

How To Restore Natural Habitat

Now the work. What does it take to convert a lawn or other piece of ground into a native habitat. There are different ways; some difficult, others relatively easy, some that take a long time, and others that yield results fairly quickly. A major consideration is the level of weed control needed, and how much you can commit to. The methods described here are loosely organized according to the wildlife habitat elements as required by the National Wildlife Federation Certified Wildlife Habitat program, which are the basic elements of any habitat. The elements overlap to large extent. For example, food sources, cover, and places to raise young can all be provided through simply providing suitable vegetation or water or woody debris or some other aspect of a larger habitat. The methods presented in this article are not intended to be exhaustive, although reading all of this may be exhausting, but are intended to give general guidance based on years of real-world experience in our region.

Water

Containers

Start with perhaps the most important element and one of the easiest things that should provide almost immediate benefits for wildlife; add a source of shallow open water. Birds and insects will be quick to make use of just a little water. Many native and beneficial insects are attracted to even just a daily spray from a garden hose onto concrete or patch of mud. A bird bath is a good start, although that really doesn't provide enough water, requires almost daily filling, and is out of reach for most ground dwelling animals. The best way to start might be to put out some shallow containers, like old pans or bowls from a garage sale, buried in the ground so that the tops are at ground level. Be sure to add some stones or branches so that small animals can climb out of the water.

There are no easy answers for providing small sources of open water in the winter, unless you use an electric heater, but remember that your habitat needs to be sustainable. Otherwise, you can use a flexible container that won't break when ice expands, or a container that won't break when you break the ice out, or an old sacrificial container of some kind. Just make sure that whatever you use doesn't have any toxic content. And in winter, unless you have a large pond or inundated wetland, you will need to commit to breaking ice almost every day and hauling out at least a jug or bucket of water.

Pools and Ponds

For people with expensive garden pools and the many accessories, but again, the habitat elements should be sustainable, not only for the environment but for the budget. If you have a high water table, a shallow hole dug in the ground might provide seasonal open water. If not, butterflies and other insects love to feed on minerals in the mud of intermittently saturated soils. You might be able to create some temporary open water by directing your roof runoff and eaves troughs or gutters into a little rain garden. Adding a shallow container should retain some water a little longer.

The next step might be to install plastic sheeting or other repurposed material in a shallow hole. Just remember that the plastic sheeting will break up into an impossible mess after several years. People often get rid of old bathtubs and old hot tubs, free for the taking. Use your imagination. But again, be sure that small animals like toads, shrews, and the many invertebrate creatures have a way of easily getting into, and more importantly, out of the water. At this scale, you need to consider whether your pool or pond could endanger young children. Also, be sure that you don't use toxic materials.

Eventually, you might consider excavating a larger pond or creating a wetland. Just make sure you will have enough water and that you obtain all required permits or approvals. You don't want to do more harm than good in your restoration project. You don't necessarily need to hire an excavator. One or two people can do a lot of digging with hand shovels if you are not in a rush. Keep in mind again, with a larger pond or wetland, you are going to create a new level of invasive weed control work for yourself. Invasive weeds like *Phragmites* Reed - *Phragmites australis* subspecies *australis* and Reed Canary Grass - *Phalaris arundinacea* soon take over freshly exposed soils around ponds and in wetlands.

Food

Feeders

The next thing you can do quite quickly for wildlife is provide food. Of course, you can put out a bird feeder or two and these range from fancy and expensive to home-made and free using scrap materials. Here's a cheap cheep and easy bird feeder tip: 1) Melt a bunch of holes into the sides of a plastic juice bottle with a hot nail, 2) Melt a hole in the center of the bottle bottom plus several holes for drainage; 3) Melt a hole in the center of the bottle cap; 4) Melt a hole in the center of an old plastic plate or shallow plastic tub, like for hummus, plus several holes for drainage; 5) Set the bottle with cap on onto the plate or tub; 6) Run an old coat hanger wire up through the center holes in the plate or tub, bottle, and cap; 7) Bend the wire below the plate or tub so that nothing will not slide off; 8) Bend the top of the wire into a hook; 9) Fill the bottle with bird seed; 10) Hang your new feeder outside from a branch or pole; 11) If you have trouble with squirrels, and you will, hang the feeder from a line or wire between two trees or poles; 12) For added bird security and a possible squirrel deterrent, add an old plate or pie tin onto the wire above the feeder.

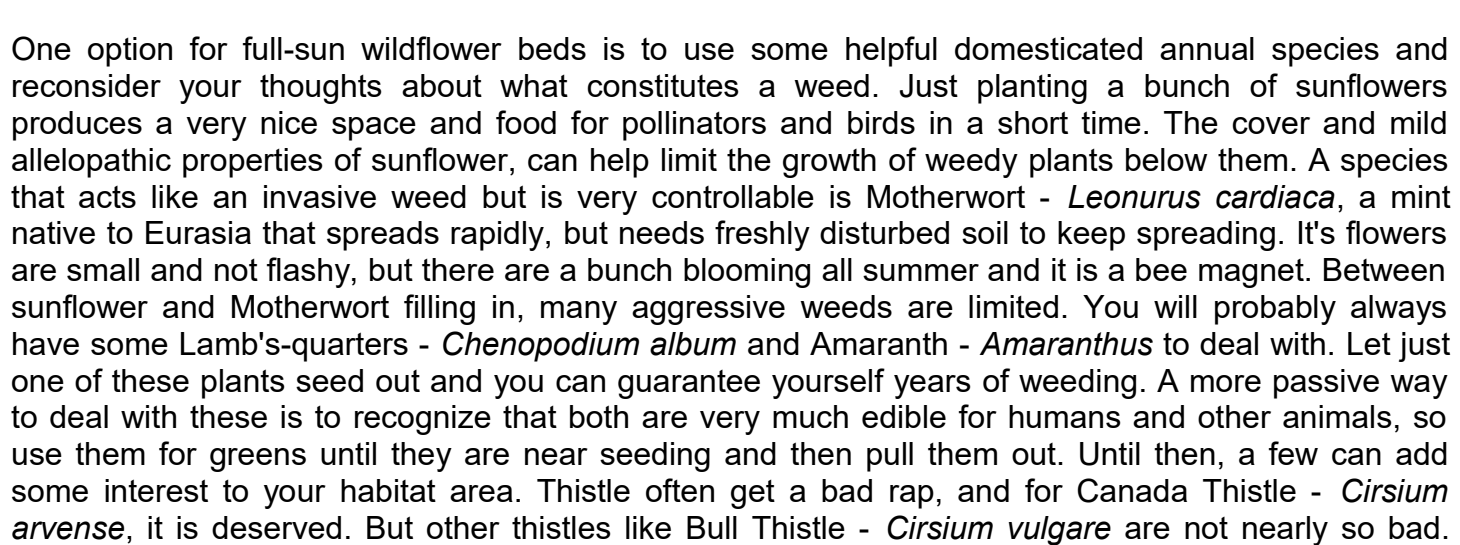
There are many ways to put out food for a variety of wildlife ranging from mammals to birds to insects, and there are all kinds of feeders that you can buy or build. No matter what type of feeder or what type of creature, a very important caution is to keep your feeders regularly cleaned because of the potential for promoting and spreading fungal, bacterial, or viral infections like salmonella, West Nile Virus, and Avian Influenza among others. It is particularly important to keep hummingbird feeders cleaned regularly because sugar water is quick to grow mold in the summer. If feeding birds and other animals, be prepared to devote a fair amount of time to cleaning your feeders, otherwise you may do more harm than good. There is no absolute solution to these problems other than to not feed animals at all. A reasonable compromise might be to largely restrict feeding to the winter when resident wildlife needs it most, and early spring to support early migrants that get caught in harsh weather. You should also check for feeding alerts from State authorities and various web sites.

Plots

Considering that your natural habitat should be sustainable for both wildlife and the people that need to maintain and monitor feeders, you might decide not to use feeding structures at all and instead, provide the bulk of wildlife food with food plots. These are areas planted with crops intended to feed wildlife and could include patches of sunflowers, corn, millet, and various grains and legumes. Similarly, you can place small portions of food around your property without structures that need cleaning; dispersed so that wildlife doesn't congregate all in one spot. This might include bundles of seed still on the stalk like sunflower heads, ears of corn, and pieces of fruit. This method might require a little more work to place the food, but saves cleaning and keeps wildlife more separated.

Gardens

Planting of native vegetation is covered in more detail under the Cover section of this article. A flower garden will provide food for a variety of insects and possibly hummingbirds through the summer in the form of pollen and nectar. Depending on your species mix, the garden can continue to be source of food for birds through the winter by providing seed retained in the flower heads. You might consider starting your flower garden with a lot of taller fast-growing annuals and even non-invasive non-native species to quickly establish flowers for pollinating insects. Sunflowers are a good choice along with zinnia, cosmos, salvia, and lavender. You can also include vegetable garden plants like squash and beans. These annuals are intended to provide a quick source of flowers and fill-out your planting area to displace weeds while giving you the pleasure of colorful blooms and watching the many pollinators at work. As your garden develops, you can gradually fill-in with more perennial native species.



Flower bed at the TLC office in 2021. Photograph by TLC Executive Director Bill Collins.

Cover

Planting just one tree in a lawn or field can provide significant benefits for wildlife as a micro-habitat, including shaded cover, food sources from fruits and insects and invertebrates that live on the tree, cover for birds from predators, nesting structure, food sources for insects and other animals from sap, pollen, flower nectar, leaves, and twigs, leaf litter for ground-dwelling invertebrates, and more. Oak trees are a great choice, as are hickory, but almost any native tree that can tolerate full sun will be beneficial. Although not native, apple and pear trees are very beneficial for a variety of wildlife. Just the cooling of the shade alone should be motivation for people to plant more trees.

Piles

Small piles of leaf and twig litter can provide great habitat for a large number of invertebrates such as sow bugs, centipedes, millipedes, insect larvae, slugs, worms, snails, and the fungi and other organisms upon which many of them feed. These in turn are sources of food for birds, toads, frogs, snakes, and small mammals.

Brush piles have been promoted for many years as a way to provide cover and nesting habitat for a variety of wildlife, when they can. You do want to be careful however, because brush piles will usually attract rabbits which are likely to eat many of the tree seedlings you planted if you are trying to restore a woodland.

While not really representative of natural communities in our region, rocks and broken concrete can also be used to create micro-habitats for a variety of invertebrate creatures, mosses, lichens, and even liverworts. Make sure you don't use broken asphalt, which discharges toxic compounds into the soil.

Similarly, piles of woody debris and rocks can provide important micro-habitats for fish, amphibians, and reptiles in aquatic or wetland areas. Again, do not use broken asphalt. Piles or accumulations of natural debris in streams not only provides habitat directly, but helps to shape the stream structure into riffles, rapids, and pools, which further diversifies the stream habitat. Woody debris in streams also helps to assimilate nitrates, which helps to reduce excessive algal blooms downstream.

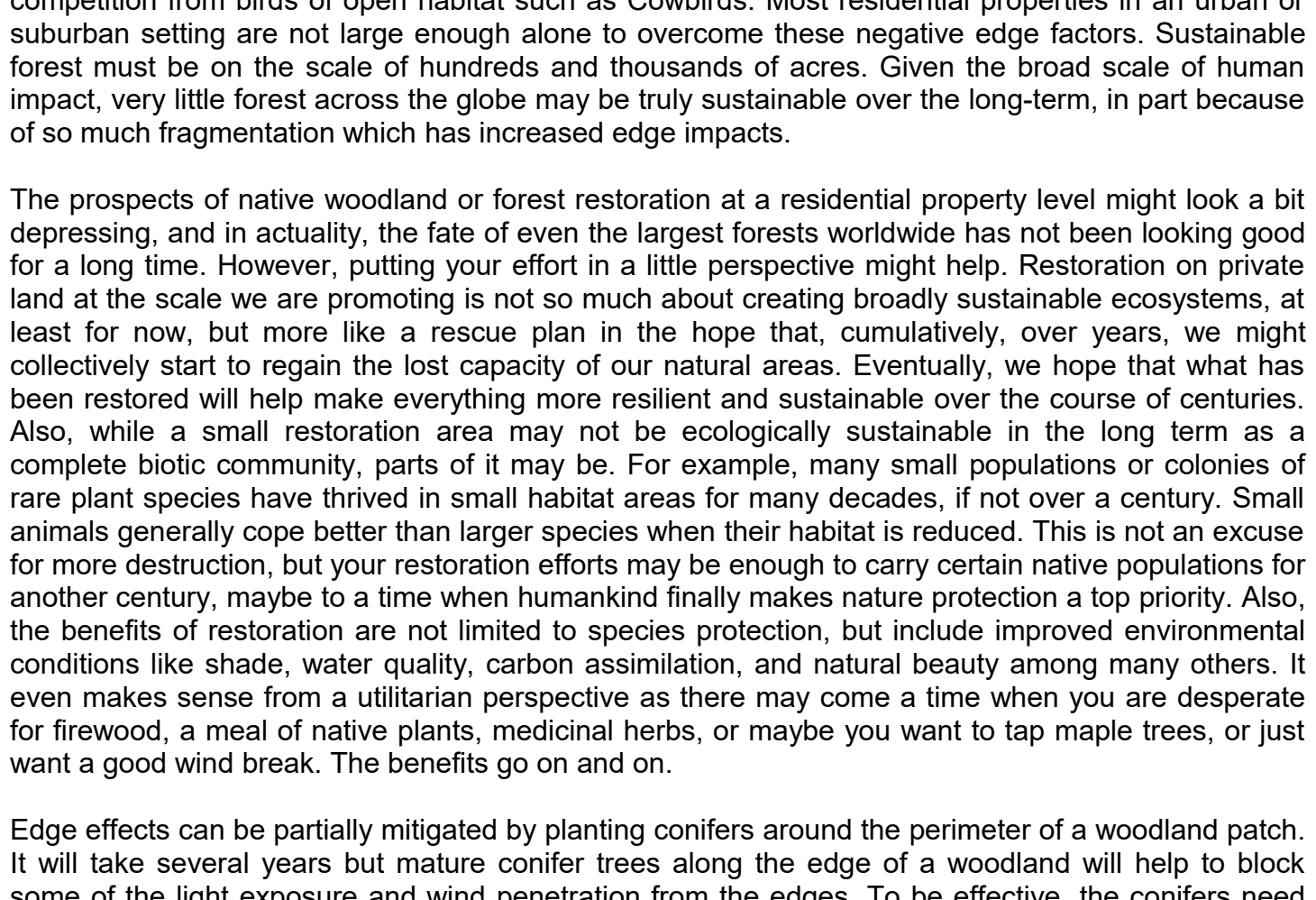
Planting Methods

As mentioned at the beginning of this article, there are different ways to start planting, some relatively difficult and slow, some relatively easy and fast, but all requiring varying levels of weed control. For the sake of not making this article too long, we will stick to those methods that are either slow or fast, but that require the least amount of weed control.

Sunny Wildflower Gardens

For those wanting to create the contemporary wildflower garden bursting with blooms in full sunlight, you've got your work cut out for you. With a lot of soil preparation, a few years of weed control prior to planting, dense plantings of tall plants, and lots of mulch, your garden will probably look great for a few years. But after a while, weeds move in, start to out-compete your plantings, and create a lot of work. In addition to the usual weeds, almost all ground in Michigan eventually defaults to shrubs and trees, most of these weeds unless you are next to a really nice mature forest. Unless these areas are regularly weeded, sprayed (don't do it), cut, burned, hayed, cultivated, or whatever, you are most likely going to get a bunch of weedy tree and shrub seedlings moving in, like Autumn-olive, Multiflora Rose, Box-elder, Siberian Elm, and others. This is what happens to fence rows between farm fields.

One option for full-sun wildflower beds is to use some helpful domesticated annual species and reconsider your thoughts about what constitutes a weed. Just planting a bunch of sunflowers produces a very nice space and food for pollinators and birds in a short time. The cover and mild allelopathic properties of sunflower, can help limit the growth of weed plants below them. A species that acts like an invasive weed but is very controllable is Motherwort - *Leonurus cardiaca*, a mint native to Eurasia that spreads rapidly, but needs freshly disturbed soil to keep spreading. It's flowers are small and not flashy, but there are a bunch blooming all summer and it is a tree mowing over several years, you can get it close to that. This type of habitat is fairly stable over perhaps 10 years or more, depending on surrounding land use. Before too many weeds start to take over, you will need to mow it or burn it every few years. An established meadow or old-field can usually handle mowing once per year if needed, and still come back with an abundance of blooms by early fall. If weeds like Canada Thistle or Burdock start to appear, mowing before they seed-out can work wonders. If you are able, and you get a burn permit, burning can help to reset the meadow community and create bare soil patches for spring or fall seeding.



A beautiful old-field covered by goldenrod north of Marlette, Michigan. Fields like this are now critical for pollinators, but more are destroyed every year. Photograph by TLC Executive Director Bill Collins.

Shrub Thickets

Another way to help keep weeds out of a generally open sunny area is to plant shrubs and maybe a few small trees to provide a little shade and to "anchor" your planting area as they say. In this way, you are kind of fighting fire with fire by planting desired shrubs and trees before the weedy ones move in. What you plant will help displace what you don't want. One of the very best shrubs to plant in our region if the area is not too dry is Buttonbush - *Cephalanthus occidentalis*. This species is an absolute pollinator magnet; the spherical flower clusters with an enchanting fragrance of honey and vanilla. Buttonbush starts blooming in mid-summer and draws in every butterfly, moth, bee, fly (not House Flies), beetle, and even ant in the territory. Better for homeowners if the ants stay out in your wildlife habitat anyway. Other good ones are Common Elderberry, Pussy Willow, American Highbush-cranberry, Ninebark, Northern Wild-raisin, Nannyberry, Staghorn Sumac, dogwood, and arrowwood. Although some would say otherwise, pokeweed - *Phytolacca americana* makes a nice addition to a sunny or partially shaded area, and is robust enough to displace weeds. The nice thing about most of these shrubs, particularly Buttonbush, Common Elderberry, and willow, is that cuttings from their branches are super easy to root in just a bucket of water. As for trees, you will want just a few with a crown that doesn't produce dense cover. Conifers are generally more, as are trees without a dense crown like Quaking Aspen, Paper Birch, and even Sycamore.



Buttonbush shrub in bloom at Bebezland Farm in Sanilac County. Photograph by TLC Executive Director Bill Collins.

Woodland

Better yet for larger areas in the right setting, is to restore the native forest that once covered about 95% of our region until about 200 years ago, prior to Euro-American settlement. Unless you are restoring open dune, marsh, prairie, fen, bog, shrub swamp, grassland, stream, or inland lake communities, all of which were in the Thumb originally but of very little coverage, you most likely will be restoring forest if your target is the originally plant community. Not only will you end up supporting a lot of wildlife and native plants, they will generally be those species that once occupied your land and are in dire need of support. Woodland or forest habitat will ultimately be the most stable and self-sustaining, making it easier to control invasive weeds as long as you are somewhat diligent. But getting started on woodland restoration has challenges, as will be explained.

Woodland Edge Effects

When creating or restoring woodland, you want to make it as large as possible because of the negative impacts of edges which allow higher influx of light and wind. This results in higher light exposure of course, higher air and soil temperatures, higher wind incursion and wind-throw of trees, increased colonization of invasive weeds, and higher intrusion by wildlife of open and edge habitats that displace species of interior forest habitat. These edge effects typically extend a few hundred feet into the forest from the edge. That means that if your woodland restoration area is no more than about 200 to 400 feet across, it will all be subject to edge conditions. With small size and more edges, your woodland will be more susceptible to colonization by invasive weed like Garlic Mustard, Japanese Barberry, Multiflora Rose, Tartarian Honeyuckle, Common Privet, and non-native trees that are not characteristic of a mature forest community, like Norway Maple, Siberian Elm, and Box-elder. Forest dwelling birds like the Wood Thrush and many warblers are particularly vulnerable to competition from birds of open habitat such as Cowbirds. Most residential properties in an urban or suburban setting are not large enough alone to overcome these negative edge factors. Sustainable forest must be on the scale of hundreds and thousands of acres. Given the broad scale of human impact, very little forest across the globe may be truly sustainable over the long-term, in part because of so much fragmentation which has increased edge effects.

The prospects of native woodland or forest restoration at a residential property level might look a bit depressing, and in actuality, the fate of even the largest forests worldwide has not been looking good for a long time. However, putting your effort in a little perspective might help. Restoration on private land at the scale we are promoting is not so much about creating broadly sustainable ecosystems, at least for now, but more like a rescue plan in the hope that, cumulatively, over eons, we might collectively start to regain the lost capacity of our natural areas. Eventually, we hope that what has been restored will help make everything more resilient and sustainable over the course of centuries. Also, while a small restoration area may not be ecologically sustainable in the long term as a complete biotic community, parts of it may be. For example, many small populations or colonies of rare plant species have thrived in small habitat areas for many decades, if not over a century. Small animals generally cope better than larger species when their habitat is reduced. This is not an excuse for more destruction, but your restoration efforts may be enough to carry certain native populations for another century, maybe to a time when humankind finally makes nature protection a top priority. Also, the benefits of restoration are not limited to species protection, but include improved environmental conditions like shade, water quality, carbon assimilation, and natural beauty among many others. It even makes sense from a utilitarian perspective as there may come a time when you are desperate for firewood, a meal of native plants, medicinal herbs, or maybe you want to tap maple trees, or just want a good wind break. The benefits go on and on.

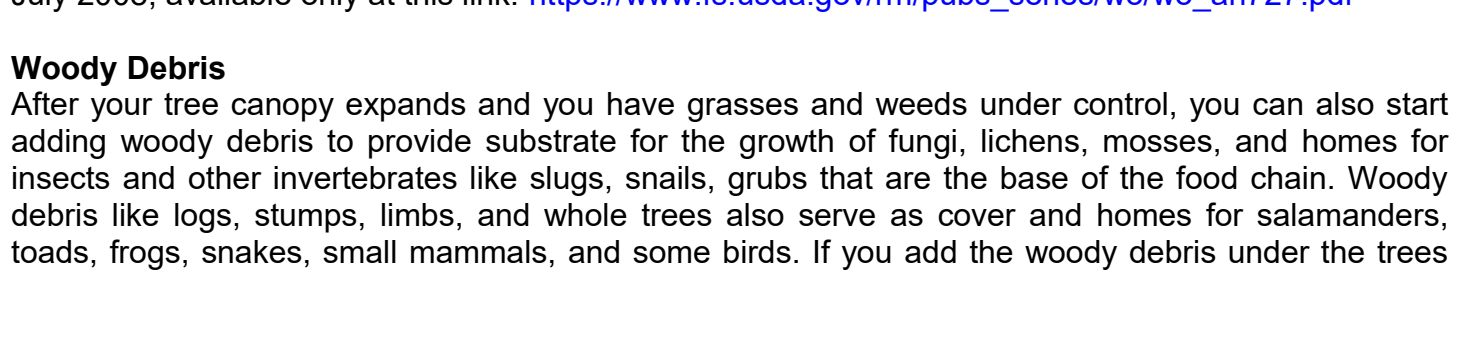
Edge effects can be partially mitigated by planting conifers around the perimeter of a woodland patch. It will take several years but mature conifer trees along the edge of a woodland will help to block some of the light exposure and wind penetration from the edges. To be effective, the conifers need fairly dense with branches retained at lower levels. Perhaps the best trees for this function are spruce, regardless of whether they are native or not. Most are unlikely to spread. A combination of spruce, pine, juniper, and arbor vitae planted in concentric layers around the edge might be most effective.

If space allows, you will further benefit any impact of woodland by extending individual tree plantings as far out from the edge as possible. The important things are shade and blocking wind, so every tree helps, whether it is part of the woodland or has mowed lawn below.

Regarding invasive weeds, it may simply take a little more work on your part to control them. The good thing is that, with the shade of a forest canopy, invasive weeds are generally easier to control, although buckthorn is still a nightmare.

Afforestation

"Afforestation" refers to the establishment of new tree cover on land not previously forested, at least for a very long time. At first glance, the word seems to suggest the lack of forest with the prefix "A" in Latin means "without" or "not". But the prefix is actually "Al" which means something like "a progression toward". There are basically two ways to accomplish afforestation - slowly and not so slowly, with variations on each theme. There are advantages and disadvantages to each way, but probably the best way is not so slowly, especially if you are feeling old. Start by planting relatively fast-growing species that can tolerate full sun or less than full shade, like Tulip Tree, Sassafras, American Basswood, Paper Birch, Eastern-White Pine, Silver Maple, and poplar or aspen. Include some species that are moderately fast-growing like Sycamore, Sugar Maple, Wild Black Cherry, and elm. Include some oak and hickory trees also, which are slower growing, but do very well in full sun and are great for many kinds of wildlife. Be careful with Black Walnut as it often becomes a weed.



Afforestation using Sycamore on a wetland mitigation bank near Kingston, Michigan. These saplings were planted as rooted cuttings only 4 years ago. Photograph by TLC Executive Director Bill Collins.

Afforestation by Eastern Cottonwood seedlings that naturally seeded-in about 3 years ago on a wetland mitigation bank near Kingston, Michigan. Photograph by TLC Executive Director Bill Collins.

Your first trees should be planted close to each other, like on about 5-foot spacings, or maybe less. The short-term goal, beyond protecting your tree seedlings from deer and rabbit herbivory, is to achieve "crown closure" as soon as possible. This means having a relatively continuous tree canopy with as few gaps as possible. This is an important stage at which shade begins to significantly suppress weeds and grasses. You might even consider planting other rapidly-growing trees, like Quaking Aspen or Eastern Cottonwood, between your preferred trees, to serve as a sort of "nurse crop" to achieve shade and crown closure more rapidly. These can later be cut down to make more room for the preferred trees to expand.

Tree Protection

It is best to plant larger caliper tree stock to give your woodland a jump start, but also to minimize damage from deer and rabbit herbivory. It's very clear that we need less Eastern White-tailed Deer in southern Michigan. They were not historically here in significant numbers and did not begin their population explosion in our region until the 1970s. Deer are not only involved in a great number of vehicle collisions, but eat a lot of tree seedlings, suppressing natural forest regeneration, especially arbor vitae in cedar swamps, and decimate large numbers of native forest wildflowers like trillium and orchids.

If you have a major issue with deer or rabbits herbivory, it may be necessary to try to protect your tree seedlings. There are several methods but success is hard to achieve and the methods are labor-intensive and expensive. Perhaps the most effective protection is the use of plastic tree tubes. This might be in combination with electric fencing and various repellents. However, deer and rabbits will almost always find ways to get through, over, under, or otherwise evade such exclusions. It may be necessary to attract them to a different area by putting out alternative food sources for a few years, until your trees are better established.

Woodland Weed and Grass Control

An important factor in afforestation is control of grasses and weeds under the tree seedlings and saplings. Not having them greatly improves the growth rate of the trees. This is where you need to make an important decision. You can mow around and under your planted trees for a decade or so to keep the grasses and weeds down. Mowing is not perfect, but it helps and if you are in an area where a weed and grass ordinance is strictly enforced, you may need to consider this route as a relatively easy way to deal with that issue. But waiting a decade or more for your trees to achieve crown closure before you start planting all of the other vegetation that makes up a forest community is less desirable the older you get. But on the other hand, if you plant woodland herbs too soon and your area becomes dominated by tall grasses and weeds, you will create an enormous amount of work for yourself to control those while protecting what you planted. It's a conundrum and there are no easy solutions. You can selectively mow, which is a lot of work. You could spray herbicide for grasses, but then it's likely to kill some of your plantings, including especially monocots like trillium, lilies, and orchids. Using herbicide is also not organic, sustainable, preferred, and maybe not safe. You can spend many days hand weeding. Perhaps the best solution for smaller restoration areas is to use a lot of leaves and wood chips as a heavy mulch. They can become your best friends. Get to know your local tree contractors and be prepared to scavenge bagged leaves and grass clippings from roadsides whenever you can.

The recommendation to control grasses during the early development of the woodland is not to suggest that eventually having some native grasses is a bad thing. Woodlands typically do have associated native grasses, sedges, and rushes that are part of the mature forest community. These are probably best seeded-in well after crown closure of the woodland canopy as they will impede tree growth earlier and may get you in trouble with a local grass and weed ordinance if they are too dominant.

Woodland Understory

Once your woodland canopy fills in and you are on top of the grass and weed problem, you can finally relax a little and take pleasure in adding biodiversity to your woodland. Then may be the best time to start planting understory trees and shrubs to recreate natural structure, produce more shade, and increase biodiversity. Good species for this in our region include Ironwood, Hornbeam, Witch-hazel, hawthorn, Flowering Dogwood, Speckled Alder, Ninebark, Bladderhut, Hazelnut, Spicebush, Highbush Blueberry, and Michigan Holly.

Woodland Herbs

At the same time you plant the woodland understory, you can plant the herb layer which typically consists primarily of forbes with some grasses and sedges. Just a few of the many native species characteristic of mature forests in our region include White or Red Trillium, May-apple, Yellow or White Trout-lily, Canada Mayflower, Jack-in-the-bud, Wild Geranium, False Solomon-seal, Solomon-seal, Spinylose Woodfern, Sensitive Fern, Red or White Banberry, Wild Leek, Wood Anemone, Wild Sarsaparilla, Wild-ginger, Marsh-mayfern, Blue Cohosh, Spring Cress, Spring-beauty, Wood Nettle, Sharp-lobed Hepatica, Royal Fern, Christmas Fern, Dwarf Raspberry, Bloodroot, Skunk-cabbage, Foamflower, sedges - *Carex debilis*, *Carex crinita*, *Carex gracillima*, *Carex grayi*, *Carex intumescens*, *Carex lupulina*, *Carex pensylvanica*, *Carex stricta*, grasses - Bottlebrush Grass, Virginia Wild Rye, Fowl Manna Grass, Canada Bromel, and Autumn Bent Grass. Contrary to popular belief, most of these species transplant very well if done at the right time of the year and they are planted in an area with suitable soil, moisture, and light conditions.

Yellow Trout-lily in the TLC Dead End Woods Sanctuary in Fort Gratiot Township, Saint Clair County. Photograph by TLC Executive Director Bill Collins.

Locally Endemic Stock

Many gardeners and landscapers are familiar with the importance of planting regional genotypes that are suited to the regional climate. An increasing number of references suggest that seeds and plants be sourced as locally as possible to maximize the survival and continued growth of planted stock used for restoration. Some of us go a step further to suggest that it is important to retain the very populations that once occupied the specific locality for the sake of maintaining the local natural heritage. This level of concern, admittedly, is mostly an unseen aesthetic, but as our awareness increases, is likely to be verified by science as being more important. For one thing, huge advances in genetic analysis have been made in recent years, making it increasingly possible to track the ancient migrations of plant and animal populations. Unfortunately, the introduction of outside genotypes to an area, let alone even native species that never occurred there, obscures the true genetic and natural history of the area. Anyone who has read through a botanical guide like *Michigan Flora* knows that regional variations of plant species are often mentioned. Some of these variations are so strong that a species is divided into varieties and subspecies. But with the introduction of plants from other regions, as they cross with original populations, these small differences are likely to disappear or completely change such that the descriptions in the flora guides may one day be useless. Although these small natural variations of plant species might be thought of as unimportant, probably most were some reaction to something in the local environment. With the loss or obscuring of these variations, we probably lose some insight into the past. Regardless, some of us just want the satisfaction of knowing that the natural areas around us contain the original populations that established after the last glacial period. This is generally far more of a concern for slow-spreading native species of forests with seeds that tend not to be broadly dispersed, versus wind-dispersed species of open communities.

With this in mind, try to collect seeds, spores, cuttings, and transplants from local natural areas for your restoration area. Be careful not to collect rare species or from small colonies that may be further impaired. Typically, just a few shrubs and trees can provide plenty of cuttings for a small restoration area. Depending on species, the same is often true for seeds, and definitely for spores. Keep transplants to a minimum for uncommon forest species. The best policy is to rescue native plants and other organisms from land that is to be developed because developers will simply pile it all up and eventually haul it away as topsoil for some new lawn.

Perhaps the ultimate guide for producing rooted cuttings of woody plant species in North America, with some imports, is *The Reference Manual of Woody Plant Propagation: From Seed to Tissue Culture, Second Edition*, by Michael A. Dirr and Charles W. Heuser, first published in 1987. To purchase the book, visit the following link, but there are many sources on the internet: <https://www.goodreads.com/book/show/5945407?the-reference-manual-of-woody-plant-propagation> Other helpful books by Michael Dirr can be viewed at this link: https://www.goodreads.com/author/list/50551_Michael_A_Dirr

Another helpful reference for handling and propagating seeds of woody plants is *The Woody Plant Seed Manual*, United States Department of Agriculture, Forest Service, Agriculture Handbook 727, July 2008, available only at this link: https://www.fs.usda.gov/mpubs_agriculture/hwv/wvwo_al727.pdf

Woody Debris

After your tree canopy expands and you have grasses and weeds under control, you can also start adding woody debris to provide substrate for the growth of fungi, lichens, mosses, and homes for insects and other invertebrates like slugs, snails, grubs that are the base of the food chain. Woody debris like logs, stumps, limbs, and whole trees also serve as cover and homes for salamanders, toads, frogs, snakes, small mammals, and some birds. If you add the woody debris under the trees

too soon, before you have everything under control, you will have a near impossible mess to deal with. You will no longer have the option of mowing, although you could maybe weed-whip most of the area. So, adding woody debris is also a step that you need to think about and plan for.

Woodland Carbon

Once you are past that critical weed and grass control stage, and you have added woody debris and other organic material, your woodland should increase in wildlife value and native forest plant habitat almost exponentially. As invertebrate communities become established, you will not only provide a stable food chain base, but the soil and trees will be storing increasing amounts of carbon. It's surprising how fast topsoil will redevelop on ground that had almost none originally. You can scavenge lots of free materials from the roadside to bolster the food sources for wildlife and build the soil. Materials are available most of the year, like bagged leaves and grass clippings, bundles of brush, cut tree limbs, cut landscape shrubs, old pumpkins, straw bales, corn stalks, and on it goes. It is amazing the precious resources that people throw out. All the while, you can take further satisfaction in knowing that these things are not taking up space in a landfill or increasing the burden of a composting facility. Just make sure you don't spread anything invasive from someone's yard. If unsure of invasive content, sometimes it's better just to leave it. As you gain confidence, you can process potentially invasive materials without seeds by drying, or with seeds by burning, making the material safe for your habitat, or safer yet for your vegetable garden. You can even add kitchen scraps or compost to your natural area. Your established forest community will break down these materials rapidly.

Woodland Productivity

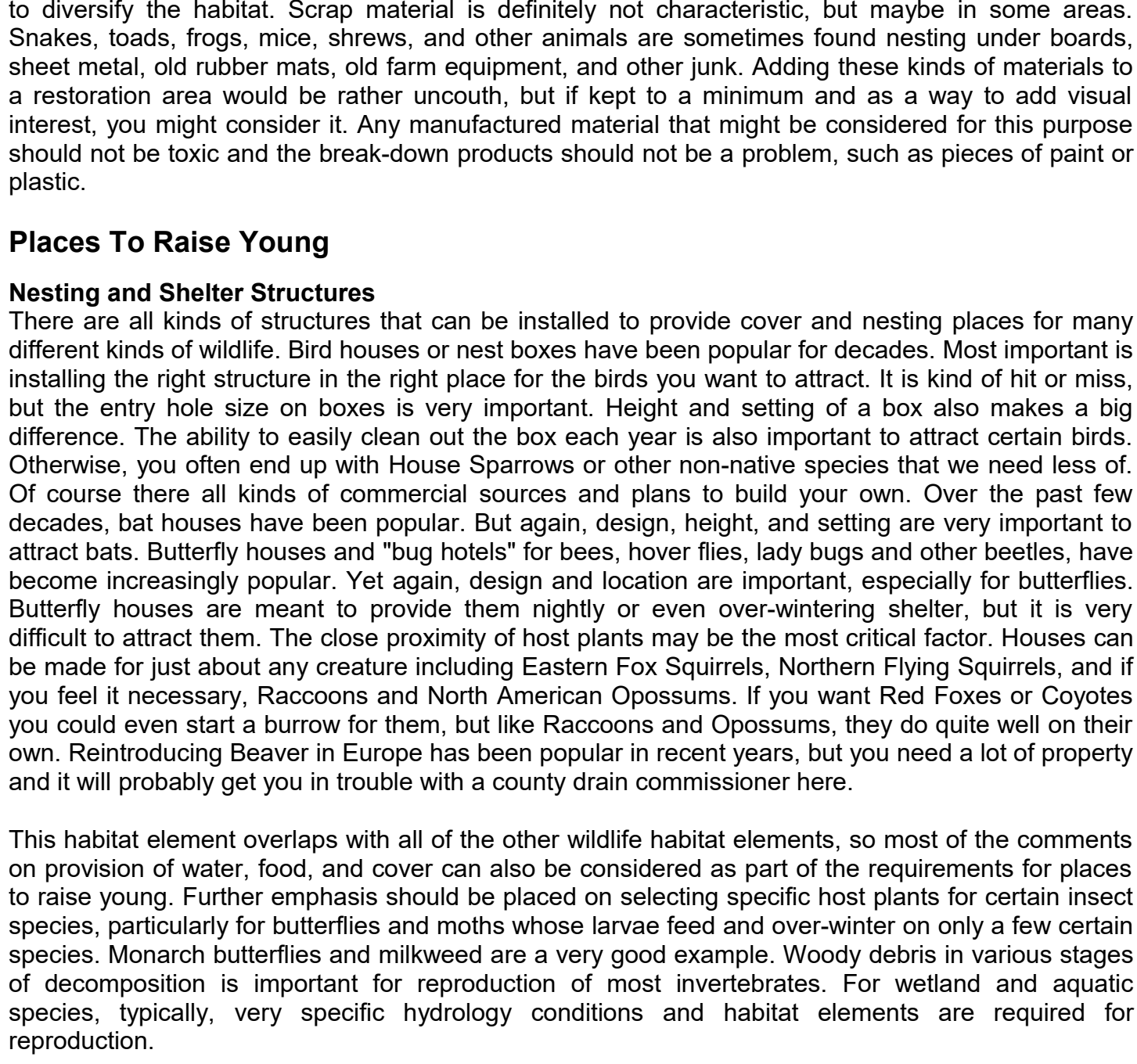
As your woodland matures, you should see a great increase in wildlife food sources from seeds, berries, nuts, pollen, flower nectar, and even sap. The continued growth of the woodland should have enough momentum to begin helping you exclude weeds and undesired grasses, and to counter some of the major edge effects. Eventually, you want to get your restoration area as close to self-perpetuating as possible. At some point, you will have established your own source for seeds, cuttings, and transplants to further expand your restoration efforts.

Woodland Weeds

Beware though. As your woodland develops, you need to be ready for a new phase of invasive weeds. Now instead of Canada Thistle, Burdock, and Autumn-olive, it will be Garlic Mustard, Common Buckthorn, Glossy Buckthorn, and Asiatic Bittersweet, among many others. You will need to be diligent in controlling these very invasive forest weeds. Unfortunately, especially for small woodlands, birds like Robins, Starlings, and others are of no help. They bring in all kinds of invasive seed. Robins are especially notorious for spreading buckthorn.

Habitat Structures

In any natural habitat, whether a sunny meadow, partially shaded shrub thicket, or heavily shaded woodland, biodiversity will almost always benefit from the addition of micro-habitat variations and structures. A pit and mound micro-topography can be excavated across an area before planting, which mimics the effects of uprooted soil by large wind-thrown trees in mature forest. Mounds are typically 1 to 2 feet high, and pits equally deep, while each is typically 4 to 5 feet across. The pit is where a mature tree would have been, and the mound is where dirt, still clinging to the uprooted tree roots, eventually falls off. These small ground level variations result in a range of soil moisture conditions that diversify the plant and animal community. Some pits are deep enough to contain seasonal surface water for wildlife, and may be inundated long enough in the spring to serve as small breeding areas for invertebrates.



Pit and mound surface on sandy ground in second-growth northern forest (with Painted Trillium) in Port Huron Township, Saint Clair County. Photograph by TLC Executive Director Bill Collins.

Other habitat structures typically include logs, stumps, whole trees, and piles of woody debris, the benefits of which have already been described. Just the addition of some partially rotted wood can help support butterflies, bees, and many other invertebrates. Standing dead trees or "snags" are particularly beneficial for nesting birds or as perches for raptors.

Boulders and rock piles are not characteristic of natural communities in our region, but can be added to diversify the habitat. Scrap material is definitely not characteristic, but maybe in some areas. Snakes, toads, frogs, mice, shrews, and other animals are sometimes found nesting under boards, sheet metal, old rubber mats, old farm equipment, and other junk. Adding these kinds of materials to a restoration area would be rather uncouth, but if kept to a minimum and as a way to add visual interest, you might consider it. Any manufactured material that might be considered for this purpose should not be toxic and the break-down products should not be a problem, such as pieces of paint or plastic.

Places To Raise Young

Nesting and Shelter Structures

There are all kinds of structures that can be installed to provide cover and nesting places for many different kinds of wildlife. Bird houses or nest boxes have been popular for decades. Most important is installing the right structure in the right place for the birds you want to attract. It is kind of hit or miss, but the entry hole size on boxes is very important. Height and setting of a box also makes a big difference. The ability to easily clean out the box each year is also important to attract certain birds. Otherwise, you often end up with House Sparrows or other non-native species that we need less of. Of course there all kinds of commercial sources and plans to build your own. Over the past few decades, bat houses have been popular. But again, design, height, and setting are very important to attract bats. Butterfly houses and "bug hotels" for bees, hover flies, lady bugs and other beetles, have become increasingly popular. Yet again, design and location are important, especially for butterflies. Butterfly houses are meant to provide them nightly or even over-wintering shelter, but it is very difficult to attract them. The close proximity of host plants may be the most critical factor. Houses can be made for just about any creature including Eastern Fox Squirrels, Northern Flying Squirrels, and if you feel it necessary, Raccoons and North American Opossums. If you want Red Foxes or Coyotes you could even start a burrow for them, but like Raccoons and Opossums, they do quite well on their own. Reintroducing Beaver in Europe has been popular in recent years, but you need a lot of property and it will probably get you in trouble with a county drain commissioner here.

This habitat element overlaps with all of the other wildlife habitat elements, so most of the comments on provision of water, food, and cover can also be considered as part of the requirements for places to raise young. Further emphasis should be placed on selecting specific host plants for certain insect species, particularly for butterflies and moths whose larvae feed and over-winter on only a few certain species. Monarch butterflies and milkweed are a very good example. Woody debris in various stages of decomposition is important for reproduction of most invertebrates. For wetland and aquatic species, typically, very specific hydrology conditions and habitat elements are required for reproduction.

Sustainable Practices

The subject of sustainable practices is a broad topic, but can be simplified to mean that your restored habitat should not require inputs of labor, materials, and other resources that cause more environmental harm than the benefits provided by the restored habitat. That's still not simple as it could require a lot of data and complex calculations to determine with certainty. Even then, there are a lot of intangible aspects to consider. However, there are some general principles.

The input of fossil fuel energy should be minimized. Even the input of renewable energy, unless it is photosynthesis, is not really sustainable given that the restoration area should be able to sustain itself without human input over the long term, just as most of the natural world did long ago. So, this means that maybe you want to forego mowing to control grasses and weeds in the initial stages of the restoration and jump right to heavily mulching the area. Of course, you need to balance this decision with your abilities, available resources, and how strict the local government is with their ordinances.

For water features such as garden pools, you probably should forego the fancy waterfalls and fountains that require a significant amount of electricity to operate. You might consider something that is solar powered, but plan on a sustainable pool or pond design should the provision of power someday not be an option. Keep in mind also that solar panels, batteries, wire, and other equipment contain metals and other materials that need to be mined, processed, and manufactured.

Try not to create a habitat that requires excessive amounts of water input that can only be provided from a well or municipal water source. For us here in Michigan, water availability has mostly not been a problem, but unless you rely just on precipitation, runoff, and ground water, it does require input of energy. If you need more water than is naturally available, rather than using a pumped source, consider capturing runoff from roofs and other impermeable surfaces. Besides, most municipal water sources are treated with chlorine and additives include fluoride. These compounds may not be good for animals, plants, and other organisms.

Regardless of your attitude toward herbicides, pesticides, and commercial fertilizers, if your restored or created habitat depends on the continuous application of these materials, it is clearly not sustainable. Again, it is best to create a natural habitat that is more or less self-sustaining. Another consideration is that manufactured chemical products are made of various extracted or mined substances and require inputs of energy during production and transport. Obviously, there is a lot of debate on the subject of toxicity and safety of herbicides and pesticides. It's safe to assume that because these products are effective at some level as biocides, that there must be some potential risk to other organisms. Like almost everything that affects our environment, remember that it's not only what you do, but collectively, what many people do that increases the damage done.

A consideration with using commercially sourced feed for wildlife is whether you are contributing to the use of valuable farm land for the purpose of feeding wild animals at the expense of feeding humans. The answer is obviously "yes", but there are some possible mitigating factors. You can rest assured that far more farm land is used to feed pets, and way more to fatten livestock and also produce ethanol fuel. Another considerable portion is used to produce alcohol for human consumption. So, you might consider starving your pets (just kidding) or eating less meat, or none at all, not drinking certain types of alcohol, or not drinking alcohol at all, and driving less. It seems like a minor issue when considered on an individual basis, but again, cumulatively, it is a big deal.

Of course you can avoid some of the potentially negative issues of feeding wildlife with commercially sourced feed by growing your own. The dilemma might be when to use part of your garden space for wildlife feed versus produce for your own consumption. This is the point at which it makes most sense to start planting feed plots and wildflower gardens specifically for wildlife and get right into creating or restoring wildlife habitat as is the ultimate goal.

Gardening for Life By Doug Tallamy

<https://homegrowwnationalpark.org/tallamy/not-in-our-yard-doug-tallamy>

The Creeping Barberous Invasion Of Our Bittersweet Privetcy A Guide to Common Invasive Weeds of the Thumb Region

It seems there's no end to invasive weeds increasing in our region. One of our latest invasive nightmares is Oriental Bittersweet. There are parts of northern Oakland County, southern Lapeer County, and Macomb County, that are absolutely covered by these vines that eliminate nearly all other vegetation and pull down mature trees. The Port Huron State Game Area is increasingly full of bittersweet, spread by birds that move through the Black River valley. We rarely encountered bittersweet on sites until about 10 years ago, and now it's on nearly every site we look at.

Below are links to the most common and worst invasive weeds you are likely to encounter in our region, including natural areas and your yard. Many others could be added to this list, but they are generally not as widespread. These are some of the most ecologically and also economically damaging, and the most difficult to eradicate for different reasons. Some, like Oriental Bittersweet and Garlic Mustard, are fast-spreading and take over everything once established. Others, like Lily-of-the-valley and English Ivy, are slow-spreading, but very commonly planted and also eventually take over large areas. Others, like Siberian Elm and White Mulberry, spread far and wide by seed, and are difficult to control because they are fast-growing and develop tree roots after a few years that keep resprouting unless dug up. Others, like Japanese Knotweed and Creeping Charlie, are nearly impossible to eradicate without very serious and expensive efforts over several years.

Herbs

Garlic Mustard

All over southern Michigan. The TLC has been removing this weed from our Dead End Woods Sanctuary for 14 years. Moves around a lot, especially from people dumping their grass clippings into the edge of woods. The entire plant is edible and has a very nice garlic flavor.
<https://michiganflora.net/record/598>

Japanese Knotweed

Extremely hard to eradicate once established. Native to East Asia and thrives on the sides of active volcanoes, if that tells you anything. The smallest root pieces can sprout from deep underground years after the plant is dug up and fragments of the stems can also root. Widespread, especially in older suburban areas and ditch banks in the northeast US where it excludes nearly every other plant.
<https://michiganflora.net/record/2276>



Japanese Knotweed. This is how bad it gets. Do not plant this stuff! Photograph by Tom Heutte. Serenityinthegarden.blogspot.com

Canada Thistle

Gardeners and farmers hate this weed. Very aggressive in fields. Short of spraying, it can be set back by cutting while it puts a lot of energy into flowering.
<https://michiganflora.net/record/284>

Common Burdock

Many gardeners and farmers hate this weed too. Very persistent, but continued cutting can set it back. Otherwise, the roots can be dug up and are very tasty in spring and early summer, fried and lightly salted. A very medicinal plant also, used to heal burns and other skin issues.
<https://michiganflora.net/record/225>

Dame's Rocket

A persistent weed of old clearings, especially older residential areas. It can be set back by continued cutting or pulling, but otherwise, it takes over.
<https://michiganflora.net/record/655>

Wild Parsnip

This is a fast-spreading weed of ditches and old moist clearings. It produces so much seed that it requires continuous and early cutting or pulling to set it back. While the roots can be eaten like parsnip, the rest of the plant can cause severe blistering of skin, especially when combined with sun exposure.
<https://michiganflora.net/record/134>

Giant Ragweed

Considered a Michigan native, especially of river floodplains and open muck soils, but becomes invasive in many places where it would not otherwise naturally occur. The tall stems make good bean poles when still green. Apparently, Giant Ragweed pollen is responsible for most of the allergies blamed on goldenrods.
<https://michiganflora.net/record/215>

Phragmites, Reed

You know this one from ditches and open wetlands everywhere. It eliminates almost all other plants. It can be eliminated by flooding for at least 2 to 3 years. Cutting or mowing prior to flooding helps. Otherwise, it's almost always requires spraying of glyphosate. Where cat-tail is dominant, Phragmites is generally excluded, but don't count on that for too long.
<https://michiganflora.net/record/2164>

Reed Canary Grass

A common invasive grass of open wetlands or just moist ground that forms large thickets that tend to eliminate most other plants. Early mowing can help set it back, but it usually requires spraying of glyphosate.
<https://michiganflora.net/record/2180>

Purple Loosestrife

Native to wetlands of Eurasia and now widespread in Michigan wetlands. Frequently spread by gardeners that like the bright purple flowers. It can exclude native plants in some settings, but it has been controlled in Michigan somewhat by the introduction of Eurasian Galerucella beetles about 30 years ago.
<https://michiganflora.net/record/1662>

Narrow-leaved Cat-tail

A Eurasian species that has gradually displaced and/or hybridized with our native Broad-leaved Cat-tail. Aside from being narrower, and the hybrids usually taller, there doesn't seem to be a significant detriment to wildlife.
<https://michiganflora.net/record/2745>

Day-lily

Very commonly planted but a widespread invasive weed. Large patches cover roadside ditches and flower beds. Fortunately, it is slow-moving, mostly doesn't spread by seed, and can be tarped or heavily mulched to help eliminate it. Most day-lily tubers can be eaten if boiled.
<https://michiganflora.net/record/1434>

Creeping Charlie, Gill-over-the-ground

A fast grower forming dense cover that can eliminate most other plants in natural settings. Nearly impossible to eradicate once out of control. It can probably be sprayed but if it is nearby on adjoining properties, it will move back in quickly. Borax is said to help control it. Being in the mint family, it makes a nice tea.
<https://michiganflora.net/record/1547>

Lily-of-the-valley

Very commonly planted. Slow-spreading but its dense cover eventually eliminates most other plants. Beautiful flowers and smell, but a very persistent invasive. Skinning or heavy mulching for a few years can help. Caution is suggested if hand-picking because the skin can absorb a powerful compound that can cause heart failure in some people. The plant is quite poisonous.
<https://michiganflora.net/record/828>

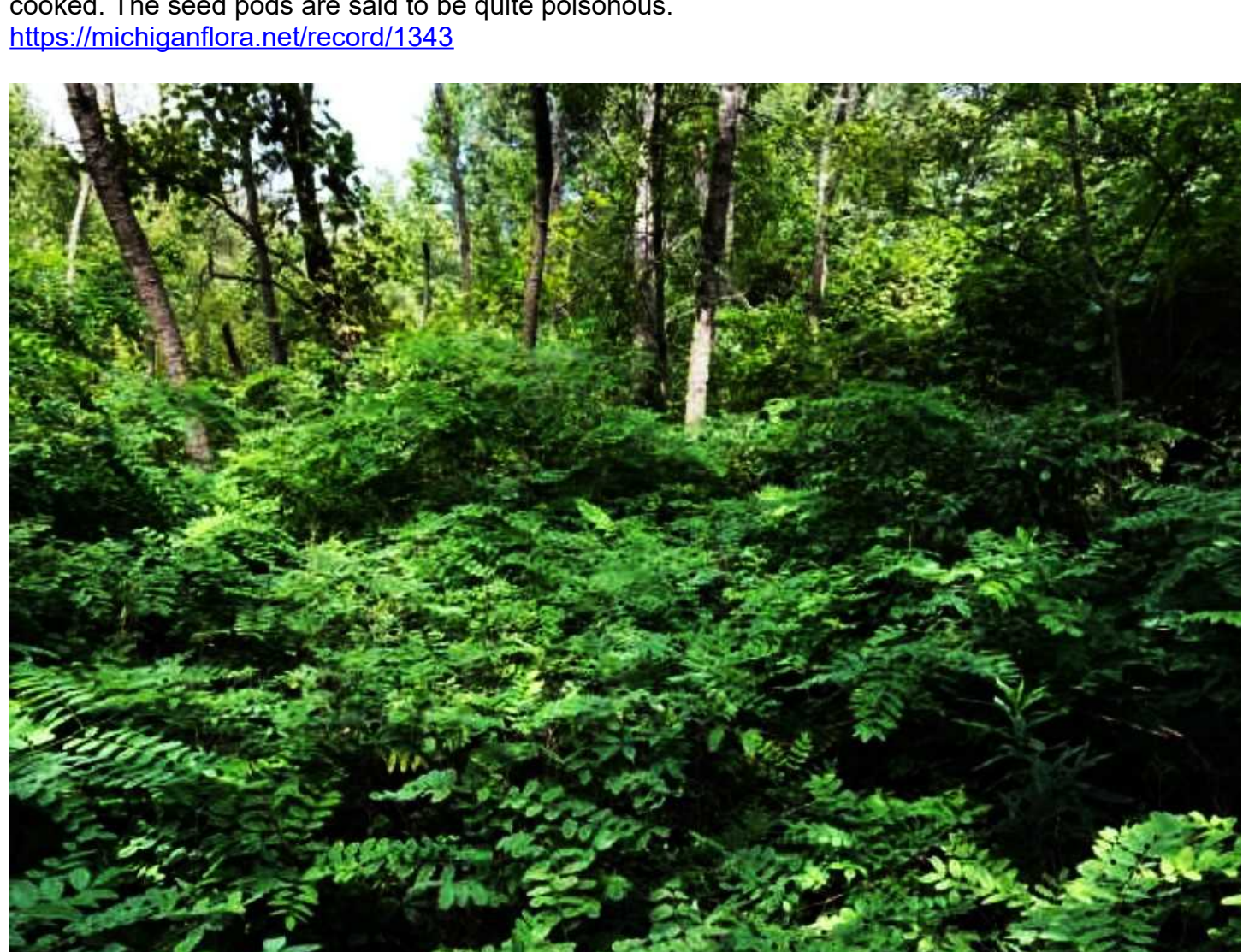
Japanese Spurge, Pachysandra

A popular ground cover planted by many residents. It is slow-spreading, but like other invasive weeds, will eventually dominate large areas.
<https://michiganflora.net/record/687>

Shrubs

Common Privet

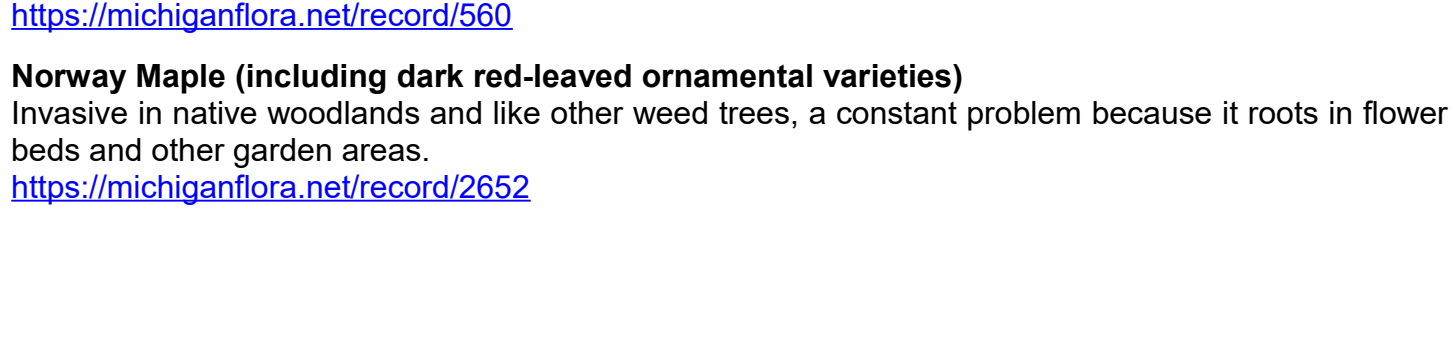
Planted as a hedge all over. Long established in the dune and swale complex of Fort Gratiot, it covers nearly 100% of the understorey in some areas. Spread by birds and mammals. Major cutting, digging, burning, and herbicide treatments are all required to eradicate privet across large areas.
<https://michiganflora.net/record/1739>



Common Privet in the dune and swale forest of Fort Gratiot. Large stems develop sharp spines and it covers huge areas. Eradicate privet wherever you find it! Photograph by Bill Collins.

Japanese Barberry

Widely planted ornamental shrub that dominates many woodlands, especially in Huron County where it forms nearly pure head-high stands in woodlands. Deer ticks are said to hang out on barberry. Spread by birds. The berries and plant are mildly toxic to humans but also medicinal.
<https://michiganflora.net/record/341>



Head-high Japanese Barberry covering a forest in Huron County. Don't plant this stuff! Photograph by Bill Collins.

Winged Euonymus

Widely planted ornamental shrub that forms dense patches in semi-wooded areas. Spread by birds. The berries and plant are mildly toxic to humans but also medicinal.
<https://michiganflora.net/record/803>

Multiflora Rose

Readily moves by bird into many different areas, from field to forest, and grows fast once established. The thorns are sharper and larger than cat claws. Forms impenetrable thickets after several years. We see it nearly everywhere. The fruit (rose hips) taste great in late October or early November.
<https://michiganflora.net/record/2543>

Common Buckthorn

A very persistent shrub or small tree that has taken over huge areas of the eastern US. Widely spread by bird. It forms dense stands that exclude most other plants. Continued cutting, burning, herbicide treatment, and digging are required to control it. The berries and plant are mildly toxic to humans, and as you may have read in our December 2023 news, causes blue pee.
<https://michiganflora.net/record/2414>

Glossy Buckthorn

A very persistent shrub of wetlands that has taken over huge areas across the eastern US. Widely spread by bird. It forms dense stands that exclude most other plants. Continued cutting, burning, herbicide treatment, and digging are required to control it. The berries and plant are mildly toxic to humans, and as you may have read in our December 2023 news, causes blue pee.
<https://michiganflora.net/record/2411>

Autumn-olive

A fast-spreading upland shrub of old fields, spread by bird. The berries are also edible for humans and taste pretty good. It forms dense stands that exclude many other plants. Continued cutting, burning, herbicide treatment, and digging are required to control it.
<https://michiganflora.net/record/1193>

Russian-olive

Very similar to Autumn-olive. A fast-spreading upland shrub of old fields, spread by bird. The berries are also edible for humans and taste pretty good. It forms dense stands that exclude many other plants. Continued cutting, burning, herbicide treatment, and digging are required to control it.
<https://michiganflora.net/record/1192>

Tartarian Honeysuckle (and other non-native honeysuckles)

A relatively fast-spreading upland shrub of old fields and woodlands that forms dense thickets that can exclude most other plants. Continued cutting, burning, herbicide treatment, pulling, and digging are required to control it. The berries and plant are mildly toxic to humans.
<https://michiganflora.net/record/727>

Vines

Oriental Bittersweet

An emerging disaster in the Thumb. A fast-growing vine that eventually covers everything and can even pull down mature trees. Spread by birds. The Port Huron State Game Area and Black River valley in general is increasingly full of it. Becoming widespread in the dune and swale complex along Lake Huron also.
<https://michiganflora.net/record/801>

English Ivy

Very commonly planted ornamental vine. A relatively slow grower but its dense cover eventually eliminates most other plants. Some people have an allergic reaction to it like Poison Ivy and it is slightly toxic if ingested. If planted along a property line or fence line, as many people do, it keeps spreading into adjoining properties which makes it a real pain.
<https://michiganflora.net/record/2933>

Periwinkle, Myrtle

Very commonly planted ground cover. A slow grower but its dense cover eventually eliminates most other plants. The plant is slightly toxic to humans.
<https://michiganflora.net/record/166>

A solid mat of Periwinkle in the Port Huron State Game Area along the old Ford Road trail. Do not plant Periwinkle please, unless it is very confined. Photograph by Bill Collins.

Trees

White Mulberry

Widespread, especially in older urban and suburban areas. Spread by birds into many different open and wooded areas. Berries are edible and quite tasty, but other parts of the tree are said to be mildly hallucinogenic.
<https://michiganflora.net/record/1702>

Siberian Elm

Widespread, especially in older urban and suburban areas. Easily spreads by blowing seeds and is fast-growing. The branches are very brittle and responsible for a lot of power outages.
<https://michiganflora.net/record/2750>

Black Walnut

Native to our region, but its natural range is mostly south of Michigan. It becomes a weed in most areas and difficult to get rid of because it's fast-growing and sets deep roots fairly quickly. Of course, the nuts are very edible and the tree is said to be medicinal.
<https://michiganflora.net/record/1496>

Black Locust

Similar to Black Walnut, Black Locust is native to North America, but its natural range is well south of Michigan, in the Appalachian, Ozarks, and southeast US in general. It is a real weed tree in our region. Patches of Black Locust exclude most other plants and spread quickly by suckers. There are a few patches on the west Shorewood Forrest parcels and several big patches on the sand ridges along M-25. The tree is toxic to humans except for the flowers and supposedly the seeds are edible if cooked. The seed pods are said to be quite poisonous.
<https://michiganflora.net/record/1343>

Dense growth of Black Locust suckers cover part of a sand ridge west of Shorewood Forrest in Fort Gratiot. Photograph by Bill Collins.

Callery Pear, Bradford Pear

This is an emerging super-weed tree that has taken over huge areas to the south and west of Michigan, especially along the east edge of the Great Plains. Very widely planted as a landscape tree over the past 30 to 40 years. It eventually excludes most other vegetation. The pear fruit is generally not edible or palatable. Callery Pear trees have invaded our Loznak Sanctuary in Marysville.
<https://michiganflora.net/record/2331>

Tree-of-heaven (not)

Highly invasive, fast-spreading, and very fast-growing weed tree, especially in older urban and suburban areas. Easily spreads by blowing seeds. Colonizes along sides of buildings, cracks in sidewalks, and any other ground.
<https://michiganflora.net/record/2686>

Catalpa

A relatively fast-growing weed tree, but spreads more in response to disturbed or bare soils. Produces huge amounts of winged seeds that blow all over. Widely planted, especially in older urban and suburban areas and on old farmsteads. Parts of the tree range from mildly toxic to very poisonous.
<https://michiganflora.net/record/560>

Norway Maple (including dark red-leaved ornamental varieties)

Invasive in native woodlands and like other weed trees, a constant problem because it roots in flower beds and other garden areas.
<https://michiganflora.net/record/2652>

Box-elder

A relatively fast-growing weed tree, spread by winged seeds, often blown great distances on top of snow. Colonizes building edges, fields, and many other areas, especially in older urban and suburban areas and around old farmsteads. Like several other native trees, good in the right place, serving an important function in colonizing and reforesting cleared areas and river floodplains, but otherwise a weed.

<https://michiganflora.net/record/2649>

Noxious Weeds

Many of the "noxious weeds" listed in weed ordinances are not really that weedy in most areas. They simply spread rapidly in disturbed soil. Once the soil and vegetation stabilizes, many of these so-called weeds disappear after a few years. Otherwise, they are relatively easy to eliminate. This includes species like Wild Carrot, most of the mustard species (except Garlic Mustard), sow thistles, and Lesser Ragweed.

For more information, see the following links. There is not a real good central web site that covers Michigan invasive weeds and how to control them.

A Field Identification Guide to Invasive Plants in Michigan's Natural Communities

<https://mnfi.anr.msu.edu/invasive-species/InvasivePlantsFieldGuide.pdf>

Michigan Invasive Plants

<https://www.michigan.gov/invasives/id-report/plants>

Michigan Invasive Species Program

<https://www.michigan.gov/invasives>

MISIN - Michigan Invasive Species

<https://www.misin.msu.edu/states/michigan/>

Lake St. Clair Cooperative Invasive Species Management Area (CISMA)

<https://www.michiganinvasives.org/lakestclaircisma/>