.org/science/2015/08/05/deer-management-solutions-it-takes-a-village-literally/

A traffic hazard for people and deer

Deer advisor: Help for communities grappling with abundant deer populations
By Cate Harrington / The Nature Conservancy

OPTIONAL:
https://blog.nature.org/science/2016/11/30/deer-advisor-help-community-grappling-abundant-deer-populations-management-advice/

Hungry for change: Deer management and food security
By Meredith Cornett / The Nature Conservancy

OPTIONAL:
https://blog.nature.org/science/2015/11/04/hungry-change-deer-management-food-security-hungry-venison/

More than a home landscaping problem

As we search for effective techniques to keep deer out of our yards and neighborhoods, **remember that this is only part of the problem.**

As Aldo Leopold warned many decades ago, the deer population is out of balance and is beyond the carrying capacity of the land. It's affecting the health of entire ecosystems and the other creatures that inhabit them. It's a complicated problem with different interest groups proposing contradictory solutions.

I now suspect that just as
a deer herd lives in mortal fear
of its wolves, so does
a mountain live in
mortal fear of its deer.

~ Aldo Leopold,
Sand County Almanac, 1949

Too many deer: A bigger threat to eastern forests than climate change?
by Allen Pursell, Troy Weldy, Mark White / The Nature Conservancy

Deer have caused both direct and indirect effects and may have a lasting impact even if overpopulation is solved.

OPTIONAL:
https://blog.nature.org/science/2013/08/22/too-many-deer/

Overgrazing is changing the face of U.S. forests ~ EarthSky

Deer's natural predators, wolves, have been exterminated. Today, there are four to 10 times more deer in the U.S. than prior to European settlement 300 years ago.

This article describes studies done by Cornell in New York and in Pittsburgh by Univ. of Pittsburgh that show that declines in plant diversity, and increase in exotic invasive plants are happening because deer prefer consuming native plants, thereby allowing exotic invasive plants to proliferate.

OPTIONAL:
https://earthsky.org/earth/overgrazing-by-deer-is-changing-the-face-of-u-s-forests

The simple-minded nature of human super predators
by David Suzuki / David Suzuki Foundation

Thought-provoking insights into the differences between humans as predators and other animals as predators. Recommended!

OPTIONAL:
https://davidsuzuki.org/story/the-simple-minded-nature-of-human-super-predators/

A natural cure for lyme disease
by Moises Velasquez-Manoff / New York Times

If, as many wildlife biologists suspect, the rise in Lyme disease has been partly caused by unbalanced ecosystems, the cure could be restoring healthy ecosystems — in other words, restoring the predators that belong there. But will people allow it?

OPTIONAL:
https://www.nytimes.com/2016/08/21/opinion/sunday/a-natural-cure-for-lyme-disease.html

Notes from the deer wars: Science & values in the Eastern forest
by Matt Miller / The Nature Conservancy

This article addresses a critical issue with respect to managing the deer population: competing human passions, values and traditions.

OPTIONAL:
https://blog.nature.org/science/2014/07/22/deer-wars-pennsylvania-forest-management-hunting/

Introduced species summary project
~ Columbia University

A list of one page summaries. It includes both plants and animals.

OPTIONAL:
http://www.columbia.edu/itc/cerc/danoff-burg/invasion_bio/inv_spp_summ/invbio_plan_report_home.html

Humans

Humans are the largest mammal found in most home landscapes.

Humans need the same habitat elements as other mammals: food, water, cover, and a safe place to raise their young.

Food

Some of the healthiest food can be grown right in the home landscape. It can be truly organic (i.e. grown in rich, healthy soil, not merely grown without pesticides), truly local, and can be consumed very soon after harvest before nutrients are lost.

Home landscapes can also be sanctuaries for native pollinators, essential in producing food for humans.

Water

Water quality: We can protect private wells and public water supplies by not using chemical fertilizers or pesticides.

Water quantity: We can choose appropriate native landscape plants that don't require additional watering.

Cover

In 1950, the average home size was 983 square feet. Today — even as family size has shrunk — the average house size is nearly 2500 square feet. Do we need all that additional space, requiring extra land, energy, and building materials?

A safe place to raise young

We know pesticides aren't safe for wildlife. Are they safe for human children? Have they been adequately tested? Have the total accumulations been considered? And have the *interactions* among all these chemicals been tested?

Are we teaching our young about healthy ecosystems and nature? Are we giving them the advantages of connecting with the natural world for their minds, bodies, and souls?

Are we creating a healthy future for our young?

Do we help children develop healthy microbiomes by letting them play in the soil? Do we provide them with healthy pesticide-free food, grown in healthy soil?

Do we encourage children to become familiar with and enjoy being in nature? Research shows this is very important for human's emotional as well as physical well-being in childhood and throughout our lifespan.

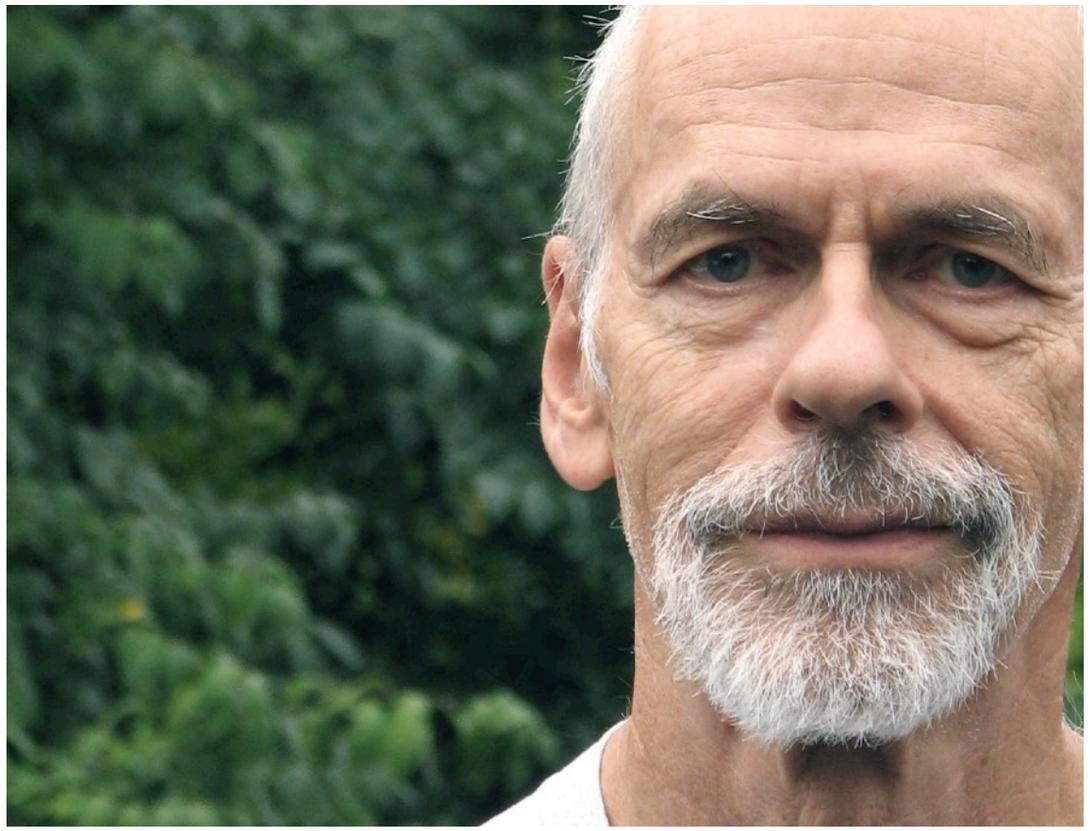
Exploring the real world is important

Conservation issues for humans

Perhaps the most important conservation issue for the human's continued well-being is preserving and recreating healthy ecosystems in our home landscapes and in the world beyond.

REMEMBER:

Creating an earth-friendly landscape isn't just to benefit wildlife or to allow us to enjoy watching wildlife in our yards. Healthy landscapes support the healthy ecosystems ***essential*** *for humans.* ***We*** *can't survive without* ***them****.*



It's up to us to make sure we maintain a healthy planet for humans!

Extinction can happen at breathtaking speed

Early-mid 19th century: 5+ BILLION passenger pigeons

1866: A flock of 3.7 BILLION pigeons passed through Ontario.

1871: Nearly the entire population nested in a single Wisconsin colony.

1878: About 10 million slaughtered near Petoskey, Mich, that year. It was the last of the huge nesting colonies.

1889: Perhaps 5,000 survived. All large colonies had been destroyed, but hunting for sale at market continued.

1895: 500–1,000; flocks of 10 were noteworthy.

1900: 1 specimen collected, last wild passenger pigeon shot.

1914: Martha, 29 yrs. old, was the last to die; never lived in the wild.

From Saving Our Birds
https://www.nytimes.com/2014/08/31/opinion/sunday/saving-our-birds.html

How many more species can disappear before the ecosystems HUMANS depend on are compromised?

*Martha, the **LAST** passenger pigeon*
By James St. John (Ectopistes migratorius (passenger pigeon) 5) [CC BY 2.0 (http://creativecommons.org/licenses/by/2.0)], via Wikimedia Commons

Humans are still around though the passenger pigeon is gone. But up to 200 plant and animal species become extinct **each day**.