ECOLOGY & BEAUTY

DIY Strategies for Creating a Landscape Full of Life

Introduction

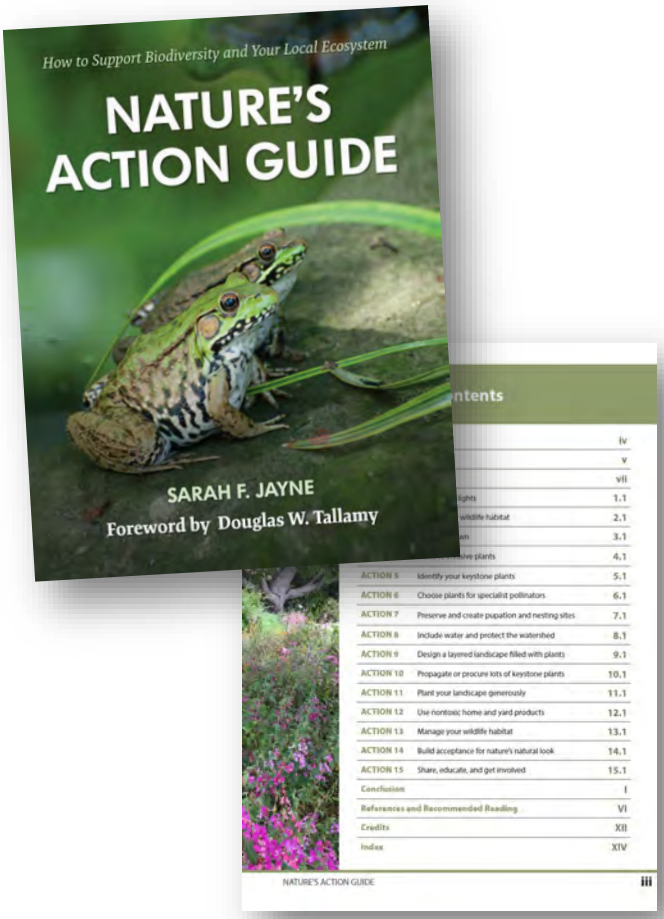
Now more than ever our yards and community spaces need to support biodiversity. How can we ensure that our spaces are both ecologically rich and beautiful? We'll look at which plants matter most when it comes to your local biodiversity; how to procure them for generous plantings; and how to place them to increase their appeal to wildlife and people, along with strategies to protect the wildlife our natural plantings attract. We'll consider strategies to ensure that our landscapes gain community acceptance such that they become invitations for others to transform their landscapes. A cost-conscious, DIY approach makes taking action doable.

Sarah F. Jayne

In this handout:

- Wildlife Habitat Design o' Meter
- 15 actions need to support biodiversity and your local ecosystem
- Grid for marking the OUTSIDE of windows to prevent fatal bird collisions *[Printable]*
- Template for cutting out leaf decals to mark the OUTSIDE of windows *[Printable]*
- Bird-friendly lighting diagram
- Top four genera for native pollen specialist bees in the Western U.S.
- Four essential ecological functions
- Procuring plants on a tight budget
- A plug for growing your own plugs!
- How to make your own DIY propagation supplies
- How to make your own DIY permanent plant labels
- Thriller-filler-spiller approach to design
- Wildlife Habitat printable yard sign
- Crossword Puzzle: Supporting Biodiversity (just for fun!) *[Printable]*
- Resources referenced or mentioned in this talk

15 actions need to support biodiversity and your local ecosystem



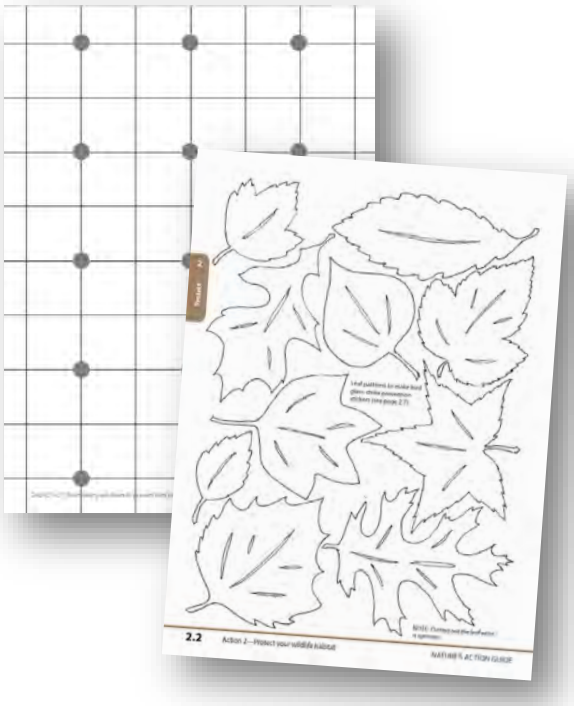
ACTION 1	Turn off the lights
ACTION 2	Protect your wildlife habitat
ACTION 3	Shrink the lawn
ACTION 4	Remove invasive plants
ACTION 5	Identify your keystone plants
ACTION 6	Choose plants for specialist pollinators
ACTION 7	Preserve and create pupation and nesting sites
ACTION 8	Include water and protect the watershed
ACTION 9	Design a layered landscape filled with plants
ACTION 10	Propagate or procure lots of keystone plants
ACTION 11	Plant your landscape generously
ACTION 12	Use nontoxic home and yard products
ACTION 13	Manage your wildlife habitat
ACTION 14	Build acceptance for nature's natural look
ACTION 15	Share, educate, and get involved

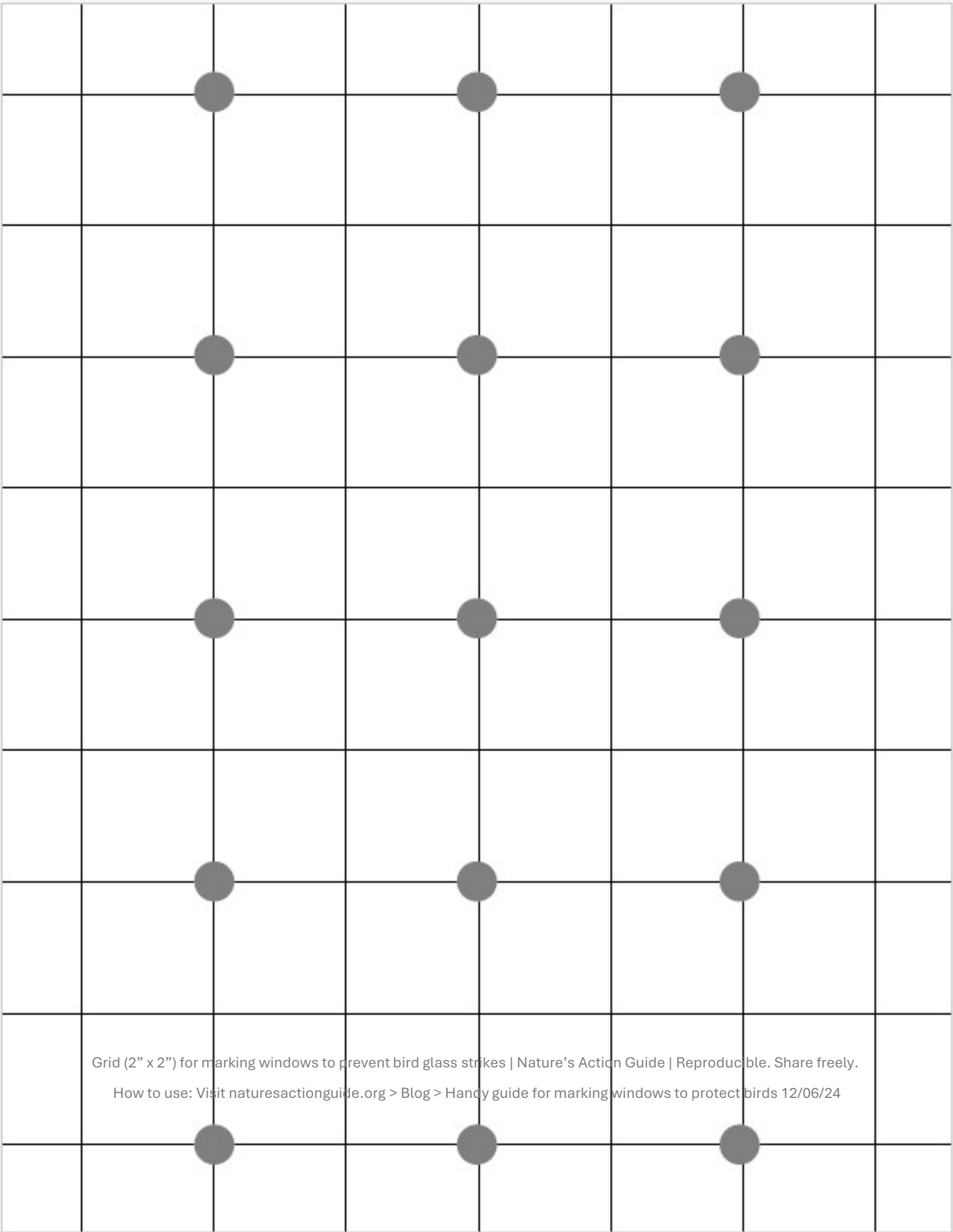
Grid for marking windows to prevent bird strikes

Tragically, new research estimates that the number of birds killed by glass strikes in the U.S. has been moved upward from 1 billion birds annually to 1.28 billion to 3.46 billion and possibly as high as 5.19 billion birds annually in the U.S.! (Klem, Saenger Brogle, 2024). Let's screen or mark all of our home and community windows as soon as possible!

Screening or marking the outside of windows is one of the easiest and most impactful actions we can take to protect wildlife. (See *Nature's Action Guide*, pages 2.2 and 2.6.) Painting dots on windows in a 2-inch grid is perhaps the quickest method for accomplishing this. Nothing fancy is needed, simply a small paint brush and some light-colored acrylic paint left over from a home project. Print and tape this handy grid (shown at right) to the INSIDE of a windowpane, and paint dots on the OUTSIDE. Move the grid to the next pane.

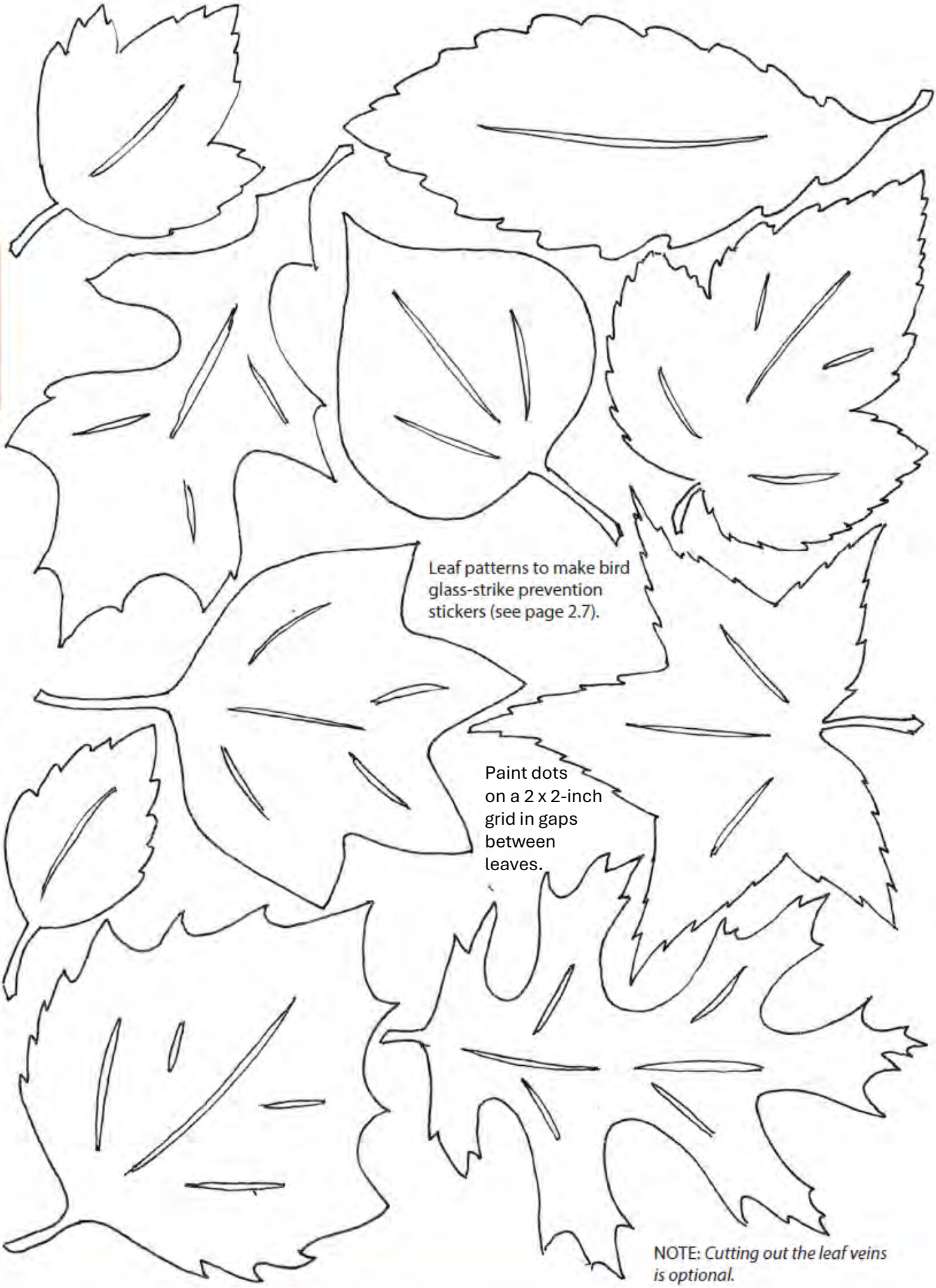
A printable grid and leaf decal pattern sheet follow; they print as 8.5 x 11-inch templates. Make multiple copies of the grid and tape them together to reduce the number of trips inside to move the grid.





Grid (2” x 2”) for marking windows to prevent bird glass strikes | Nature’s Action Guide | Reproducible. Share freely.

How to use: Visit naturesactionguide.org > Blog > Handy guide for marking windows to protect birds 12/06/24

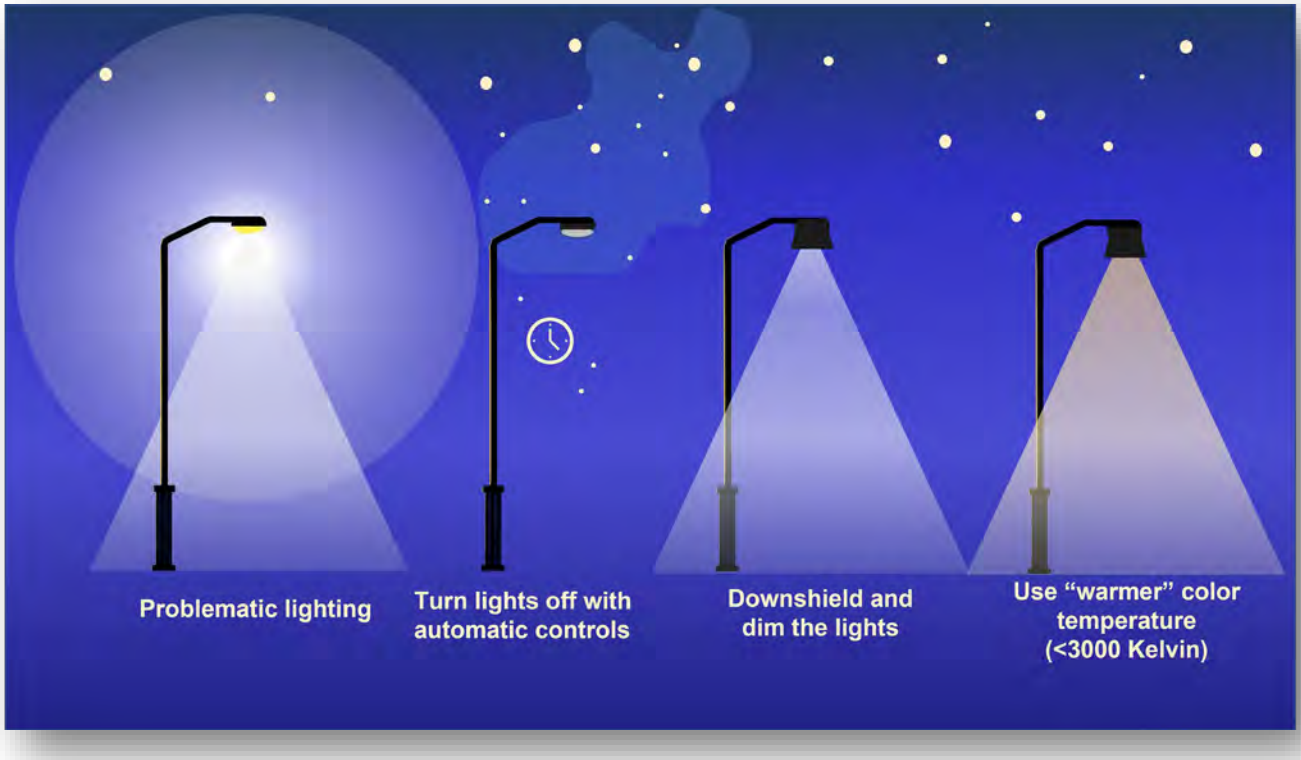


Leaf patterns to make bird glass-strike prevention stickers (see page 2.7).

Paint dots on a 2 x 2-inch grid in gaps between leaves.

NOTE: *Cutting out the leaf veins is optional.*

Wildlife-friendly lighting:



SOURCE: USFWS/USFWS, https://www.fws.gov/media/bird-conscious-light-diagram, Public domain

Top 4 genera for native pollen specialist bees in the Central U.S.

9 Protect your wildlife habitat from deer and other creatures *(if present)*

Deer may be a welcome sight in your landscape, but as many gardeners have experienced, deer can devour an entire planting in one night. In regions where their populations are exploding, deer pose one of the most serious risks to biodiversity. Their browsing removes keystone trees, shrubs, and other plants that wildlife and insects depend upon for survival. Exclosures, which we'll look at in a moment, are the most effective way to protect your wildlife habitat from deer and other critters. Exclosures can require a significant upfront investment of time and money; but where deer pressure is heavy, they are liberating for the wildlife gardener. Unfortunately, not all neighborhoods look kindly upon exclosures. If that's the case in your neighborhood, consider a combination of the following strategies:

Deer repellent strategies that offer variable protection:

Plant deer resistant plants. If deer pressure is heavy, few plants are completely safe. A plant that goes untouched in one landscape, may be devoured by deer in another. Search online for **deer resistant native plants [ZIP Code™]**. Make it a priority to grow as many deer resistant ***keystone*** plants as possible (see ***Action 5: Identify your keystone plants***).

Install a motion-activated sprinkler. Setting it to spray only at night spares the delivery person an unexpected shower. The ***Orbit 62100 Yard Enforcer® Motion-Activated Sprinkler*** (*right*) is an example of this effective deer deterrent that is second only to exclosures in the protection it offers. Bringing it in for winter, if needed, and changing its batteries are the only tasks required to care for this ***Orbit™*** model.

Mix two or more of these ingredients in 1 gallon of water:
4 Tbsp cayenne pepper
3 Tbsp garlic powder
1 egg
1/4 tsp peppermint oil (or more)
Strain. Spray weekly.

Spray deer's favorite plants with homemade (*above*) **or commercial deer repellents.** An online search for **deer repellents** yields a variety of brands, such as the environmentally friendly ***Deer Out®*** or ***Deer Scram™***. Read product labels carefully to verify that all the ingredients are nontoxic.

Deer repellent strategies to avoid:

Don't hang scented fabric softener dryer sheets. Most brands of dryer sheets contain extremely toxic chemicals (see page 12.11). I hung dryer sheets in small evergreen trees, and later, wherever they had been, there were 1-foot spheres of dead branches that never recovered.

Don't hang bars of fragrant soaps randomly around the garden. As with dryer sheets, soap bars (especially the fragrant ones recommended to repel deer) may contain toxic chemicals that will contaminate the soil and watershed.

Don't erect a single fence under 8 feet in height. Unfortunately, a single short fence takes considerable time to erect. Although it may deter deer momentarily, one night they'll inevitably hop over the fence and enjoy a lovely feast—at your expense!

Protect your wildlife habitat from deer and other creatures, *continued*

In contrast to fenced enclosures designed to keep animals in, **exclosures** are intended to keep animals out. The type of animal you are trying to keep out will determine the height of the exclosure as well as the most suitable materials for construction. Here, we provide directions for building exclosures to prevent deer browsing with an option for including a lower fence dug into the ground to exclude rabbits and other medium-sized creatures. Unfortunately, a lower fence poses the ecological concern of preventing turtles from freely roaming to and from your wildlife habitat.

So innocent and oh so cute!

How to erect simple exclosures to protect individual shrubs or trees

Enclose a newly planted or prized shrub or tree with a circle of garden fencing. Cut a length of garden fencing (2 x 3-inch mesh welded wire) long enough to encircle the plant. The height of the fencing should be sufficient to stand at least 18 inches above the plant's height. Drive in two stakes to hold up the fencing. If the exclosure is in the front yard, consider using decorative stakes. This approach can be used to protect smaller plants from rabbit browsing but use chicken wire and bamboo stakes instead.

Make an invisible fence using nylon fishing line. Fishing line (30-lb) can be used to erect a fence or add height above a short fence. Tie fishing line to posts 15 to 20 feet apart. A **Seed Savers Exchange** (*seedsaver.org*) blogpost gives clear directions. Search online for **how to build a deer fence with fishing line fence seed savers exchange**. Following the same procedure, fishing line can be used to extend the height of an existing fence. This method often works surprisingly well and is visually less bothersome to neighbors than wire fences.

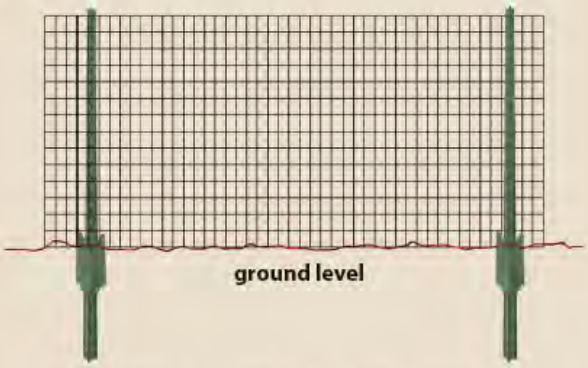
What is the deer population in your state? For a state-by-state analysis of deer species and their estimated populations, check out a blogpost from **Wildlife Informer** (***wildlifeinformer.com***) or search online for **wildlife informer deer populations by state.** This article considers the populations of black-tailed deer, mule deer, and white-tailed deer. As stated in the blogpost, these are population estimates only. Refer to the sources linked in the post for additional information.

Protect your wildlife habitat from deer and other creatures, *continued*

How to erect double exclosures to protect large areas

Where deer pressure is heavy, fencing must be at least 8 feet high to keep deer out. The materials for such a tall fence are expensive, harder to come by, and the installation is difficult for the average DIYer. An easier alternative is to construct a 5-foot-high fence and add a second fence or obstacle. If you want to exclude rabbits and other small mammals from the area, run chicken wire along the base of the fence dug in at least 6 inches below ground level.

Primary fence: 5-foot-high fence that requires a secondary fence to exclude deer

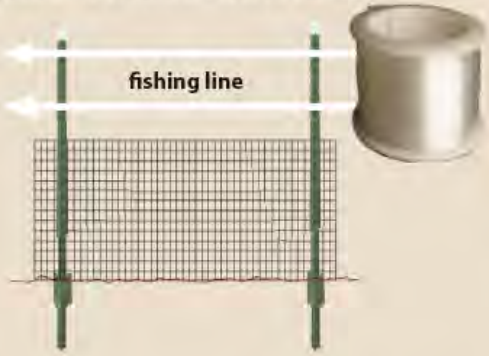


- One 50-foot roll of 5-foot-high, 2 x 3-inch mesh welded wire for each 50 feet of fence length. Green or black fencing readily blends into the landscape.
- One 8-foot metal stake for each 10 feet of fence length
- Single strand wire to tie the wire to the stakes
- Dual-handled steel fence post driver OR sledgehammer to pound in the stakes

The post driver (*right*) makes short work of stake installation enabling a person of average (or even below average) strength to easily install the stakes single-handedly.

OPTIONAL: One 50-foot roll of 3-foot high, galvanized steel chicken wire with 1-inch hexagonal openings for each 50 feet of fence length. If pressure from rabbits or other animals is heavy, you might consider 4-foot-high chicken wire dug in 12 inches.

Secondary fence: Consider the following options (or a combination of these):



- Two strands of 30-lb fishing line directly above the primary fence 12 to 18 inches apart (*above*)

  NOTE: If 6-foot-high fencing is used for the primary fence, a single strand of fishing line 18 inches above the primary fence should be sufficient. Add another strand above if deer pressure is extreme.
- Single strand of visible wire strung about 4 feet above the ground and 5 feet inside the primary fence on 5-foot stakes spaced 20 feet apart. Deer typically do not jump into enclosed spaces. Severe deer pressure may require that the secondary fence be constructed of mesh wire. In this case, 4-foot-high mesh wire can be used.
- Wide (and/or high) brush pile built lengthwise along the inside of the primary fence line leaving only enough room to walk between the pile and the fence. The average horizontal jumping distance for deer is about 10 to 15 feet. The point here is to prevent deer from perceiving there to be a safe landing place if they jump over the primary fence. A brush pile on the external side of the fence needs to be wider.

NOTE: *Chicken wire in contact with moist soil tends to break down within about 3 years requiring monitoring and likely replacement.*

2 Propagate or procure lots of plants (even on a tight budget!)

Obviously, planting densely requires a lot of plants. First, we'll look at how two of the tips we just shared for helping bridge the transition from traditional to more eco-friendly landscapes are also helpful strategies for planting generously when on a tight budget. Then, we'll look at additional strategies for procuring plants on a tight budget so that it's easy to plant generously.

Keep introduced (non-native) plants in place as long as they're not invasive until you have the resources to replace them with native alternatives. If an introduced plant is not invasive, it's better left in place until it can be replaced with a native. Although native plants will do so much more, as you gather resources to transition your property to a wildlife habitat, a non-invasive introduced plant can provide shelter for wildlife, sequester carbon, and perhaps add appeal to your property for neighborhood acceptance.

Choose easy-to-grow native plants that cover the ground quickly. Buy a single plant of a native plant described as "vigorous" or "aggressive," and it will likely fill in an area and provide transplants to fill in other areas. Try out a variety of plants and soon you'll know which ones are your easy-to-grow "go to" plants to quickly and economically fill an area.

How to procure plants on a tight budget so that it's easy to plant generously

Here are additional tips for procuring an abundance of plants when you're on a tight budget (or even if you're not!).

10 Propagate

Learn how to grow plants from seeds and nuts and grow your own plugs! You'll save a tidy sum and have a wider selection of plants from which to choose.

Learn how to propagate plants from cuttings, division, and layering. Many native plants are quite easy to propagate with these methods!

Collect seeds, nuts, and cuttings instead of buying them whenever possible. As your plants become established, you'll be able to collect seeds, take cuttings, and make divisions.

Native seed and plant material collection etiquette

When you find opportunities to collect seeds and nuts OR take cuttings or other plant material on public or privately owned lands, keep native plant collection etiquette in mind:

- Be sure you have correctly identified the plant material you are collecting so that you never accidentally collect rare or endangered species!
- Ask permission of property owners before collecting any plant material.
- Only collect seeds, nuts, and other plant material in places where a species is growing abundantly.
- Limit harvest to a very small percentage of the existing plant population.

How to procure plants on a limited budget so that it's easy to plant generously, *continued*

Grow from seed the plants that are easy to grow from seed. This allows you to save your plant budget for hard-to-propagate plants. Most seed catalogs note easy-to-grow seeds, such as this spotted beebalm (*Monarda punctata*) that blooms in its first year.

Buy single "parent plants" of easy to propagate species. Choose parent plants that are easy to propagate by seed, division, or cuttings. For example, the native trumpet honeysuckle (*Lonicera sempervirens*) is a rampant grower that is quite easy to propagate by taking cuttings or layering.

Exchange native plants with friends and neighbors. A word of caution: Be sure that you can accurately identify all plants that you exchange to avoid giving or receiving invasive plants. Cup plant (*Silphium perfoliatum*), a pollinator magnet, is an aggressive native plant that happily volunteers all over the place. Despite its being native, this eagerness to grow has earned cup plant a place on noxious lists in New York and Connecticut.

Buy one species in bulk to broadly fill an area instead of many single plants of different species. Native species that are already doing well in your landscape are good choices for mass plantings. Consider purchasing 6-packs, 8-packs,12-packs, or flats (when available). These are much more economical than single pots. Plus, insects find what they need more easily when plants are grown in drifts or masses. Later, you can add plant diversity as time and resources permit.

Learn to identify the seedlings that volunteer from your native plantings so that you don't accidentally weed them out. When allowed space to do so, Mother Nature will help with propagation. These volunteers can be left to grow or moved to fill in other areas. When I grow plants from seed, I take a picture of the seedlings a couple of weeks after germination. This helps me train my eye to spot these welcome seedlings in the landscape.

Encourage native plants to volunteer. Allow plants to self-sow by not cutting off the flower heads of desirable plants so that they can go to seed. In spring, monitor the leaf litter or mulch below your plants to be sure it's loose enough so that seedlings can come up through it. As soon as you spot a native tree seedling, protect it from deer and other hazards (such as the lawn mower). These seedlings are nature's succession plan. Shown above is an oak volunteer likely planted by a squirrel or blue jay.

How to procure plants on a limited budget so that it's easy to plant generously, *continued*

Buy just one or two of a plant to test it out in your landscape before investing in more. Existing native species that are doing well make good choices for mass plantings. If your budget permits, consider buying several of one species and planting it in various locations to see where it will grow best (or if it will grow at all). Despite its reputation as being deer resistant, after much experimentation where I live, woodland phlox (*Phlox divaricata, above*) thrives only in areas protected from deer.

Cover large areas by planting with seeds purchased in bulk. Compare the seed packet prices with the price per ounce. For example, a nursery may offer a seed packet containing 500 seeds of little bluestem (*Schizachyrium scoparium*) and an ounce containing 15,000 seeds for only a dollar more. Buying seed in bulk gives you the opportunity to grow thousands of plants for the price of just one 3-inch potted plant!

LANDSCAPE LAYER	THEME: Keystone deer resistant, winter
THEME:	Keystone edible landscape east
Canopy tree	shagbark hickory (Carya ovata); ha (Celtis); Eastern black walnut (Jugl
Understory tree	pawpaw (Asimina triloba); Alleghe serviceberry (Amelanchier laevis)
Shrub	blueberry (Vaccinium); viburnum (Viburnum); elderberry (Sambucus American hazelnut (Corylus americ New Jersey tea (Ceanothus americ
Herbaceous: Vines:	blackberries (Rubus); fox grape (Vit labrusca); groundnut (Apios americ
Flowering perennial	wild bergamot (Monarda fistulosa) keystone pollinator plants
Tall accent	sunchoke (Helianthus tuberosa) Ha
Grass (clumps)	Native grasses

Limit your plant palette. If you're on a tight budget or if you have a large area to cover, consider focusing on a limited number of keystone species. Pick easy to propagate plants and propagate multiples or sow seed of your selected species. Then, repeat different combinations of the species throughout your landscape. For larger properties, propagate or sow seed in higher quantities of each species. This approach is explained below.

No need to purchase potting supplies

Although garden supply catalogs offer of an array useful propagation supplies, there is little need to buy them since modern life supplies us with plastic containers of every size and shape. These pages from *Nature's Action Guide* shows a few ways to repurpose household waste and save a little money for the native plant budget!

Grow your own plugs!

Growing your own plugs is worth learning how to do. It's as easy as baking a cake or painting a room—it simply requires a little bit of how-to guidance from books or online sources, supplies (most of which you likely already have), and seeds. Try it out!

How to make your own do-it-yourself propagation supplies

Propagation supplies need not be fancy. In fact, most of the necessary supplies can be found around the house or from a recycle bin. Seeds and fertilizer-free potting soil are the only expenses needed for a basic setup other than the one-time purchase of lighting (if you choose to propagate indoors and don't have bright light from a window). Here are some budget-friendly, do-it-yourself supplies for propagation:

Seed-starting cells: Recycled plastic containers of all shapes are useful. Egg cartons provide handy cells that make potting up easy. Punch holes in the bottom of each cell, fill with potting soil, and sow seeds.

Reuse cell packs, pots, and flats from purchased plants. To disinfect, soak containers for 30 minutes in a 1 : 1 vinegar to water solution. Rinse well.

Plant labels: Plastic containers and their lids (which often are not recyclable) can be cut into strips for plant labels. Print the name of the plant with a permanent marker. Lids can also be left whole and used to mark soil mixes.

Pots for transplanting seedlings into: Plastic containers such as 1-quart yogurt containers make nifty, adjustable pots. Mark and cut the container in half with sturdy scissors or clippers. Cut as shown below. Wrap the cut half into a cylinder and secure with a rubber band. I call these **R-pots** (R = repurposed). R-pots make deep and narrow plugs—a pot size that's not readily available for purchase.

R-pots are easy to mass produce.

NOTE: *Product containers vary in their suitability. Some plastics are brittle or difficult to cut, especially across the bottom. Experiment with containers from the recycle bin to find ones that cut relatively easily without splitting.*

Larger R-pots: The same system works well to make wider cylindrical pots ideal for shrub and tree seedlings. Mark as shown (*right*) and cut down only one side of the container. Cut one bottom circle. Secure with a rubber band.

Supports for R-pots: R-pots need to be placed in a container with drainage holes because the R-pot bottoms need support. Four small R-pots fit in a 1-quart yogurt container with 5 drainage holes cut in the bottom. Eight fit in the tubs that baby lettuce comes in; any similar container will work. To hold drainage water and keep things tidy, cut drainage holes in one tub and place it inside another tub. Save the lids of recycled tubs because the tubs can be inverted and set up as miniature greenhouses for seed starting.

How to make plant labels that last

Getting in the habit of labeling your plants at planting time will help you keep track of the plant species you plant. Plus, labels mark the location of plants to prevent their accidental removal when weeding. After experimentation with many types of labels, here's one that finally delivers in terms of legibility and longevity.

Gather supplies. Most of the supplies are common household items except for metal staples. Shown here is the 12-inch *Whonline*™ 11-gauge, heavy duty, garden staple (also called a stake). Staples with a square top work best.

Cut a sheet of aluminum from a recycled aluminum beverage can. Regular household scissors work fine for this. Wearing gloves is advisable.

Print the names of the plants. Put the aluminum sheet on a pad of paper. Use a cheap ballpoint pen and press hard to engrave the letters on the aluminum. Capital letters tend to be more legible than lower case letters. Leave a 1/2-inch margin blank (dotted red line) to allow for folding the label over the staple.

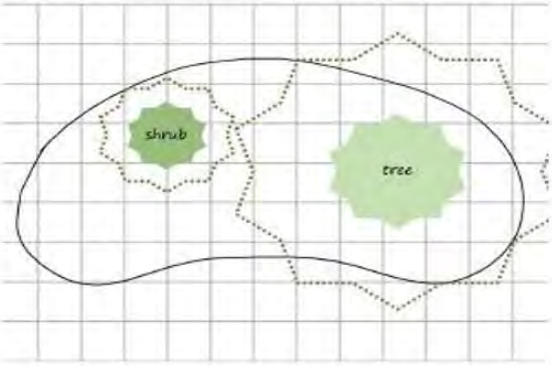
Cut out the labels and punch holes in them. It works best to cut out the individual labels ***after*** filling the aluminum sheet with different plant names. Fold the label over the staple. Use a large nail and hammer to punch two holes at the top of each label.

Round the lower edges of each label with scissors and wire the label to the garden staple. Cut a piece of wire about 3 inches long and secure the label to the staple.

Stick the tag in the ground next to the plant. To make it easier to locate plants when the landscape fills in, consider positioning labels in the same place for each plant, for example, to the left, in front, or to the right of the plant, as you prefer.

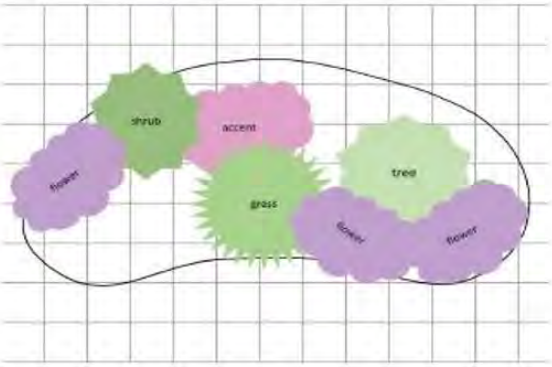
For the laminated tags (shown at left and on page 15.4), we used clear, 5 mil, UV laminating sheets to protect plant descriptions cut out of plant catalogs. Holes were-punched in all-plastic areas of the label, and the label was mounted on a 12-inch heavy-duty, 11-gauge, galvanized, square-top or U-shaped garden staple (described in Step 1 above). These informative labels can be used repeatedly for native plant events, but they are less useful as permanent markers in the landscape as they tend to fade somewhat after a season outdoors.

The ‘thriller-filler-spiller’ approach to design



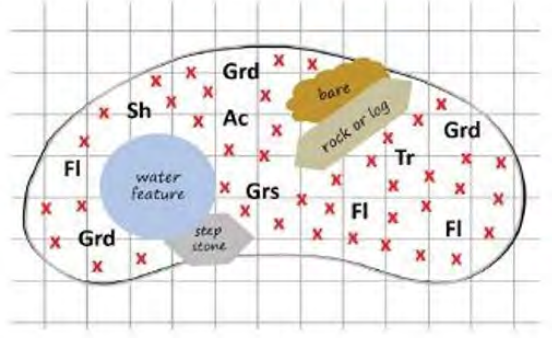
STEP 4: Mark the spots for keystone trees and shrubs.
If you are including a tree, place it first; then, place shrubs. Consider the mature circumference of trees (and shrubs). Allow sufficient area for the landscape bed to expand to accommodate caterp… …y mature tree. For the next sever… …e the tree will be small. The bed can be expanded to accommodate larger pupation sites as the tree expands its canopy and as you propagate or procure more plants to plant generously around the tree as it grows.

Place thrillers



STEP 5: Mark the spots for keystone herbaceous plants, pollinator plants, and native grasses. Place multiples of the same species to make the plants more attractive to insects (and people). Intermingle plants where two species meet (see p… …ch herbaceous plants to place… …ose plants that meet the current site conditions. As trees and shrubs mature and the site conditions change, shade-adapted plants can be planted. Place plants as densely as resources permit. This will help control invasives, protect the soil, and provide a richer wildlife habitat.

Place fillers



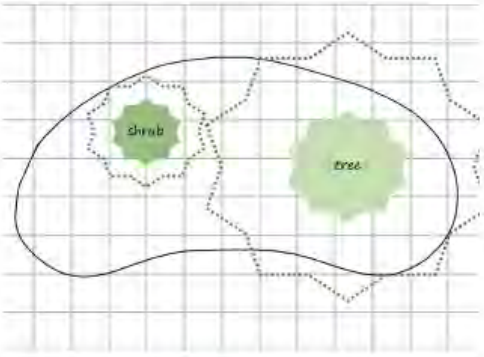
STEP 7: Mark the spots for low-growing ground layer plants.
Fill in gaps with low-growing plants (red x's). Place ***sun adapted,*** low… …reas. Under any existing large shrubs and trees, tuck in ***shade-tolerant*** plants, such as low-growing sedges (*Carex*), mosses, and native creeping plants, to establish a matrix of ground layer plants. Your landscape bed design is ready to go!

Place spillers

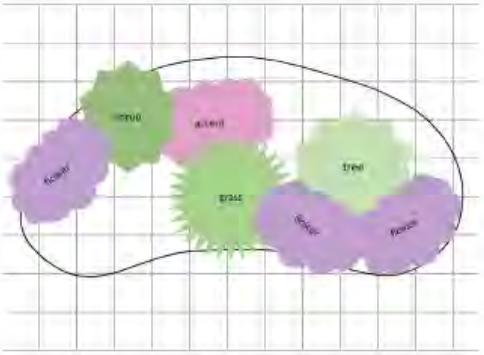
Sheets A, B, and C stacked (*right*)

Sketch your landscape bed design in seven steps, *continued*

PLAN SHEET B: (*middle*), *continued*

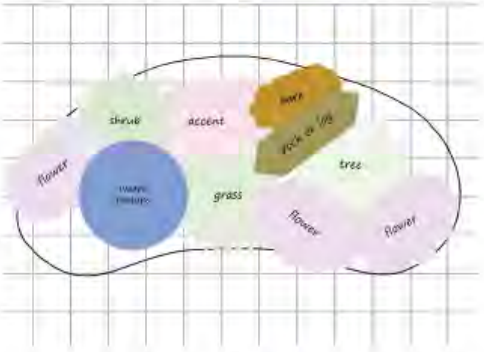


STEP 4: Mark the spots for keystone trees and shrubs. If you are including a tree, place it first; then, place shrubs. Consider the mature circumference of trees (and shrubs). Allow sufficient area for the landscape bed to expand to accommodate caterpillar pupation sites beneath a fully mature tree. For the next several years, the bed can be small since the tree will be small. The bed can be expanded to accommodate larger pupation sites as the tree expands its canopy and as you propagate or procure more plants to plant generously around the tree as it grows.



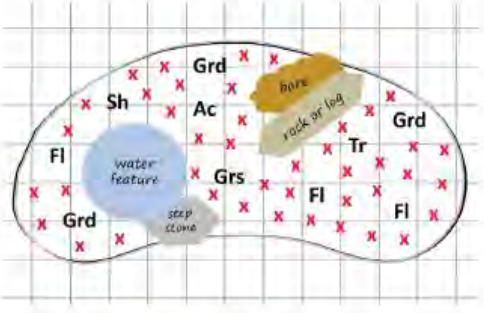
STEP 5: Mark the spots for keystone herbaceous plants, pollinator plants, and native grasses. Place multiples of the same species to make the plants more attractive to insects (and people). Intermingle plants where two species meet (see page 9.9). When deciding which herbaceous plants to place around trees and shrubs, choose plants that meet the current site conditions. As trees and shrubs mature and the site conditions change, shade-adapted plants can be planted. Place plants as densely as resources permit. This will help control invasives, protect the soil, and provide a richer wildlife habitat.

PLAN SHEET C: *(top)* Placement of logs, stones, water features, bare ground, and ground layer plants

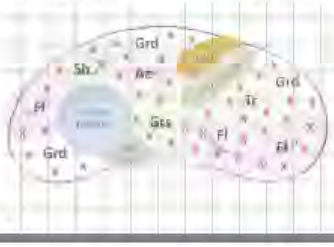


STEP 6: Mark the spots for several logs or large stones, additional water features, and bare ground for native bees. Logs and large stones will serve as pupation sites and hiding places for all kinds of small creatures. Determine the placement for additional water sources, such as elevated and ground-level birdbaths. Mark a spot which can be left bare for ground-nesting, native bees if this has not been adequately provided elsewhere on your property.

Sheet C shown with Sheet B underneath it (*left*)



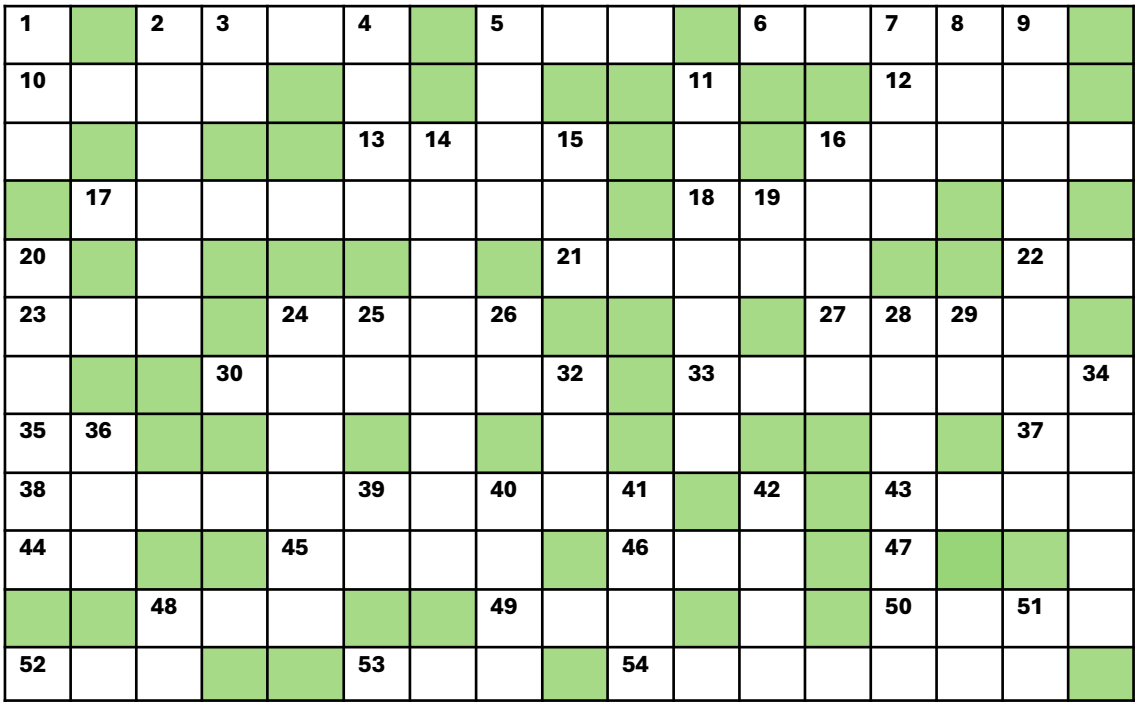
STEP 7: Mark the spots for low-growing ground layer plants. Fill in gaps with low-growing plants (red x's). Place ***sun adapted,*** low-growing plants in gaps or open areas. Under any existing large shrubs and trees, tuck in ***shade-tolerant*** plants, such as low-growing sedges (*Carex*), mosses, and native creeping plants, to establish a matrix of ground layer plants. Your landscape bed design is ready to go!



Sheets A, B, and C stacked (*right*)


Coming soon . . .
WILDLIFE
HABITAT!

CROSSWORD: **Supporting Biodiversity** by Sarah F. Jayne



ACROSS (Nature's Action Guide page numbers in parentheses are hints)

2 Largest monoculture in the US covering more land than the other eight top irrigated crops combined! (3.3)
5 ___ down shoots to layer plants. (10.18)
6 Give definition and are an invitation to enter a landscape (14.6)
10 Buy plants in a ___ to save $$. (10.7)
12 To soak flax or hemp to soften its fibers
13 Animal droppings
16 The ___ plant is a nonnative aster that gets its name from a popular Indian spice.
17 Most important type of native plant to plant (5.3)
18 FDA term for "Generally Regarded As (Safe &) Effective"
21 Change light bulbs to ___. (1.8)
22 US state with greatest biodiversity (abbr.)
23 First half of the name of a large city with "green bin rule" to reduce methane from food waste in landfills
24 Popular emitters of greenhouse gases
27 Gas-powered lawn mowers ___ 4 – 5% of the total greenhouse gases released in US.
30 Woodpecker nest construction (7.15)
33 Troublesome plants (adj.) (5.12)
35 Just say ___ to neonicotinoids (10.23)
37 Registered nurse (abbr.)
38 Bluestem grass genus (11.19
43 Sweetspire genus
44 ___mar; ocean (French)
45 Happy indoor cat sound
46 Bear (Spanish)
48 Type of ALAN (1st syllable) (1.10)
49 Stiff bristle on barley or rye seed head
50 Fence part
52 Requires proper disposal (2.10)
53 The fire___ needs your leaf litter! (1.9)
54 Genetic profile adapted to location (10.21)

DOWN (Nature's Action Guide page numbers in parentheses are hints)

1 Turn ___ the lights to protect nocturnal life. (1.4)
2 Keep track of plants with these. (11.2)
3 Initials of scientific name for a monarch favorite
4 Bird's home (7.15)
5 Helpful guide to your landscape (9.8)
7 T/F: Propagating plants is easy! (10.9)
8 Opposite of "him"
9 Element contributing to legibility of a landscape (14.7)
11 Native source of fiber but deadly to dogs, horses, etc.; a milkweed look-alike
14 Vegetation filled area that connects habitats (15.5)
15 New Jersey ___ was an important beverage substitute during the American Revolution
16 A lovely lawn-like alternative (11.10)
19 ___ -fuse, -duce, -use, -purpose, -cycle (10.10)
20 Asexual propagation (9.8)
24 Upper layer of the landscape (9.4)
25 Audio/visual (abbr.)
26 Common name of Hypericum (1st word; abbr.)
28 Survival strategy of the admiral butterfly
29 Moth of venomous stinging caterpillar
32 Bantu language that over 1 million people speak
34 Important decomposer, pollinator, composter, soil former, human food, and beauty product ingredient producer.
36 Number of people it takes to make a difference
39 Smell of improperly made compost (slang)
40 Reusable water (American English) (
41 Best type of pesticide
42 Peat replacement (10.13)
48 Important late season keystone genus (1st two letters) (7.13)
49 ___ yay yay
51 For example (abbr.)

Resources referenced or mentioned in the talk:

American Bird Conservancy: Visit abcbirds.org for bird protection information, resources, and bird strike prevention product database. e *Nature's Action Guide,* page 2.6.

Bat-friendly Lighting: Read: https://www.signify.com/global/our-company/news/press-release-archive/2017/20170601-philips-lighting-scientists-develop-led-road-lighting-that-wont-disturb-bats

BeyondPesticides: Visit beyondpesticides.org

BiodiversityStripes.info This data reflects that the populations of mammals, birds, fish, amphibians, and reptiles have dropped an average of 73% since 1970

Bird Strikes: [Article] : Klem, D.,Jr, Saenger, P. G., & Brogle, B. P. (2024). Evidence, consequences, and angle of strike of bird–window collisions: A journal of ornithology. *The Wilson Journal of Ornithology, 136*(1), 113-119. doi:https://doi.org/10.1676/23-00045

Bringing Nature Home: How You Can Sustain Wildlife with Native Plants, Douglas W. Tallamy, Timber Press, 2009.

Crowfoot, Wade. [Quote] California Native Plant Society**.** *Saving what matters most*. Flora. Summer 2025, Vol. 8, No. 1, p.20

Cues to Care and Orderly Frames: Nassauer, J. I. (1995). Messy ecosystems, orderly frames [Article]. Landscape Journal, 14(2), 161–170. http://www.jstor.org/stable/43324192. See *Nature's Action Guide*, page 5.10.

Dark Sky: Visit darksky.org for responsible lighting recommendations

Dead or injured bird reporting: Dbird.org [Website}

Design elements that people prefer: [Article] Kaplan, R., Kaplan, S., & Ryan, R. L. (1998). With people in mind : design and management of everyday nature. Island Press.

Generalism in Nature: Loxdale, H.D., Balog, A., & Harvey, J.A. (2019). Generalism in nature . . . the great misnomer: aphids and wasp parasitoids as examples [Article]. Insects. 10, 314.

'Half the tree of life': Ecologists' horror as nature reserves are emptied of insects, Tess McClure, The Guardian, June 3, 2025; https://www.theguardian.com/environment/2025/jun/03/climate-species-collapse-ecology-insects-nature-reserves-aoe

Host plants for native pollen specialist bees: Visit JarrodFowler.com/host_plants.html OR search online for "host plants specialist bees eastern us". See *Nature's Action Guide,* page 6.9.

Injured bird or wildlife conflict reporting: Animal Help Now, ahnow.org [Website}

Keystone species research: [Article] Narango, D.L., Tallamy, D.W., & Shropshire, K.J. (2020). Few keystone plant genera support the majority of Lepidoptera species. Nature Communications.

Lady Bird Johnson Wildflower Center, wildflower.org

Light pollution effect on pollinators: Simone, G., Fontaine, C., & Knop, E. (2021). Impact of artificial light at night on diurnal plant-pollinator interactions. *Nature Communications*, 12(1) doi:https://doi.org/10.1038/s41467-021-22011-8

Light pollution effect on plants: Singhal, R. K., Kumar, M., & Bose, B. (2019). Eco-physiological responses of artificial night light pollution in plants. *Russian Journal of Plant Physiology*, 66(2), 190–202. https://doi.org/10.1134/S1021443719020134

Most Valuable Woody and Perennial Native Plant Genera, Doug Tallamy, 2018. See *Nature's Action Guide*, page 5.10.

National Wildlife Federation Native Plant Finder: Visit: https://nativeplantfinder.nwf.org/ or search online for "NWF find native plants". See *Nature's Action Guide,* pages 5.5, 5.8-5.9.

Native Plant Information Sheet—Blank template: Included in this handout. See *Nature's Action Guide,* page 9.5.

Nature's Action Guide: How to Support Biodiversity and Your Local Ecosystem, Sarah F. Jayne, Old Garden, 2024, naturesactionguide.org

Nature's Best Hope: A New Approach to Conservation That Starts in Your Yard, Douglas W. Tallamy, Timber Press, 2020.

Pollinator Partnership—Host Plant Garden Cards: Visit: pollinator.org; click Resources; click Host Plant Garden Cards; Find your region.

Pollinator Partnership—Ecoregional Planting Guide and **Garden Cards**: Visit: pollinator.org; click Resources; click Planting Guides; enter your ZIP Code®. See *Nature's Action Guide,* pages 1.12, 6.12, 15.9.

Pollinator Pathway: pollinator-pathway.org. See *Nature's Action Guide,* pages 6.12, 15.5.

Savanna hypothesis [Article] Bennett, K. (2019). Savanna hypothesis and landscape preferences, the. In: Shackelford, T., Weekes-Shackelford, V. (eds*) Encyclopedia of Evolutionary Psychological Science*. Springer, Cham. https://doi.org/10.1007/978-3-319-16999-6_3726-1

Soft Landings: Visit pollinator conservationist Heather Holm's website: pollinatorsnativeplants.com. In the menu, click on "Soft Landings". See *Nature's Action Guide,* pages 6.12, 7.3, and 7.12.

Top plant genera supporting native pollen specialist bees in the Eastern US: Jarrod Fowler and Sam Droege, 2020; https://jarrodfowler.com/specialist_bees.html. See *Nature's Action Guide,* page 6.7.

Turn the Lights Out for Fireflies and Other Insects: [Video] Xerces Society webinar, Avalon Owens, a firefly conservationist, presents a comprehensive view of light pollution as a conservation issue. Search online for this video's title—it's a compelling must-watch!