

INTRODUCTION TO BACKYARD MANAGEMENT



The area around your home, including the backyard, is the perfect location to enhance wildlife habitat. One reason is that you are already managing the property--growing and mowing grass, tending to trees and shrubs, and planting flower and vegetable gardens. You can use these management strategies to enhance wildlife habitat. Another reason the backyard should be managed for wildlife is that your backyard is probably an edge to another type of habitat such as a cropland, grassland, woodlot, brushland, fencerow, hedge, or other land boundary. With a little management, wildlife that inhabit these edges will most likely frequent your yard. Further, what better place to enjoy wildlife than in your own backyard? Also, developing a wildlife management plan for your backyard can enhance the natural beauty of your home and actually increase its value.

Before you can develop a management plan, you should know what wildlife need to survive, and thus what will attract them to your yard. Wildlife cannot exist without the four components that comprise habitat: food, water, cover, and space. When their habitat is fragmented or destroyed, these components become limited. Remove



or fail to provide any one of these components and wildlife will not survive. These conditions put wildlife at risk, including vulnerability to predators, accidents, and starvation. Because some types of wildlife are not very mobile, local populations may be easily lost when habitat is destroyed. Also, different kinds of wildlife need different combinations of food, water, cover, and space.

Your property may not be large enough to provide all of the habitat needs for the kinds of wildlife you wish to attract. However, you can offer one or more components of habitat and still attract a variety of wildlife to your yard. Usually, a management plan with the widest range of plantings and artificial structures and features will attract the greatest assortment and number of birds, mammals, butterflies, moths, amphibians, and reptiles. Working with neighbors on an overall management plan is a good way to increase both of your properties' appeal to wildlife. Patience is important because some wildlife species may require several years to find the habitat and use it.

Backyard Habitat Components

Food for wildlife is easy to supply. Besides planting natural foods, you can supplement with a variety of products, especially for seed-eat-



ing birds. Although wildlife can't survive in your backyard on food alone, you can attract migrant birds and nearby resident species. The ideal backyard plan supplies as much diversity in food items as possible through plantings of shrubs, trees, flowers, and grasses. Carefully choosing these plants can provide food directly in the form of fruits, berries, nuts, seeds, and nectar. Indirectly, they provide habitat for other sources of food such as insects, spiders, grubs, and worms. Features such as small ponds and piles of rocks, brush, and leaves improve both the variety and quantity of available food.



Wildlife need **water**, for both drinking and bathing. You can provide water in a birdbath, recirculating waterfall, shallow dish, or dripping hose. Most desirable is a small, shallow pond with an area large enough to support plants that grow in water and around the edge. The pond will become the center of activity for a wide range of wildlife species. Turtles and frogs will sun there and make use of the pond's cover as a nursery area for their young. Insects will use the pond for reproduction, greatly enhancing the food chain.

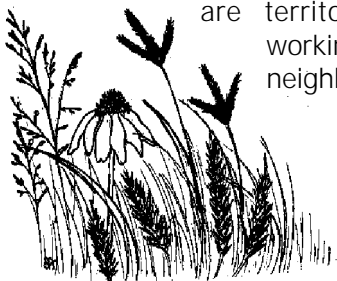
Cover helps shield wildlife from harmful weather and protects them from predators. Different kinds of cover serve the sheltering

needs of different wildlife species. Rock piles or piles of wood, for example, help keep chipmunks safe from hawks and cats.



Brush piles protect rabbits, toads, and salamanders. Dense shrubs shelter chickadees and cardinals. Painted turtles and leopard frogs hide under submerged logs when threatened. Cavities in trees offer safe places for squirrels. The farther an animal must venture from shelter, the more vulnerable it is to predation, and that is why plants that provide both food and cover are an important consideration. Placing trees, shrubs, flowers, or grasses in clumps creates a natural community and provides diversity. Also, adding specific wildlife houses to your property may attract bats, wood ducks, and a wide variety of songbirds.

All wildlife need **space** and some species--in particular most nesting birds--are highly territorial. Space and territorial needs vary with each wildlife species. By understanding how much space is necessary for each species, you can learn what wildlife is attracted to your property. Bluebirds, for instance, are territorial and need about five acres per pair. In contrast, purple martins are not territorial, and need only small areas. You can create a larger area for those species that are territorial by working with neighbors.



The greater the diversity of habitat, the greater the variety and number of wildlife species attracted to the habitat. Some of the best backyard habitats are those comprised of trees bordered by tall shrubs and low shrubs, which are next to wildflowers or native grasses bordered by a small amount of lawn. Each border provides a different kind of "edge". What follows is a summary of management ideas for your property. Each consideration is more fully explained in the chapters in this Backyard Section.

Trees and Shrubs

Trees and shrubs add color to landscapes, provide shade in summer, protection from wind in winter, and offer texture to the area around your home. Planting trees and shrubs in your yard will reduce the area of lawn, which will reduce mowing and maintenance giving you more time to enjoy your property. In the long run it will also save you money as you will no longer need fertilizers, pesticides, or irrigation. Plantings that serve a dual-purpose--providing food for wildlife and aesthetic beauty for your home, for example--increase in home value, and therefore deserve strong consideration in backyard planning.



The wildlife habitat components that trees and shrubs create include cover for nesting and rearing young, secure winter cover, and summer, fall, and winter foods. For example, dense pines and spruces provide roosting sites and escape

cover for mourning doves, chickadees, and other songbirds. Gray dogwood and American mountain-ash offer fall fruits to migrating birds. Tall oaks and hickories provide hard mast (nuts) to squirrels and blue jays in winter and cool shade on hot summer days.

When choosing trees and shrubs for your property, considering color, texture, and height will help you to provide a pleasing landscape. Early blossoming shrubs such as crabapples, lilacs, and red-bud offer spring color. Silky dogwood and red elder give summer color, and red elder, serviceberry, and red-osier dogwood provide a palette of beauty in late summer and early fall. Fall-fruiting shrubs and the leaves of maple, birch, aspen, and other deciduous trees furnish an array of color in fall. Red-osier dogwoods show a striking red, and conifers give a pleasing green to a bleak winter landscape.

Pyramidal-shaped American mountain-ash and spruces, round-shaped crabapples and dogwoods, and flat junipers all add different shapes and sizes to your property. The fine textures of hemlock, white pine, and serviceberry can be a sharp contrast to rough-textured plants such as hawthorn and jack pine. Trees and shrubs come in all heights. Choosing a variety assures nesting and feeding sites for birds with strong preferences for specific elevations, providing visual screens, and adding to landscape diversity.

Grasses and Ground Covers

Mowed lawns require time and money to maintain, and they provide little habitat for wildlife.

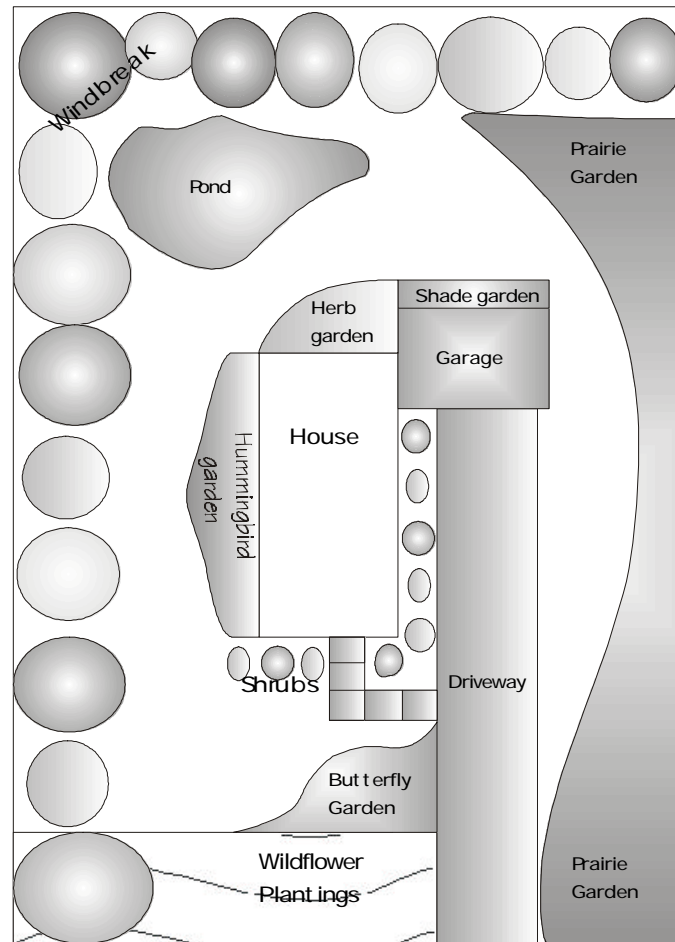
INTRODUCTION



Canada wild-rye

Monocultures of weed-free grass demand water, fertilizers, herbicides, and frequent mowing, and they are easily stressed by extreme drought or wet conditions. An estimated 70 percent of pesticide use occurs on the nation's lawns, but those with diverse wildflowers, groundcovers, and native grasses provide for a healthier, environmentally friendly lawn, which does not need chemicals. For these reasons, consider reducing the mowed areas in your yard to as little as possible.

Areas with tall, unmowed, or infrequently mowed grasses can provide outstanding wildlife habitat such as nesting and brooding areas, insect-foraging sites, and green foraging areas for deer and rabbits. Brown thrashers, bluebirds, pheasants, and wild turkeys are among several types of birds that also use such unmowed areas. These can be places where you let the grass go wild or where you plant to a specific grass type to create a meadow, prairie, or wildflower viewing spot. Mixing flowers with grasses is a good choice as they will furnish a nectar source for bees, butterflies, and hummingbirds.



A landscape providing the four wildlife habitat components: food, water, cover, and space.

Ground covers offer an ideal opportunity to reduce the mowed lawn surface and to develop low-maintenance wildlife habitat. Examples include wild ginger, wintergreen, and bearberry. They provide nest sites for ground-nesting songbirds, brood-rearing areas for pheasants and quail, and protective cover for rabbits and chipmunks. Such plantings can provide more formal settings for wildlife landscaping projects.

Special Feature Gardens

Everyone loves a garden. Specialty gardens serve to enhance

viewing pleasure and attract certain kinds of wildlife. Butterfly, hummingbird, and native prairie gardens are well suited to this purpose. Besides adding beauty to the landscape, gardens that are creatively designed and well-tended can increase the value of your property. On larger properties these special-feature gardens break up the monotony of your lawn and reduce mowing time. If you do not own property, you can still enjoy a small-scale garden by arranging planters and potted flowers on the balcony or deck of your apartment, townhouse, or condominium.

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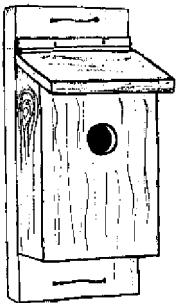
Wildflowers

Michigan has a wide variety of native wildflowers that offer spectacular color and are well-suited to a number of locations. What better way to create beauty and wildlife habitat, along with contributing to our state's natural heritage, than by planting native wildflowers on your property? Once established, wildflowers enhance the attractiveness of the landscape, help control erosion, furnish food and cover for wildlife, and provide maximum enjoyment with minimal care. An increasing number of property owners are converting portions of their large, high-maintenance lawns to plantings of wildflowers. After the initial cost to establish them, you will save money and time by not having to fertilize, mow, and rake your lawn. Wildflower stands are also showing up in increasing numbers on public property, such as highway rights-of-way, corporate industrial parks, and various recreational areas.

Homes and Feeders for Wildlife

Planting trees and shrub thickets give some birds roosting shelters, food sources, and places to

build their nests. Leaving leaf litter, rotting logs, and fallen branches in a woodland setting provides homes for salamanders and snakes. Standing dead or dying trees (snags)



attract woodpeckers, squirrels, screech owls, and other cavity nesters. Restoring or protecting wetlands helps furnish homes for waterfowl and other wetland birds, turtles, snakes, frogs, toads, and salamanders. In addition to creating natural homes for wildlife, consider building nest boxes and feeding stations and placing them in your backyard to enhance viewing pleasure.

In summary, your backyard is the ideal place to create wildlife habitat. Once established, you will reduce the amount of maintenance, saving time and money. In addition, you will have attracted many kinds of wildlife to watch and enjoy.

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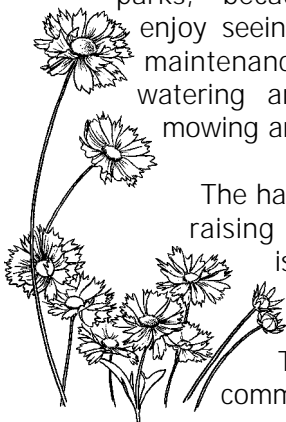
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WILDFLOWERS



What better way to create beauty and wildlife habitat, along with contributing to Michigan's natural heritage, than by planting native wildflowers on your property? Once established, wildflowers enhance the attractiveness of your landscape, help control erosion, furnish food and cover for wildlife, and provide maximum enjoyment with minimal care. An increasing number of property owners are converting all or portions of their large, high-maintenance lawns to plantings of wildflowers. Wildflowers can be established either from seed in larger areas or from plants in smaller gardens. After the initial cost of establishment, these plantings will save you money and time as you will not have to fertilize, mow, and rake that portion of your lawn. Also, they help to increase the value of your land. Wildflower stands are also showing up in increasing numbers on public property, such as highway rights-of-way, corporate parks, and various recreational parks, because people enjoy seeing them and maintenance costs of watering and frequent mowing are reduced.



coreopsis

The hardest part of raising wildflowers is successfully establishing them. There is a common misconception that wildflowers

are easily grown from seed. On the contrary, all wildflowers require specific soil and temperature conditions, a considerable amount of early attention, and most of all patience. When converting grass to wildflowers, you may have to till sod or perhaps, in the case of a well-established lawn, remove it. Under ideal conditions, most native wildflower plantings take at least two years to be fully developed. Therefore, you should not expect to see blooms the first year, or even the second year with some species. Most plantings take three to five years to become established firmly enough to reduce weedy competition. But the reward is well worth the work and the wait.

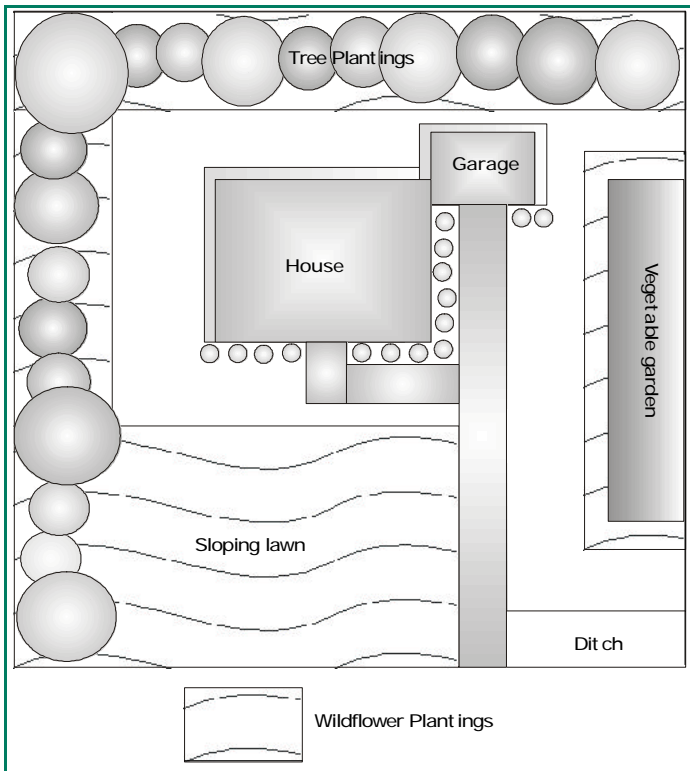
Expect to see lots of butterflies, moths, bees, and hummingbirds in the summer and many songbirds, such as goldfinches, in the fall. Enjoy the panorama of color in spring, summer, and fall that you created through careful planning. You can do this as you take a well-deserved break from your previously manicured lawn maintenance.

Where to Plant

Wildflower plantings can be as small as a few square feet of border around the vegetable garden or as large as several acres. You may want to consider locations that are difficult to mow on a regular basis, such as ditches, around trees, near woodlots, or in wet areas. Because a wildflower stand does not require

the same intensive maintenance as a lawn, you may want to plant anywhere you are simply tired of mowing. For best results, choose an area that is well-drained and that has a limited population of weeds. Weed seeds lie in undisturbed soil, and you should expect some weeds to germinate whenever the soil is disturbed. If the area you have chosen is void of plants, chances are it won't grow wildflowers either. Be sure to pick a location that you can water if rainfall is inadequate during germination and establishment. The size of the wildflower planting should only be a major concern when time and expense are large factors. Whether or not you have a large area or one or more small scattered areas, you can bring color, diversity, and wildlife to your backyard.

All plants have certain requirements for sunlight, moisture, and nutrients. Some species require a great deal of sunshine, at least eight hours per day, while many other species will tolerate partial shade. Be aware that sun-loving plants placed in shade will produce spindly plants with very few blooms. Common planting locations include dry areas, moist to wet areas, areas of moderate nutrition and moisture, and in or at the edges of woodlots. However, some wildflowers will not grow well on very compacted, wet clay or extremely droughty, infertile soils. Therefore, it is essential that you determine the drainage and soil type of the area where the wild-



flowers will be planted. A soil survey map can give you that information and should be available at the Conservation District office in your county. This map indicates the soil type and the percent slope of your land, along with detailed explanations. This information is imperative to a successful wildflower planting. If you wish to know the pH of your soil, your county extension office can perform a soil test to measure pH and nutrient levels. In order to receive this information you must remove soil from the area and take it to the extension office for analysis. For more details about how to take a soil sample, refer to the chapter **Knowing Your Soils** in the Habitat Planning section.

What to Plant

Where you decide to plant the wildflowers will determine which species to plant. Michigan has a wide variety of native wildflowers that offer spectacular color and are well-suited to a number of locations.

Wildflowers may be annuals, perennials, or biennials. Annual plants are those that go from seed to flower to seed within a single growing season. Each year roots, stems, and leaves of the plant die and only dormant seeds are left to regenerate the following year, most of which are not successful. Examples of annuals that are beneficial to butterflies, moths,

bees, and hummingbirds include marigold, scarlet petunia, tobacco flower, scarlet sage, and zinnia. These are exotic species, but they are not aggressive and do not present threats to the success of native plants. They are good supplements to your perennial garden and as colorful borders. However, you should incorporate only small amounts of them to cut down on annual costs.

Perennials, such as butterfly-weed, tickseed, purple coneflower, and shasta daisy, live for many growing seasons, and keep their roots year-round. When started from seed, perennial wildflowers will not bloom until the second year after planting. After that, they will bloom every year and you will not have to replace them as you do annuals. However, depending on soil and climate conditions, some wildflowers act as annuals or perennials--for example, black-eyed Susan behaves as an annual in Louisiana but in Michigan is a

perennial. For best success and greatest benefit, choose perennial wildflowers native to Michigan. If possible, buy seed from plants actually grown in Michigan, and even better, from a local seed source.

In combination with native perennial wildflowers, you may wish to plant native grasses. Common types that should do well on most sites (except in woodlots) are big bluestem, little bluestem, Indiangrass and switchgrass. These are clump grasses that provide open spaces for wildflowers to grow as well as good nesting, rearing, and winter cover for wildlife. In backyard settings they add beauty and diversity, especially in winter. For more information see the chapters on **Warm Season Grasses and Prairie Restoration** in the Grassland Management section.

Biennials need two years to complete their life cycle. First-season growth produces a small rosette of leaves near the soil surface. During the second year the plant grows a stem, flowers, produces seed, and then dies. Biennials include sweet clover, mullein, curly dock, wild mustard (yellow rocket), shepherd's purse, black mustard, foxglove, and the thistles. Many of the species listed here are exotics and may present problems to wildflower plantings for the first couple years. Because they are biennials, they should die off after the first two years and the planted wildflowers will then be able to flourish. However, to ensure success of your wildflowers, you can control them by spot treating with herbicides or cutting them by hand.

The accompanying tables of perennial, native wildflowers should be helpful for choosing the

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Wildflowers for Moist to Wet Soils

Common Name	Scientific Name	Color	Sunlight Needs	Height	Blooming Season
Blue Vervain	<i>Verbena hastata</i>	Blue/Purple	f - p	2 - 4 ft.	July-September
Boneset	<i>Eupatorium perfoliatum</i>	White	f - p	3 - 4 ft.	July-August
Cardinal flower	<i>Lobelia cardinalis</i>	Red	f - p	2 - 4 ft.	July-September
Great blue lobelia	<i>Lobelia siphilitica</i>	Blue-Violet	f - p	1 - 4 ft.	August-Sept.
Marsh marigold	<i>Caltha palustris</i>	Yellow	f	1 - 2 ft.	April-June
New England aster	<i>Aster novae-angliae</i>	Rose/Purple	f - p - s	1 - 4 ft.	Sept.-October
Prairie dock	<i>Silphium terebinthinaceum</i>	Yellow	f	2 - 6 ft.	August-September
Spotted Joe-pye-weed	<i>Eupatorium maculatum</i>	Rose	f	2 - 6 ft.	July-September
Swamp milkweed	<i>Asclepias incarnata</i>	Lavender	f	2 - 4 ft.	June-August
Sweet black-eyed Susan	<i>Rudbeckia subtomentosa</i>	Yellow/Brown	f	2 - 4 ft.	July-August
Wild bergamot	<i>Monarda fistulosa</i>	Lavender	f	2 - 3 ft.	June-July
Wild iris	<i>Iris shrevei</i>	Purple	f	2 - 3 ft.	June

f = full sun p = partial sun s = shade

Wildflowers for Dry to Moderate Soils

Common Name	Scientific Name	Color	Sunlight Needs	Height	Blooming Season
Black-eyed Susan	<i>Rudbeckia hirta</i>	Yellow/brown	f - p	1 - 3 ft.	June-August
Butterfly weed	<i>Asclepias tuberosa</i>	Orange	f - p	2 - 3 ft.	July-August
Common milkweed	<i>Asclepias syriaca</i>	Rose-purple	f - p - s	3 - 5 ft.	June-August
Gray-headed coneflower	<i>Ratibida pinnata</i>	Yellow	f	3 - 5 ft.	July-September
Hairy Beardstongue	<i>Penstemon hirsutus</i>	White/lavender	f - p	1 - 2 ft.	May-July
Lance-leaved coreopsis	<i>Coreopsis lanceolata</i>	Yellow	f	1 - 2 ft.	May-August
Leadplant	<i>Amorpha canescens</i>	Violet	f	2 - 4 ft.	June-July
Maximilian sunflower	<i>Helianthus maximilliani</i>	Yellow	f	2 - 5 ft.	August-October
Purple coneflower	<i>Echinacea pupurea</i>	Purple	f - p	2 - 4 ft.	July-August
Rattlesnake master	<i>Eryngium yuccifolium</i>	White	f	3 - 5 ft.	July-September
Rough blazingstar	<i>Liatrus aspera</i>	Purple	f - p	2 - 4 ft.	July-September
Round headed bushclover	<i>Lespedeza capitata</i>	White	f - p	2 - 3 ft.	August-Sept.
Showy goldenrod	<i>Solidago speciosa</i>	Yellow	f	2 - 5 ft.	August-Sept.
Smooth aster	<i>Aster laevis</i>	Lavender	f	2 - 3 ft.	August-Sept.
Stiff goldenrod	<i>Solidago rigida</i>	Yellow	f	2 - 5 ft.	August-Sept.
Western sunflower	<i>Helianthus occidentalis</i>	Yellow	f	1 - 3 ft.	July-August
Wild bergamot	<i>Monarda fistulosa</i>	Pink-lavender	f	2 - 3 ft.	June-July
Wild indigo	<i>Baptisia tinctoria</i>	Yellow	f	1 - 3 ft.	May-Sept.
Wild lupine	<i>Lupinus perennis</i>	Blue/lavender	f - p - s	1 - 2 ft.	June-July
Wild Senna	<i>Cassia hebecarpa</i>	Yellow	f	3 - 5 ft.	July-August

f = full sun p = partial sun s = shade

WILDFLOWERS

Wildflowers for Woodlands (shaded sites)

Common Name	Scientific Name	Color	Sunlight Needs	Height	Blooming Season
Common milkweed	<i>Asclepias syriaca</i>	Rose-purple	f - p - s	3 - 5 ft.	June-August
Dutchman's breeches	<i>Dicentra cucullaria</i>	White	s	5-9 in.	April-May
Hepatica	<i>Hepatica</i> spp.	White, to blue	p - s	4 - 12 in.	March-May
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>	Green-purple	p - s	12 - 2 ft.	April-June
Large-flowered trillium	<i>Trillium grandiflorum</i>	White-pink	p - s	1 ft.	April-June
May-apple	<i>Podophyllum peltatum</i>	White	s	1 ft.	April-June
Meadow-rue	<i>Thalictrum dioicum</i>	White	s	1-2 ft.	April-May
Pale touch-me-not	<i>Impatiens pallida</i>	Yellow	s	3 - 5 ft.	July-October
Spotted touch-me-not	<i>Impatiens biflora</i> or <i>capensis</i>	Orange	p - s	2 - 5 ft.	July-September
Spring beauty	<i>Claytonia virginica</i>	White-pink	p . s	1 ft.	March-May
Solomon's seal	<i>Polygonatum biflorum</i>	Yellow	p - s	1 - 3 ft.	April-June
Squirrel corn	<i>Dicentra canadensis</i>	White	s	6-12 in.	April-May
Turk's-cap lily	<i>Lilium michiganense</i>	Orange	f - p	3 ft.	July-August
Trout lily	<i>Erythronium americanum</i>	Yellow	p - s	4-10 in.	March-May
Violet	<i>Viola</i> spp.	Violet - blue	s	4-6 in.	April-July
Wild bleeding heart	<i>Dicentra eximia</i>	Pink-red	p - s	1 ft.	May-Aug.
Wild columbine	<i>Aquilega canadensis</i>	Red	f - p	1 - 2 ft.	May-June
Wild ginger (low vine)	<i>Asarum canadense</i>	Purple-brown	p - s	1 ft.	March-May

For woodland/grassland edges

Butterfly weed	<i>Asclepias tuberosa</i>	Orange	f - p	2 - 3 ft.	July-August
False Solomon's seal	<i>Smilacina racemosa</i>	White	p - s	1 - 3 ft.	April-June
Fireweed	<i>Epilobium angustifolium</i>	Pink	f - p	2 - 4 ft.	July-August
Wild bergamot	<i>Monarda fistulosa</i>	Pink-lavender	f	2 - 3 ft.	May-July
Wild columbine	<i>Aquilega canadensis</i>	Red	f - p	1 - 2 ft.	April-July
Wild geranium	<i>Geranium maculatum</i>	Lavender	p - s	1 - 2 ft.	April-May
Wild lupine	<i>Lupinus perennis</i>	Blue/lavender	f - p - s	1 - 2 ft.	June-July
Woodland sunflower	<i>Helianthus divaricatus</i>	Yellow	f - p	2 - 6 ft.	July-September

f = full sun p = partial sun s = shade

best plants for your area. While color and height are important, you should also consider the blooming season. Spread your blooming season throughout the spring, summer, and fall for the butterflies, moths, bees, and hummingbirds that will feed on the pollen and nectar, the birds that will eat the seeds after bloom, and your personal viewing pleasure.

Remember, patience is important as establishing a planting of wildflowers from seed will take

three to five years. For small areas you may wish to use plants instead of seeds. You can also fill in the area with a few annual plants until the perennials bloom. Many wildflower suppliers offer annual mixes for this purpose. Check these mixes carefully for weeds that may cause serious problems, such as queen Anne's lace and chickory. However, you should expect a weed problem the first year. Avoid the temptation to pull them because you may damage the fragile wildflower

seedlings. For more information refer to the chapter on **Wildflower Planting** in this section.

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WILDFLOWER PLANTING



Once established, wildflowers enhance the attractiveness of your landscape, help control erosion, furnish food and cover for wildlife, and provide maximum enjoyment with minimal care. The plantings can be as small as a few square feet of border around the vegetable garden or individual trees, or as large as several acres. Even small areas of wildflowers, especially when coupled with grass, tree, and shrub plantings, can shelter chipmunks, and migrating birds and can be used as a travel corridor by many wildlife species. Many landowners are saving money and labor by converting their high-maintenance lawns to wildflower plantings.

This chapter explains how to establish wildflowers on your property and how to maintain them for long-term wildlife habitat and viewing pleasure. Key factors are careful site selection, preparation, and maintenance. This can include choosing plants that are suited to



purple coneflower

the soil, picking the right method and time of installation, controlling weeds before and after planting, and managing for long-term success. There is an important emphasis placed on planting native wildflowers. Native refers to those species that historically occurred naturally in an area (i.e. was not introduced). These native species are important to the Michigan ecosystem and its continued existence.

Site Consideration

If the area you have selected is capable of growing a healthy lawn, it will most likely support the establishment of wildflowers. However, you must match the wildflowers you choose with the type of soil you have, the soil moisture, and the amount of light that the area receives. For wildflowers needing direct sunlight, the location should receive a minimum of eight hours per day. Also, be sure to pick a location for maximum viewing pleasure. In sites with less sunlight, such as wooded areas, you should look for plants that are tolerant of shade.

Knowing your soil type is essential for successful establishment of wildflowers. Information on soil types is available from county wide soil survey maps that are available at your local Natural Resources Conservation Service and sometimes from your Michigan State University County Extension office. You can also take a soil



poppy

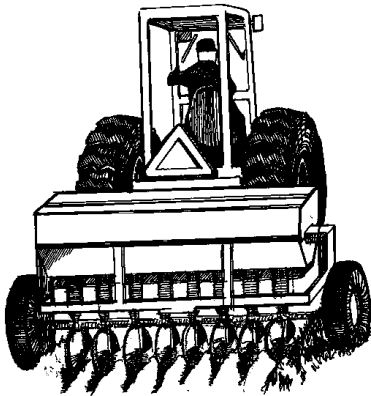
sample to the county extension office to find out the pH level and nutrient contents of your soils. For more information refer to the chapter **Knowing Your Soils** in the Habitat Planning Section. As a general rule, adding topsoil or fertilizer is not recommended as it will increase weedy competition. Topsoil usually contains dormant weed seeds, and heavy doses of fertilizer will enable them to grow and compete more heavily with wildflowers.

Soil moisture is equally important in deciding what wildflower species to plant. Moist soils have a generous amount of water in the subsoil throughout the growing season. Clues are periods of standing water in spring and fall. Dry soils include sandy and gravelly soils that drain readily and never have standing water, even after a heavy rain. Moderate or mesic soils include well-drained loams and clays. These soils may have standing water for short periods after a hard rain. To see which types of

wildflowers grow best in which environments, refer to the tables that accompany the **Wildflowers** chapter in this section.

Site Preparation

It is very important to remove all existing vegetation before planting wildflowers. If this vegetation is not properly eliminated, you will have limited success with your plantings. There are many ways to eliminate existing vegetation, either singly or in combination. Smothering the soil surface with plywood, a thick layer of leaves, or a sheet of black plastic will kill many existing plants if the covering is left in place for one full growing season. This practice is commonly used for areas less than 1,000 square feet. For more aggressive species, such as quack grass and Canada thistle, you may have to leave the covering for a longer period of time. A low toxicity, non-persistent herbicide such as Roundup is another efficient method. Be sure to read and follow all labeled directions. A third technique is to cultivate with a rototiller, plow, or disk. Commercial companies often remove old grass with a sod cutter. What works best depends on the size of the area and the vegetation currently growing there. The most effective way to remove existing vegetation is to mow, apply herbi-



cide, and cultivate repeatedly until vegetation is controlled.

Converting Lawns

One of the best ways to prepare a lawn for wildflower planting is to remove the top three inches of grass and soil, using a commercial sod cutter on big sites and a hand shovel on smaller sites. A second method is to apply herbicide in spring or fall when lawns are actively growing. In about two weeks or after the area has turned brown, cultivate once with a rototiller or disc, taking care not to disturb the soil deeper than two inches (to discourage deeper-soil weeds from sprouting). After one week cultivate again. If weeds continue to germinate after a week, you may need to spray again.

Converting Old Fields

Converting an old field to wildflowers requires at least one full growing season to prepare the site. Burn or mow in early spring to remove the previous year's growth. Apply herbicide three times during the season: mid-spring, mid-summer, and early fall. This schedule allows you to attack different weeds which have peak growing activities at different times. Cultivate every two to three weeks to a depth of four or five inches. Be very consistent because it is important to rid the area of weeds before planting, especially grasses such as quack grass and reed canary grass.

Converting Crop Fields

Good soils are more weed-prone than poor soils. For existing crop fields, spray with herbicide either after harvest in fall or after green up in spring. Similar to old fields, using cultivation and subse-

quent application of herbicide, work the soil all spring and summer. Once vegetation is fully removed, prepare the final seedbed by lightly tilling or discing, followed by dragging or raking. Caution: Do not plant wildflowers in fields treated with Atrazine within the last two years because wildflowers cannot tolerate this herbicide. A smother (or cover) crop of corn or sorghum will hold the soil from erosion for a year and control unwanted weeds until the Atrazine breaks down.

On sites prone to erosion, do not leave the soil unvegetated for any length of time, and keep cultivation to a minimum. Plant the site as soon as it is ready or, if ready in the fall, plant a cover crop of oats at the rate of 100 pounds per acre or annual rye at the rate of one bushel per acre. When you are ready to plant the wildflowers in the spring, till the cover crop under. It is critical to use certified seed when planting cover crops so as to not introduce more weeds.

Seeding

Once you have the site properly prepared, seeding can commence. If the soil is loose, roll or press with an ordinary lawn roller to firm it up. Sow the seeds with a whirlwind mechanical seeder or cast by hand. If you hand cast, consider mixing the tiny seeds with a slightly dampened inert material such as vermiculite, sawdust, or peat moss so the seed will stick to it. For a planting of 1,000 square feet, two-thirds of a bushel basket of inert material is plenty. For an area 1/10 acre in size (about 4,400 square feet) two bushel baskets will suffice. Mix the seed into the inert material. Evenly spread half of the total mixture over the area,

WILDFLOWER PLANTING

then cast the other half while walking in a perpendicular manner to your first pass.

If the seed has not already been mixed by your supplier, consider sowing each type of flower in small clumps or drifts throughout the area, which will mimic natural colonization. If planting in combination with native grass, sow the grass seed separately. Lightly rake and/or roll the site, taking care not to cover the seeds more than their average diameter (about 1/16th inch). Therefore, expect some seeds to be visible. Mulching may be necessary on potentially erosive slopes. If mulching, use only light material such as clean oat or wheat straw and cover no more than half of the bare soil. If necessary, water for four to six weeks, just enough to moisten the seeds with each application.

Follow the supplier's instructions as to seeding rates. Wildflowers are generally planted at the rate of four to five pounds per acre although some seed supply companies recommend rates of six to eight pounds per acre. When seeding with native grasses, you may only need one pound wildflowers per acre, depending on the desired density of wildflowers. If using transplants, follow the supplier's planting instructions.

Consider a large broadcaster or no-till grain drill for planting large areas. Because wildflower seeds are so small, adding a bag of cracked oats to the drill will help ensure even distribution of seeds, which will settle below the larger oats in the drill. Also, be sure to count the number of passes necessary to cover the field and then divide the seed into an equal number of passes. Fill the drill hopper

after each pass with the correct amount of seed and oats.

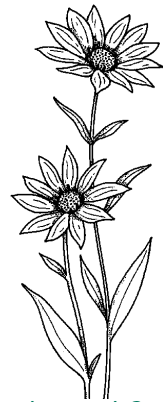
Post-planting

Most native wildflower seeds take at least three weeks to germinate. Do not expect to see blooms the first or possibly even the second year. Supplementing your planting with a few annual wildflowers will give you a show of color the first year. Many seed suppliers mix annuals with perennials for this reason. Be sure to check for aggressive exotic species in the mix to avoid problems.

Expect a weed problem in the first year. Avoid the temptation to pull the weeds, because the wildflower seedlings may be dislodged. Instead, mow to a height of six to eight inches throughout the summer and into early fall (wildflowers do not usually grow taller than six inches the first year). This mowing will remove the seed heads of weeds before they are mature, which will prevent them from regenerating. If the planting was supplemented with annuals, however, mowing will sacrifice them unless you wait until the blooming period has passed. Consider spot mowing problem areas or over rough terrain with a stringed power weed trimmer. Mature establishment of perennial wildflowers will occur in three to five years. Weeds should not be a problem by then.

Long-term Management

In the early spring of the second year, mow the planting to the ground and rake off the cuttings. If weeds remain a problem in the second year, mow again in late spring or early summer. To avoid damaging desirable plants, do not mow after new plant growth has reached



black-eyed Susan

one foot or more. If you mow too late in the fall, you may destroy the seedheads of coneflowers and coreopsis, which feed birds in winter. Also, mowing too late in the season will remove vital nesting cover for early spring, as well as remove the aesthetic value of snow on native grasses and wildflower stalks in winter. By the third year weeds should be minimal.

Burning, which is also a valuable management tool for long-term success, can be started at the beginning of the third growing season. Burning removes the accumulated plant litter from the previous year's growth and exposes the soil surface to warming rays of the sun. It also encourages the growth, flowering, and seed production of native flowers and grasses. Conducting a burn right after snowmelt produces a slow, cool burn, which benefit wildflowers the most. A mid-spring burn, from three weeks after snowmelt to about 60 percent greenup, is most beneficial to prairie grasses because it helps set back undesirable cool season plants that begin their growth early in the season.

Never initiate burning after new plant growth has reached one foot or taller, and be sure to check with local fire authorities for permits and

WILDFLOWER PLANTING

Wildflower Planting Plan

Year	Plan	Methods
1	Evaluate Site	Know soil type through soil survey maps. Decide on location as it determines what plants will be able to grow
	Remove Vegetation	Smothering, using herbicides, cultivation, and burning are all ways to remove vegetation, and are dependent on the site's location.
	Seeding	Use a lawn roller, and either cast with a seeder or by hand. Expect a 3 week germination period before any results are seen.
	Avoid Pulling Weeds	Instead of weeding, mow at 6-8 inches off the ground in late summer/early fall. Spot mow in trouble areas.
2	Mow in Spring	Mow close to the ground, and rake the cuttings. Let it grow the rest of the year.
3	Burn in Spring	Burn at the beginning of growing season (3 weeks after snowmelt) every 3-4 years.
Beyond 3	Burn in Sections	Consider burning 1/3 parcel every year to add diversity.
		Always check with authorities for regulations on burning.

other regulations. Plan to burn every three to five years. Splitting large parcels into thirds and burning or mowing one-third each year will help provide habitat diversity. If you have more than one planting area, burn or mow one planting per year.

Factors That Cause Poor Results

Nothing is more frustrating than spending money and time on establishing wildflowers only to have the planting fall short of expectations. The following 10 factors are common reasons why some landowners experience poor results or, in some cases, failure.

1. Unsuitable site conditions for the species of wildflowers being planted.

2. Not enough weed control -- before or after planting.

3. Disturbance of soil deeper than two inches during site preparation.

4. Planting at the wrong time of year (late summer or fall).

5. Ignoring recommended seeding rates.

6. Covering the seed too deep beneath the soil surface.

7. Not enough sunlight.

8. Inadequate rainfall after seed germination.

9. Extreme weather conditions.

10. Impatience.

Thus, to ensure a successful planting, it is important to educate yourself about proper procedures. Stick to the methods described here and you should reap wonderful rewards.

FOR ADDITIONAL CHAPTERS CONTACT:

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FOR ADDITIONAL ASSISTANCE: CONTACT YOUR LOCAL CONSERVATION DISTRICT



TREES & SHRUBS

Trees and shrubs can help provide a wide variety of backyard landscape designs while creating valuable wildlife habitat. Planting trees and shrubs offers a variety of benefits to your home. They add color to landscapes, provide shade in summer, protection from wind in winter, and offer texture to the area around your home. These plantings reduce the size of your lawn, which saves you time and money as you will not need as much mowing, fertilizers, or pesticides. They may also increase the value of your home.

The wildlife habitat that trees and shrubs create includes sites for nesting and rearing young, secure winter cover, and summer, fall, and winter foods. For example, dense pines and spruces provide roosting sites and escape cover for mourning doves, chickadees, and other songbirds. Gray dogwood and American mountain-ash offer fall fruits to migrating birds, and oaks and hickories provide hard mast (nuts) to squirrels and blue jays in winter and cool shade on hot summer days.

There are four factors to consider when choosing trees and shrubs for your backyard: (1) your landscaping goals, (2) wildlife values of the trees and shrubs, (3) their aesthetic characteristics (color, texture, height), and (4) your landscape's characteristics (soils, slope, location). Plants that serve multiple purposes, such as



providing both food for wildlife and aesthetic beauty for your home, deserve the strongest consideration.

Landscaping Goals

Before deciding what to plant, you must determine what goals you have for landscaping. Are you interested in creating a colorful backyard? Do you want to develop visual barriers from neighbors or sound barriers from a noisy street? Is providing shade important? Is your goal to protect your home from winter winds? To help you determine your goals, refer to the chapter **Setting Goals and Considering Alternatives** in the Habitat Planning section.

Oaks, hickories, maples, and other large deciduous trees planted on the south side of your home can provide relieving shade in summer and allow the winter sun to furnish warmth. Conifers mixed with tall and medium shrubs provide a privacy screen. Medium and short

shrubs mixed with perennial flowering plants can furnish color and serve as attractive foundation plantings around the base of your home, as well as backgrounds to formal flower plantings and borders around trees, fences, and other structures.

A mixture of deciduous plants (whose leaves drop in fall) and conifers (evergreens) is highly effective for creating shade, shelterbelts or windbreaks, and visual barriers. Locate them on the windward side of the area to be protected and plant them a distance from your home of three to four times the mature height of the tallest plant. In other words, if the tallest tree in the windbreak is 50 feet, plant the windbreak 150 to 200 feet from your home.

Wildlife Values

You should also choose trees and shrubs based on their value to wildlife. Food production and cover are the two most important values that trees and shrubs have for wildlife. Both of these habitat components are critical during all months of the year.

Trees and shrubs provide pollen and nectar in the spring and throughout the summer. Butterflies, moths, and bees especially rely on these trees and shrubs at these times as they play an important role for pollinating insects. Basswood and maple, for example, are key pollen sources in



early spring. Crabapple, hawthorn, dogwoods, American mountain-ash, and nannyberry have beautiful springtime flowers that also provide a pollen source. Birches, aspens, willow, hackberry, butterfly bush, and the various cherries and oaks provide important food habitat for butterflies and caterpillars. Coralberry, snowberry, and spicebush are also valuable to moths. Cherries, apples, plums, peach, pussy willows, lilacs, coralberry, snowberry, and wolfberry are critical sources of pollen for bees.

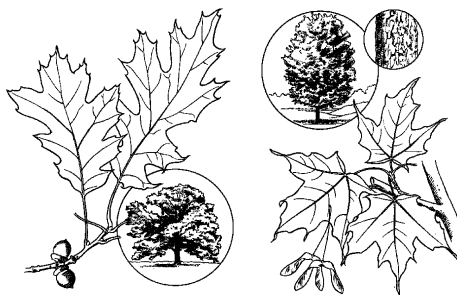
Plantings that provide food in summer help juvenile birds as well as early migrants to develop early winter energy reserves. Wild plum, serviceberry, red elder, hazelnut, mulberry, and the cherry species (choke, nanking, and pin) all provide important late-summer foods. The dogwoods (red-osier, silky, and gray), winterberry, American mountain-ash, hawthorn, crabapple, nannyberry, bearberry, buffaloberry, and arrowwood are all shrubs that provide valuable fall fruits. Nut-producing trees such as oak, hickory, butternut, and black walnut are also key fall foods for both migratory and resident wildlife.

Shrubs and trees must have persistent fruits in order to have winter value. The better ones are not palatable earlier in the year nor are highly preferred. Winter thaws

and cold weather may make them more desirable to wildlife later in the year. Black chokecherry, crabapples, snowberry, staghorn sumac, hawthorn, American mountain-ash, nannyberry, and American highbush cranberry all have persistent winter fruits. Maple, ash, white pine, and white cedar are important sources of winter browse for deer and rabbits.

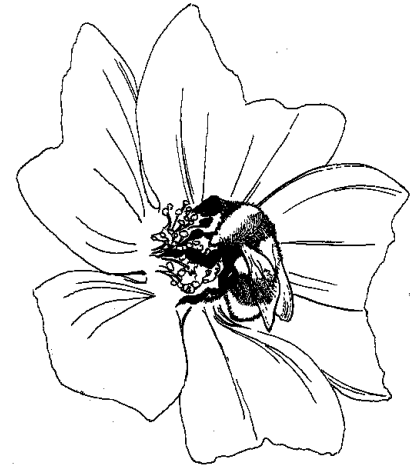
Many of these species provide cover for wildlife. Conifers are important sources of thermal and nesting cover for many species of wildlife, especially songbirds. Red and white cedar, hemlock, balsam fir, and the many kinds of spruce provide crucial winter cover because of their dense boughs. All trees and shrubs can provide nesting cover for some type of songbird, but plants that offer high quality nesting cover include hawthorns, cedars, crabapples, hemlocks, dogwoods, and spruces. Cavity-producing trees such as older beech and white oak provide homes for squirrels, screech owls, wood ducks, and many songbirds including chickadees. Therefore, dead and dying trees (snags) should be kept, if possible.

The following shrubs and shrub families should be highly considered as they are well adapted to Michigan's soil and climate conditions and offer valuable year-round wildlife habitat components:



red oak

sugar maple



American Highbush Cranberry is a widely available viburnum that is an upright, tall (8 to 12 feet) shrub adaptable to most soil types. It fruits well on sunny sites and its bright red berries remain on the bush well into winter. It is used for nesting by brown thrashers, catbirds, and many other songbirds. An excellent wildlife shrub on moist sites, it will also grow on sandy soil, although more slowly.

Dogwoods are used intensively by wildlife. In Michigan, the most popular varieties include silky dogwood, gray dogwood, and red-osier dogwood. They all produce flowers in the spring and fruits in the fall, and adapt to a variety of soils. Red-osier dogwood is so named as its bark is a bright to deep red when in full sun areas. It thrives on moist areas as well as sandy sites and can easily be used to form dense hedges.

Elderberry is often overlooked as a shrub for wildlife. Growing on a variety of sites in both sun and shade, it fruits best in sunny, moist areas to attract many songbird species in late summer and fall. Black elderberry is found on lowland sites, while red elderberry is found on upland sites.

TREES & SHRUBS

Junipers and cedars provide good cover, nest sites, and food for songbirds. Scattered among deciduous shrubs, they enhance habitat diversity and can be used effectively in windbreaks and other strip covers. One drawback is that eastern red cedar is the alternate host for cedar-apple rust, which results in blemishes on the fruit and leaves of apple, crabapple, and hawthorns. For this reason do not plant it close to apple orchards.

Hawthorns are small thornapple trees that bear persistent fruits and are excellent nesting sites for songbirds. Washington Hawthorn is a common variety. Although difficult to transplant, hawthorns survive well on upland and lowland sites. They do best when planted at regular, well-spaced intervals among other low-growing trees and shrubs.

Crabapples come in many varieties from nurseries and grow from 10 to 30 feet tall. Like hawthorns, they provide nest sites for robins and other songbirds. They also have stunning flowers in the spring and fruits in the fall that are persistent through winter. If possible, choose disease resistant varieties.



American mountain-ash

Popular species of trees and shrubs to consider planting in your backyard.

SPECIES	SOIL	MOISTURE	SUN-SHADE	HEIGHT
	S=sand L=loam C=clay M=muck	D=dry M=moist W=wet	S=sun Sh=shade	S=small M=medium T=tall
SHRUBS				
Crabapples	S-L-C-M	D-M	S	S-M
Hawthorn	L-C	D-M-W	S-S, Sh	S-M
Dogwood	L-C-M	M-W	S-S, Sh	S
Highbush-cranberry	L-C-M	M-W	S-S, Sh	S
Nannyberry	L-C-M	M-W	S-S, Sh	S
Elderberry	L-C-M	D-M-W	S-S, Sh	S
American mountain-ash	L-C	D-M	S-S, Sh	M
CONIFERS				
White Spruce	S-L-C	D-M	S-S, Sh	T
Balsam Fir	S-L-C	D-M	S-S, Sh	T
Hemlock	L-C-M	M-W	S-S, Sh	T
White Pine	S-L	D-M	S	T
White Cedar	S-L	M-W	S-S, Sh	T
DECIDUOUS TREES				
White Oak	S-L-C	D-M	S-S, Sh	T
Red Oak	S-L-C	M	S-S, Sh	T
Am. Beech	S-L-C	D-M	S-S, Sh	T
Red Maple	L-C-M	M-W	S-S, Sh	T
Quaking Aspen	S-L-M	M-W	S-S, Sh	T
Black Cherry	S-L	D	S-S, Sh	T
Shagbark Hickory	S-L	D-M	S-S, Sh	T

Wild plums are growing in popularity among wildlife biologists as an alternative to planting exotic species. They have showy flowers and produce fruits that humans may also use. They spread by suckers to form clumps.

Nannyberry is a tall shrub or small tree that is used as an ornamental for its attractive flowers. It provides fruits in the fall for many species of wildlife. This shrub spreads by suckers and may be difficult to control near lawns and gardens.

See the accompanying panel for popular species of conifer and

deciduous trees to consider planting in your backyard.

Aesthetic Characteristics

When choosing trees and shrubs for your property, considering their characteristics such as color, texture, and height, which will help you to provide a pleasing landscape. Early blossoming shrubs such as crabapples, lilacs, serviceberry, and redbuds offer spring color. Silky dogwood and red elder give summer color, and red elder, sumac, and red-osier dogwood provide a palette of beauty in late summer and early fall.

TREES & SHRUBS

Fall-fruiting shrubs and the leaves of maple, birch, aspen, and other deciduous trees furnish an array of color in fall. Red-osier dogwoods show a striking red, and conifers give a pleasing green to a bleak winter landscape.

Pyramid-shaped American mountain-ash, tamarack, and spruces, round-shaped crabapples and dogwoods, and flat junipers all add different shapes and forms to your property. The fine textures of hemlock, white pine, and serviceberry can be a sharp contrast to rough-textured plants such as hawthorn and jack pine.

Trees and shrubs come in many heights. Choosing a variety of heights assures nesting and feeding sites for birds with strong preferences for specific elevations. It also provides visual screens and adds to landscape diversity. To develop a "feathering" or "staircase" effect, which is highly beneficial for wildlife, plant oaks, hickories, and tall conifers at property borders. As you move closer to your home, add serviceberry, American mountain-ash, and medium-height shrubs such as dogwoods and crabapples. Low-growing shrubs such as bearberry and coralberry, will complete the staircase effect to your lawn. Beyond this, you may want to plant grasses or wildflowers to further increase your yard's value to wildlife.

Landscape Characteristics

Another important factor to consider before selecting trees and shrubs is the characteristics of your property, which may include soil types and locations of your plantings. Before planting, it's a good idea to determine the pH and available nutrients in your soil. For example, you should not plant a shrub that needs moist, acidic soils on a dry, sandy site. Even though the shrub may fit all of your landscape goals (color, texture, wildlife value), it may not fit in with your landscape characteristics. Therefore, it will most likely not grow on your property and you will have wasted your time and money. For a nominal fee your county's Michigan State University Extension office will analyze soil samples from your yard. Refer to the chapter **Knowing Your Soils** in the Habitat Planning section for more information.

Another thing to consider is the location of your planting. You may not want a nut producing tree in an area where the nuts will be a problem, such as near a pool. Another example of location problems is seen with mulberry trees. These trees should be planted along property boundaries and away from porches, decks, and cars because its fruit and droppings from birds eating mulberries will stain.

Another thing to remember with location is the height that the trees and shrubs will grow. Be careful that they will not grow too tall and encroach on other backyard projects. For instance, a tree is planted in a spot where it is not currently shading a garden. However, if the height of the tree is not checked, in a few years it may cast a much larger shadow than expected. Therefore, be sure to plant the trees and shrubs far enough from each other and any other areas where they may cause problems.

In summary, there are many trees and shrubs that can not only create valuable habitat for wildlife, but also enhance the value of your home. When selecting trees and shrubs for your yard, it is important to consider your landscaping goals, the wildlife values and aesthetic characteristics of the plants, and the characteristics of the current landscape. With these in mind you will create a beautiful landscape that will also benefit wildlife. Refer to the chapter **Tree & Shrub Planting** in this section for more information.

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TREE & SHRUB PLANTING



Trees and shrubs are an important part of Michigan's natural ecosystem. About 50 percent of the state is forestland. The plants that make up our forests provide food in the form of fruits, berries, and hard mast (nuts) for a wide variety of wildlife; browse for rabbits and deer; nectar and pollen production for bees and butterflies; and leaves for caterpillars and other insect larvae. They also offer critical cover for wildlife to nest, rest, hide from predators, and seek shelter from heat, cold, and moisture.

The **Trees and Shrubs** chapter in the Backyard Management section explains the wildlife value of key plant species, and considers landscaping goals and site selection. The **Knowing Your Soils** chapter in the Habitat Planning section will help you understand how to identify soil types and to know what plants will grow best on your property. This chapter focuses on how to purchase healthy trees and shrubs, plant them properly, and manage them successfully. Considerations include site selection and preparation, plant selection and pre-planting care, planting techniques, and post-planting care.

Site Selection and Preparation

The decision to plant shrubs and trees should be made months in advance of their arrival at the nursery or at your local county



Trees and shrubs produce food and cover for a variety of wildlife.

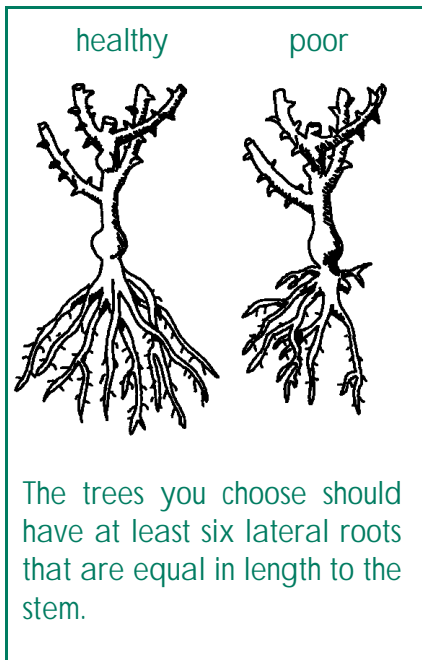
Conservation District. For best success, plan in the spring or summer before planting (including soil testing), prepare the site for planting in fall, order stock in winter, and plant upon arrival in early spring. Place your order early or you may have to choose from leftover stock or receive your seedlings past prime planting time. Lack of planning is one of the main reasons why some landowners fail to grow healthy trees and shrubs. Select plant species that are adapted to the soil texture, drainage, and amount of shade at your site. Do not plant a shade intolerant tree in the shade of other trees as they will die. Slopes greater than 6 percent, odd-shaped fields, ditch banks, property boundaries and wetland and forest edges all make ideal shrub-planting sites. The local Conservation District office, nurs-

ery, public library or Michigan State University Extension offices will have information on specific plant requirements.

Site preparation includes reducing weedy competition and any logging debris, and improves soil conditions for tree growth. Most planting failures can be traced to poor weed control, so this step is very important. Because weeds compete directly with seedlings for water, nutrients, and sunlight, they must be controlled before (and after) planting. In the fall before planting, place a weed-barrier cloth or apply a general emergent herbicide like Roundup. Be sure to read and follow all label directions. Individual planting sites should be 36 inches across. When planting in rows, prepare a 36 inch wide strip. All vegetation within the area must be killed. If weeds are growing again in spring when it is time to plant, apply an emergent herbicide once again. "Emergent" herbicides kill only those plants already growing. Mechanical treatments such as disking or plowing will also help to control weeds. Many tree planters even scrape the sod off the planting site at the time of planting to reduce weed competition.

Plant Selection and Pre-Planting Care

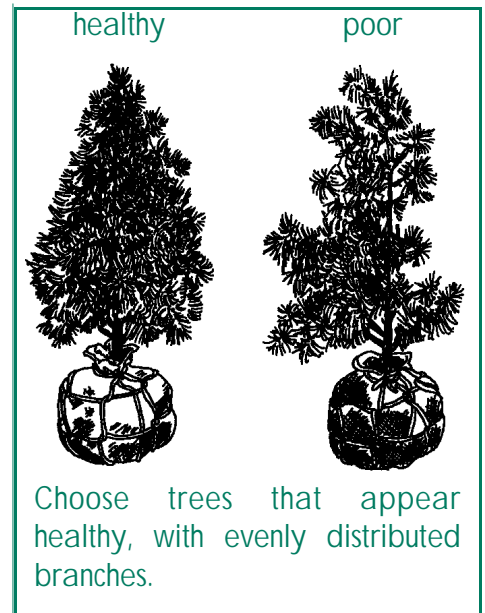
You may purchase trees and shrubs as transplants or seedlings. Transplants are plants that were uprooted and planted in another



location, while seedlings are young plants grown in one location. Both are available in bare-root form or come with soil either in containers or balled and burlapped. Seedlings are less expensive when bought in large amounts. They are also easier to plant with a tree planter because of their small roots. Transplanted stock is more expensive than seedlings, but survival and growth rates after planting are often better. In addition, larger transplant stock grows more quickly into recognizable trees or shrubs. When only a small number of trees and shrubs are needed, purchasing them with soil attached is a good idea because planting success rates are higher due to decreased shock to the plant. If possible, it is best to choose plants that were grown from a local source.

Seedlings can be one, two, or three years old and are designated as 1-0, 2-0, or 3-0 stock. Transplants are usually three to five years of age, and the last number in the sequence tells how long they have been in the transplant beds. For example, stock designated as 2-1 is three years old total, the last year of which was spent as a transplant. In addition to age, some seedlings and transplants are sold by height class, which has the advantage of establishing a plantation that should develop uniformly. Seedling sizes may range from six to 12 inches. Buy the biggest or oldest seedlings you can afford. Avoid small, spindly stock less than six inches tall. Hardwood saplings should have a trunk diameter (also called a stem caliper) of at least 3/8 inch and at least six vigorous lateral roots that should be equal in length to the stem. Avoid hardwood stock with a single large taproot.

How stock is handled at the nursery and in transit often determines its health. Signs of mishandling include dry roots, white-tipped roots, excess soil on the roots, swollen or burst buds, pres-

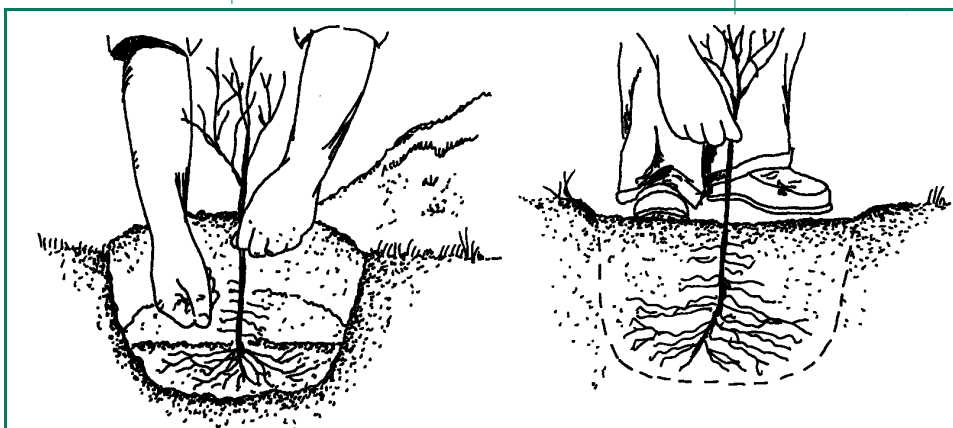


ence of mold on needles or stems, broken stems or stripped roots, and containers that are ripped or crushed.

Bare-root plants, regardless of whether they are seedlings or transplants, need to be kept moist before and during planting. Keep the shipping package moist or place the plants in a pail with an inch or two of water (over-watering can kill the plants). The best option is to mix peat moss, dirt, and water in a pail to make a slurry. Put the little trees or shrubs in

the slurry and keep them in a cool place (35 degrees Fahrenheit if possible) until you are ready to plant, which should be within 48 hours.

Plants sold in containers should have soil and roots joined tightly. Pruned roots should be cut cleanly and be no wider than an



When planting bare root stock, make the hole large enough to spread the roots out naturally; add soil around the roots; fill hole completely; tap firmly to fill in air gaps.

TREE & SHRUB PLANTING

average finger. Check for the absence of large, circling roots by feeling down into the top 3 or 4 inches of the pot. Stock that has been balled and burlapped should have a firm root ball near the trunk. Size of the ball should be about 1 foot for each inch of trunk diameter.

Planting Techniques

It is best to plant in early spring or late fall when the plants are dormant. However, in heavy soils such as clay, planting in fall is discouraged as the plants may be frost heaved from the ground before roots can become established. When planting, keep the young plants moist and out of direct sun, if possible. If the roots of the trees were not pruned to an eight-inch length at the nursery, do so with clippers or a sharp ax. Root pruning makes planting easier and increases survival rates. The depth of the planting hole and length of roots should be about the same but not less than 8 inches, and the root collar (small swelling where the ground level was at the nursery) should be an inch deeper than the new surface.

When planting bare root stock by hand, use a shovel to dig a hole large enough to spread the roots in a natural, uncrowded way, add soil around the roots to the root collar, and tap firmly to exclude air. You can also use a planting bar, or dibble, to make a vertical slit in the soil and to repack the soil around the tree after planting. Be careful not to crowd the roots, and make sure the soil is firmly replaced. If possible, water the trees after planting.

When planting trees and shrubs with soil attached by hand, slope the sides of the hole away



When planting trees and shrubs with soil attached to the roots, slope the sides of the hole away from the plant and dig deeply around the hole to prevent excessive shock to the plant.

from the plant and dig or deeply rototill to a depth of 12 inches around the hole. Before placing plants in the hole, loosen the roots from the soil. This extra preparation will lessen the shock of transplant and give roots a chance to spread in a wide periphery while in softer soil. How wide an area to dig depends upon the amount of space available, whether roots of other trees will be damaged, and soil compaction (the more dense the soil, the wider the area). The usual range to consider is two to five times the diameter of the root ball. Wet the bottom of the hole before planting, place the tree or shrub upright, pack soil firmly, and water if possible.

Planting machines are usually used when planting large numbers of trees or shrubs. Bare root stock is usually used. The planting machine makes a slit in the soil where the operator places the tree. The machine then closes the slit and packs soil around the roots. Typically pulled behind a tractor, some planting implements have a furrowing attachment to clear away

debris and vegetation. Others have spray attachments for applying herbicide. Check with your county Conservation District office or nursery for availability.

One person can plant 40 to 60 trees or shrubs per hour by hand or 200 to 300 per hour with a machine planter. Hand planting may be the only method on steep or rough terrain, and it is better for walnut and various oaks, which have long tap-roots. If you are planting conifers, the typical rate is 600 to 1,000 trees per acre. Hardwoods are typically planted at 300 to 500 trees per acre. Windbreaks of hardwoods and/or conifers should have at least three staggered rows. Tree spacing to reach these recommended densities is included in the

Distance Apart	Number of trees per acre
6 X 10	726
7 X 7	889
7 X 10	622
8 X 8	681
9 X 9	538
10 X 10	436
12 X 12	302

TREE & SHRUB PLANTING

accompanying panel. Do not plant stems and rows too close together. Eight to 10 feet apart is usually sufficient. This may look like a long way when the stems are 10 inches tall, but when they are eight feet tall you will know why you should plant them with ample space.

Post-planting Care

Watering at intervals will help newly planted trees and shrubs to become established and grow successfully. Mulching with bark, peat moss, or straw retains soil moisture and holds down competing weeds or grass. Support stakes and wires will help taller trees if necessary. Protect the tree from browsing by deer or rabbits, if necessary, by installing plastic tubes or wire cages.

After the first year, some maintenance is usually needed. Eliminate competing vegetation

within a 3-foot circle for a period of at least three years. Hand pulling weeds, hoeing or relying on a selective herbicide are all good methods whether applied singly or in combination. Using weed whackers or whips is not a good idea because they can injure young plants. Mowing is not usually effective weed control either. Pruning may also be needed annually to help growth.

In summary, successful tree and shrub planting requires thorough planning, careful selection and planting, and proper maintenance. Poor maintenance may delay the growth of your trees and cause them to die or require replanting. However, if done correctly the reward is added beauty to the landscape and invaluable habitat for wildlife.



Keep a watchful eye out for wildlife eating your new plantings for lunch.

FOR ADDITIONAL CHAPTERS CONTACT:

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FOR ADDITIONAL ASSISTANCE: CONTACT YOUR LOCAL CONSERVATION DISTRICT

GRASSES & GROUND COVERS



Lawns are practical and acceptable landscapes that beautify homes and provide pleasure to homeowners. However, recent building trends that have resulted in larger homes on larger properties give cause for concern. In increasing numbers, Michigan landowners are moving from smaller lots to residential sites to rural estates of 10 to 40 acres in size. Lawn sizes have also increased dramatically. This increase in rural estates contributes to habitat fragmentation. This presents a problem for wildlife as extensive lawns of mowed grass have much less benefit to wildlife than an area of similar size with a diversity of plants. However, some wildlife can benefit from small amounts of mowed lawns. Cowbirds, flickers, and robins forage in the short grasses for food. Canada geese, moles, and 13-lined ground squirrels also frequent lawns, but can create nuisance problems with their droppings or burrows.

There are many important reasons to have as small a mowed lawn as possible. Pesticides and fertilizers used to grow grass can contaminate ground and surface water killing valuable plants and insects. Excessive mowing takes extensive time and fuel. Also, other alternatives to mowed grass may be better for the environment and provide more valuable wildlife habitat. Therefore, having a smaller mowed lawn is an important wildlife manage-

ment consideration. This chapter explains how to manage and maintain mowed and unmowed areas of lawn as well as how to develop alternative ground covers of higher quality for wildlife.

Mowed Lawns

Mowed lawns require time and money to maintain. Monocultures of weed-free grass demand a large amount of water, fertilizer, pesticides, and time. They provide less wildlife habitat than do unmowed lawns, and they are easily stressed by extreme drought or wet conditions.

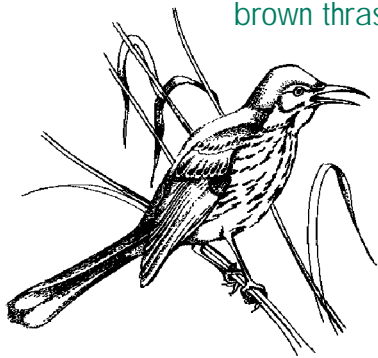
To maintain your lawn in a less-intensive and more environmentally friendly manner, consider accepting a variety of grasses and non-grasses, or remove weeds by hand instead of using herbicides over the entire lawn. Instead of fertilizing, leave the clippings, which will provide nitrogen. Mowing at heights of 2 to 3 inches helps protect roots from summer heat and promotes better grass growth. Another tip: keep mower blades sharp so they cut the grass cleanly and do not tear the plants.

robin



An estimated 70 percent of pesticide use in the United States occurs on the nation's lawns. You can help reduce this number by planting diverse forbs and other plants to provide for a healthier, environmentally friendly lawn, which needs few or no chemicals. Although weeds such as dandelions, plantain, black medic, spurge, orange and yellow hawkweed, and white clover are not acceptable to some landowners that strive to create a uniform lawn, such plants attract a variety of wildlife. Rabbits and deer love clover and will frequent lawns that contain it. Birds use dried stalks of weeds and other plants to build nests and feed on the seeds of some common weeds.

How much lawn you mow should depend on the size and shape, and uses of your property. For example, if you need an area for playing ball or exercising a dog, a long rectangular area may suffice. However, if the only activity on portions of your lawn is mowing, consider converting those areas to an unmowed parcel or wildlife-friendly planting. A wet area, for example, can be



brown thrasher

restored to a wet meadow or wildlife pond. Mixing in areas of trees, shrubs, perennial and annual flowers, unmowed grasses, and prairie grasses will not only add wildlife value but will help contribute to a beautiful landscape that requires less upkeep. Another way to improve value for wildlife is to keep the lawn in an irregular shape, which will provide more edge than a square or rectangular design.

Grasses

Areas with tall, unmowed or infrequently mowed grasses can provide outstanding wildlife habitat such as nesting areas, brooding areas, insect-feeding areas and foraging areas for songbirds, gamebirds, and rabbits. You can create places where you let the grass go wild or where you plant a specific grass type to create a meadow, prairie, or wildflower viewing spot. The flowers will furnish a nectar source for bees and butterflies.



white clover

Grasses such as timothy, orchard grass, red top, or blue grass can be planted to develop a grass meadow two to five feet in height. Adding clovers such as ladino, alsike, white, or medium-red will increase the wildlife value and decrease the overall vegetative height. Clovers help to promote healthy lawns as they are able to fix nitrogen. Planting clovers will develop a meadow that is one to three feet in height. They will create a green open space and allow a pleasing view to the edge of your property. Once a year in late August, mow the mix of grasses and clovers to help maintain the stand and to check the invasion of woody plants. For additional information please refer to the chapter on **Cool Season Grasses** in the Grassland Management section.

Another alternative is to plant a part of your yard to prairie grasses and/or wildflowers. Because native prairie grasses (big bluestem, little bluestem, Indiangrass, and switchgrass) have deep root systems and short underground stems (rhizomes), they help water to percolate through the soil. The process of percolation is important for recharging ground water and supplying plants with adequate water. A manicured lawn, for example, will stop percolating after a half-inch of rain. On the other hand, a native prairie will percolate up to six inches of rain per hour.

Mixing wildflowers in with the prairie grasses adds diversity. Wildflower types to plant include coneflower, black-eyed Susan, leadplant, coreopsis, aster, and blazing star. Prairie grasses and forbs provide forage for deer, rabbits, and woodchucks; nesting sites for pheasants, bobolinks, and field

sparrows; feeding areas for songbirds and wild turkeys, and winter cover for resident wildlife. The wildflowers offer brilliant colors in summer and fall, and the stiff stems and golden-to-rust colors of the prairie grasses make for attractive winter gardens. For additional information please refer to the following chapters: **Wildflowers** and **Wildflower Plantings** in this section, and **Warm Season Grasses** in the Grassland Management section.

Ground Covers

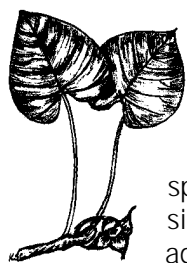
Ground covers offer an ideal opportunity to reduce the amount of mowed lawn surface and to develop low-maintenance wildlife habitat. They provide nest sites for ground-nesting songbirds, and protective cover for rabbits and chipmunks. Such plantings can provide a more manicured appearance while increasing habitat value and reducing maintenance.

A wide variety of species can be used. Preferred plants will depend upon the soil type and the amount of sun or shade the area receives. Shaded areas on clay soils, for example, call for one type of ground cover, while dry areas with all-day sun will need a different kind of ground cover. Native shade-tolerant species include wild ginger, wintergreen, and bearberry. There are many other species of groundcover that are often seen in backyards such as spotted nettle, lily of the valley, vinca,



little bluestem

GRASSES & GROUND COVERS



wild ginger

myrtle, crown vetch, birds-foot trefoil, and e u o n y m u s . However, these species will aggressively spread into adjacent areas and will need extensive management and control to reduce their impact to adjacent sites. Therefore, they must be used with caution.

Plant ground covers around homes, trees, swimming pools, and other fragmented habitats. Readily available from nurseries as plugs or plants, they are usually listed by their scientific names, which are included in the accompanying table.

Wet Areas

If your property includes frontage on a lake, river, pond, or wetland, special habitat considerations apply. Leave a buffer strip of unmowed vegetation between your lawn and the wetland or water's edge 100 feet or more in width. The buffer will filter out sediments and lawn fertilizers before they enter the water, and it will provide important niche habitat for a variety of birds, mammals, amphibians, and reptiles. To beautify the buffer strip and enhance wildlife habitat, plant wildflowers and grasses, or add trees, shrubs, and ground cover.

If you use your lake or pond for swimming, clear an area only large enough for this purpose. Remember, removing or adding soil, sand, or gravel may be subject to regulation -- check with the Michigan Department of Environmental

Quality's (DEQ) Land and Water Management Division before making alterations. Maintain aquatic vegetation in all or a portion of the water frontage. Although control of purple loosestrife, Eurasian watermilfoil, and other aggressive exotic plants may be necessary, retain a mixture of submerged, floating and emergent plants such as wild celery, pondweeds, waterlilies, cattails, and pickerelweed. These plants also help to reduce toxins in the water and increase oxygen and provide the structure and greenery to support snails, insects, and other aquatic food organisms important to fish, turtles, snakes, salamanders, frogs, and toads. If you plan to use a

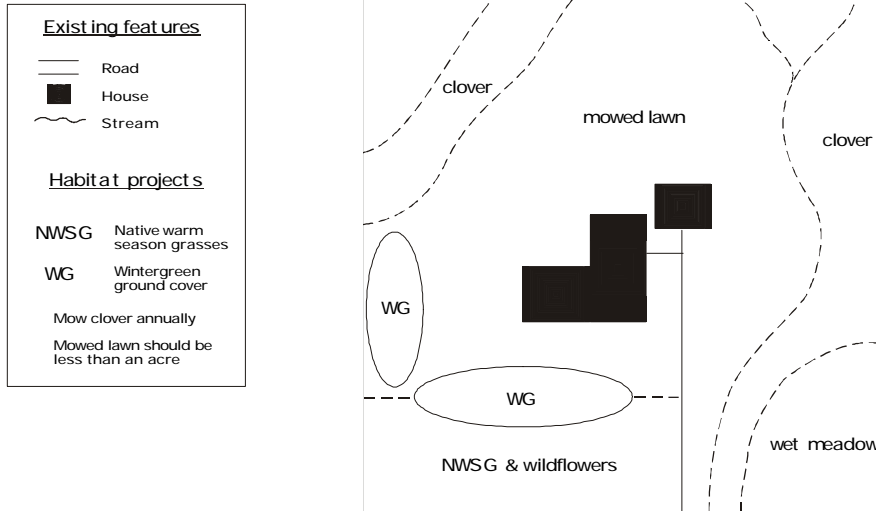
herbicide to control aquatic plants or algae, check with DEQ's Land and Water Management Division to see if a permit is required and always follow product label directions. To protect water quality and reduce the likelihood of excess algae and plant growth, do not dispose of grass clippings, leaves, charcoal briquettes or ashes, or other refuse in the water. In addition, it is important to use little or no fertilizer on your lawn, or switch to a phosphorus-free or low phosphorous brand.

cattail

Common Name	Scientific Name	Origin	Sunlight	Height (ft.)
Wildflowers				
Aster	Aster spp.	Native	Full	4
Rough blazing star	Liatris aspera	Native	Full/Partial Shade	3
Black-eyed Susan	Rudbeckia hirta	Native	Full/Partial Shade	3
Purple coneflowers	Echinacea purpurea	Native	Full/Partial Shade	4
Tall coreopsis	Coreopsis tripteris	Native	Full	3
Lead plant	Amorpha canescens	Native	Full	3
Warm season grasses				
Big-bluestem	Andropogon gerardi	Native	Full	8
Indiangrass	Sorghastrum nutans	Native	Full	6
Little-bluestem	Schizachyrium scoparium	Native	Full	3
Switch grass	Panicum virgatum	Native	Full	5
Cool season grasses				
Canada wild-rye	Elymus canadensis	Native	Full	4
Redtop	Agrostis gigantea	Native	Full	4
Orchard grass	Dactylis glomerata	Not Native	Full	4
Timothy	Phleum pratense	Not Native	Full	3.5
Legumes				
White clover	Trifolium repens	Native	Full/partial	0.5
Ladino	Trifolium var.	Not Native	Full/partial	0.5
Alsike	Trifolium fucatum	Not Native	Full/partial	0.5
Ground Covers				
Bearberry	Arctostaphylos uva-ursi	Native	Full/partial	0.5
Wild Ginger	Asarum canadense	Native	Full/partial	0.5
Wintergreen	Gaultheria procumbens	Native	Full/partial	0.5

GRASSES & GROUND COVERS

yourself. These diverse plantings improve critical wildlife habitat that attracts songbirds, chipmunks, rabbits, squirrels, toads, frogs, snakes, and turtles.

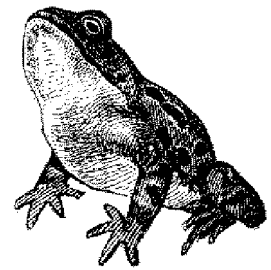


This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

Trees along the waterfront provide nesting, resting, and feeding areas for birds and small mammals. When trimming trees, leave enough branches to maintain wildlife habitat and privacy for your home while allowing a view of the water. Enhance the waterfront's habitat value and aesthetic appeal by planting flowering and fruiting shrubs as well as ground cover at the base of trees. Grasses for moist areas include redtop, switchgrass, and prairie cordgrass. Attractive wildflowers that grow in moist areas are cardinal flowers, blue lobelia, and Jack-in-the-Pulpit.

Leave dead trees (snags) that do not create a safety hazard to humans, for woodpeckers and squirrels. Remember, that logs, stumps, and fallen branches are critical wildlife habitat for amphibians and reptiles. See the chapter on **Frogs, Turtles and Snakes** in the Species Management Section for more details.

In conclusion, by using a variety of vegetative types such as tall grasses, ground covers, trees, and shrubs, you can create a beautiful yard and reduce your work load. You will also create a better environment for a variety of wildlife and



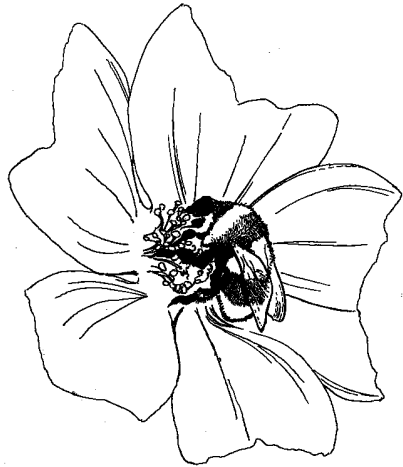
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SPECIAL FEATURE GARDENS



Besides adding beauty to the landscape, gardens that are creatively designed and well-tended can increase the value of property. Some gardens provide food for the table and others furnish cut flowers for indoor enjoyment. On larger properties these special feature gardens break up the monotony of lawn and reduce mowing time. Blending your garden into the surrounding landscape will also help to minimize habitat fragmentation effects.

If you do not own property, you can still enjoy a small-scale garden by arranging planters and potted flowers on the balcony or deck of your apartment, townhouse, or condominium. Specialty gardens attract certain kinds of wildlife, which serve to enhance viewing pleasure. Butterfly, hummingbird, and native prairie gardens are well suited to this purpose. This chapter will offer suggestions on how to create them.

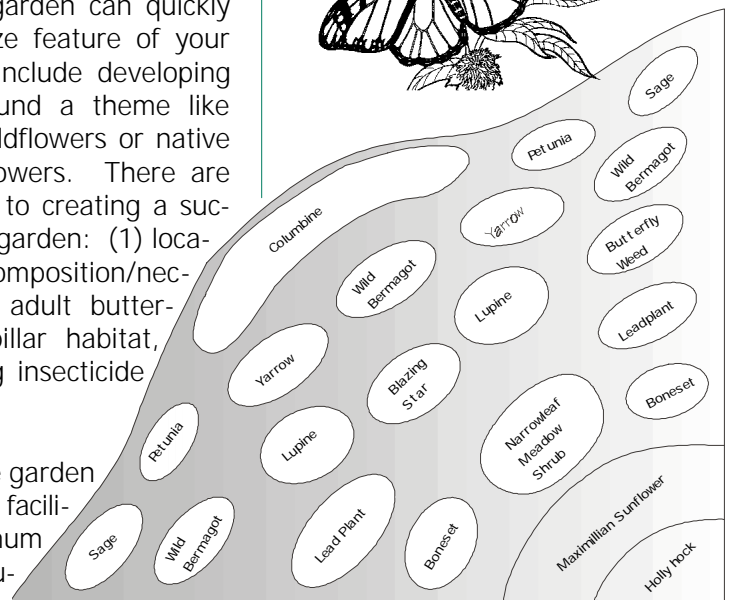
Butterfly Gardens

North America is home to more than 700 species of butterflies. At least 200 of them occur in Michigan and the Midwest including swallow-tails, skippers, satyrs, sulphurs, and cabbage butterflies along with the monarch, painted lady, comma, red-spotted purple, and red admiral. Adult butterflies are most attracted to red, yellow, orange, pink, and purple flowers that grow in sunny locations and that offer an easy source of nectar. Butterfly caterpillars will use at least 175 kinds of Midwest plants, nearly 50 of which are also excellent for attracting bees. Several kinds of moths, including hummingbird clearwings, night- and day-flying sphinx species, prometheas, and cecropias, are also regularly attracted to butterfly gardens.

A butterfly garden can quickly become the prize feature of your yard. Options include developing the garden around a theme like native prairie wildflowers or native woodland wildflowers. There are four key factors to creating a successful butterfly garden: (1) location, (2) plant composition/nectar sources for adult butterflies, (3) caterpillar habitat, and (4) avoiding insecticide use.

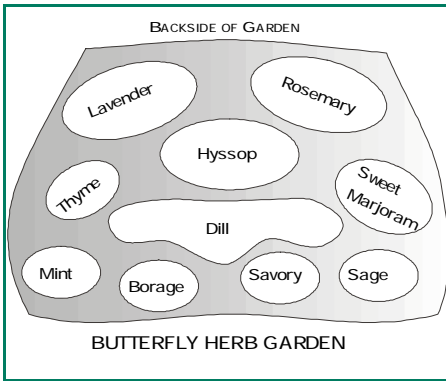
1. Locate the garden in a spot that facilitates maximum viewing opportunity.

The best location is one that receives sun from mid-morning to mid-afternoon because adults generally feed only in the sun. If sunny spots are limited in your yard, consider planting a small area of your vegetable garden to herbs. Many of the best bee and butterfly plants are herbs, including borage, hysop, lavender, lovage, lemon balm, sweet marjoram, rose-mary, sage, dill, winter savory, parsley, thyme, and the mints.



BUTTERFLY GARDEN

BACKSIDE OF GARDEN



2. Plant perennial plants that provide excellent sources of nectar. Perennials will lessen your overall cost as they do not need to be replaced each year. When choosing plants, consider their blooming season, and select some that bloom early and others that do not bloom until late summer or fall. However, for earliest results and to add diversity to the garden, plant a few annual flowers. Also consider the mature height of plants and place the taller plants toward the back and work down in height toward the front. For open gardens that will be seen from all sides, establish the tallest plants in the center and work downward with the smallest plants at the edge. If you are using climbing plants be sure to use a climbing structure such as a lattice, fence, or building for backdrop.

Plants with a flat-topped towering head, like stiff goldenrod and zinnias, are excellent butterfly plants because the nectar is richer and more easily accessible. See the accompanying table for a list of plants that will provide good to excellent sources of nectar for butterflies, bees, and moths. Latin names are included to help you find stock at nurseries and garden centers.

3. Providing habitat for caterpillars as well as adult butterflies is

essential to a successful butterfly garden. Most butterfly caterpillars do not cause the leaf damage associated with moth caterpillars. Oaks, aspens, birches, boxelders, and spice bushes can provide the feeding habitat that butterfly caterpillars need. Some species feed specifically on certain plants. For example, monarchs use milkweed for both stages of life --adults visit the flowers for nectar and caterpillars feed on the leaves. The larvae of mourning cloaks eat nettles, and black swallowtails feed on parsley.

4. Most insecticides are lethal to butterflies in both larvae and adult stages. Avoid use of insecticides in or near the butterfly garden and on key caterpillar habitat. Pesticide use has had a major impact on butterfly numbers in recent years.

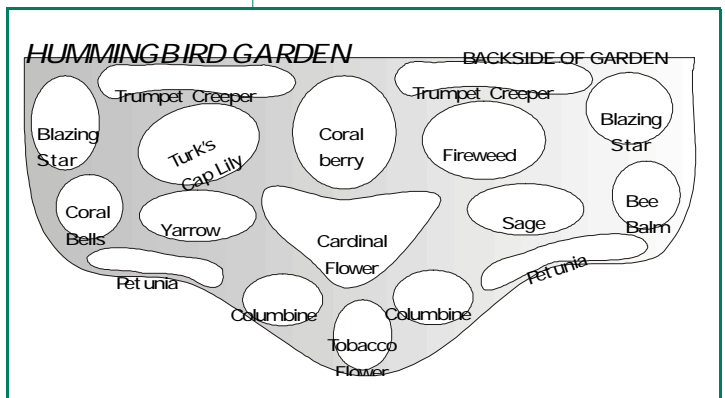
Hummingbird Gardens

Hummingbirds pollinate more than 160 native North American plants. Because of their extremely high metabolism, hummingbirds consume daily up to one-half their body weight in food and as much as eight times their body weight in fluids. Besides feeding on flower nectar, the ruby-throated hummingbird (the only hummingbird species found in Michigan) also eats small insects. Usually attracted to red, tubular flowers,

hummingbirds also use a wide variety of other flowers. Thus, you can add both diversity and color to your yard while providing excellent sources of nectar and small insects for hummingbirds. Incidentally, because orioles use many of the same plants as hummingbirds, your hummingbird garden may provide additional habitat for them and increase your viewing pleasure.

Unlike butterflies, hummingbirds find sources of food regardless of sun or shade. However, the plants themselves can have specific sunlight requirements. So, when planning the location of your hummingbird garden, consider the sunlight requirements or limitations of the plants you wish to highlight there. You may also want to consider visibility. Because hummingbirds are highly territorial, you might want to locate plants throughout your yard, in addition to the specialized garden.

You may also want to supplement natural nectar with hummingbird feeders near the garden and around the house. Place feeders in the shade and change the mixture of one part sugar (do not use honey) to four parts boiling water every three to five days. Cool the mixture before filling the feeder, and store the excess in the refrigerator. If the mixture in the feeder



SPECIAL FEATURE GARDENS

Plant Species for Butterfly and Hummingbird Gardens

Common Name	Scientific Name	Type ¹	Origin	Sunlight ²	B/H	Height ²	Blooming Season ²
American columbine	<i>Aquilegia canadensis</i>	P	native	F/P	B/H	1-2 ft	May-June
Bee Balm	<i>Monarda didyma</i>	P	native	F/P	H	3 ft	June-July
Blazing Star	<i>Liatrus</i> spp.	P	native	F/P	B/H	2-4 ft	July-Sept.
Boneset	<i>Eupatorium perfoliatum</i>	P	native	F/P	B	3-4 ft	July-Aug.
Butterflybush	<i>Buddleia davidii</i>	P	exotic	F/P	B	3-8 ft*	June-Aug.
Butterflyweed	<i>Asclepias tuberosa</i>	P	native	F/P	B	2-3 ft	July-Aug.
Cardinal flower	<i>Lobelia cardinalis</i>	P	native	F/P	H	3 ft	July-Sept.
Coral bells	<i>Heuchera sanguinea</i>	P	exotic	F/P	H	2.5 ft	May-July
Coralberry	<i>Symphoricarpos orbiculatus</i>	S	native	F/P	B/H	3 ft	
Fireweed	<i>Epilobium angustifolium</i>	P	native	F/P	B/H	2-4 ft	July-Aug.
Foxglove (Gerardia)	<i>Agalinis pediculana</i>	P	native	F/P	H	3-5 ft	June-July
Gaillardia (firewheel)	<i>Gaillardia pulchella</i>	P	native	F	B/H	3 ft	June-Aug.
Hollyhock	<i>Althaea rosa</i>	P	native	F/P	B/H	5-8 ft	June-Aug.
Joe-pye-weed	<i>Eupatorium purpureum</i>	P	native	F/P	B	2-6 ft	July-Sept.
Leadplant	<i>Amorpha canescens</i>	P	native	F	B/H	2-4 ft	June-July
Lupine	<i>Lupinus perennis</i>	P	native	F/P	B/H	2 ft	June-July
Maximillian sunflower	<i>Helianthus maximiliani</i>	P	native	F	B/H	5 ft	Aug.-Sep.
Narrowleaf meadowsweet	<i>Spiraea alba</i>	S	native	F	B/H	4 ft	June-July
Oxeye sunflower	<i>Heliopsis helianthoides</i>	P	native	F	B/H	2.5-3 ft	July-Sept.
Purple coneflower	<i>Echinacea purpurea</i>	P	native	F/P	B/H	2-4 ft	July-Aug.
Scarlet petunia	<i>Petunia</i> spp.	A	exotic	F/P	H	1 ft	through summer
Scarlet sage	<i>Salvia splendens</i>	A	exotic	F/P	H	2.5 ft	until frost
Swamp milkweed	<i>Asclepias incarnata</i>	P	native	F/P	B	2-4 ft	June-Aug.
Tobacco flower	<i>Nicotiana sanderae</i>	A	exotic	F	H	1-2 ft	through summer
Trumpet creeper	<i>Campsis radicans</i>	V	native	F/P	H	climbing	July-Aug.
Turk's cap lily	<i>Lilium michiganense</i>	P	native	F/P	H	3 ft	July-Aug.
Western sunflower	<i>Helianthus occidentalis</i>	P	native	F	B/H	2 ft	July-Aug.
Wild Bergamot	<i>Monarda fistula</i>	P	native	F	B/H	2 ft	June-July
Yarrow	<i>Achillea millefolium</i>	P	native	F	B	2 ft	June-Aug.

¹A = annual; P = perennial; S = shrub; V = vine

²F = full sun, P = partial shade; Sun requirements, height, and blooming season may vary with individual cultivars.

*Butterflybush will die back in the winter

B = for butterflies H = for hummingbirds

has spoiled (a black fungus or very cloudy water are clues), clean it with a small amount of vinegar mixed with water, then allow to dry thoroughly before refilling. Because they are migratory species, you only have to keep the sugar solution available from April to September.

In addition to sunlight requirements, be aware of other characteristics of your plant choices. Trumpet creeper, for example, is an attractive plant to hummingbirds, but it requires a fence or other structure on which to climb. Place vines and shrubs to the back, working down in height toward the front of the garden. Spread your bloom-

ing season as much as possible. Adding a few annuals to the variety of early- to late-blooming perennials will give the garden a head start. Refer to the accompanying list of plants that will provide both nectar and insects for hummingbirds. Also, realize insecticides not only kill the small insects that hummingbirds use for food, but large

SPECIAL FEATURE GARDENS

Plant Species for Prairie Gardens

Common Name	Scientific Name	Type	Height	Blooming Season
Big bluestem	<i>Andropogon gerardii</i>	G	3-6 ft	
Indian grass	<i>Sorghastrum nutans</i>	G	3-5 ft	
Little bluestem	<i>Schizachyrium scoparium</i>	G	2-3 ft	
Switchgrass	<i>Panicum virgatum</i>	G	3-5 ft	
American columbine	<i>Aquilegia canadensis</i>	P	1-2 ft	May-June
Black-eyed Susan	<i>Rudbeckia hirta</i>	P	1-3 ft	June-Aug.
Gray-headed				
prairie coneflower	<i>Ratibida pinnata</i>	P	3-5 ft	July-Sept.
Maximillian sunflower	<i>Helianthus maximilliani</i>	P	5 ft	Aug.-Oct.
New England aster	<i>Aster nova angliae</i>	P	1-4 ft	Sept.-Oct.
Prairie blazing star	<i>Liatrus pycnostachya</i>	P	4 ft	August
Prairie coreopsis	<i>Coreopsis palmata</i>	P	1-3 ft	July
Prairie dock	<i>Silphium terebinthinaceum</i>	P	2-6 ft	Aug.-Sept.
Prairie milkweed	<i>Asclepias sullivanti</i>	P	2 ft	June-July
Purple coneflower	<i>Echinacea purpurea</i>	P	2-4 ft	July-Aug.
Wild bergamot	<i>Monarda fistulosa</i>	P	2 ft	July-Aug.
Wild indigo	<i>Baptisia tincitoria</i>	P	3 ft	June-July
Yarrow	<i>Achillea millefolium</i>	P	2 ft	June-Aug.

¹G = Grass; P = Perennial

doses of insecticides can be directly lethal to the birds themselves.

Native Prairie Gardens

Native prairie grasses and wildflowers are a shrinking resource in Michigan, and they attract a large number of wildlife species. In fact, there are many species that can only survive on native grasses and wildflowers. Wildlife benefit most when the mixture of warm season grasses and wildflowers occurs in stands of 40 acres or more. However, even small plantings in backyard gardens can help wildlife and are also attractive. Native prairie gardens, as well as the other

gardens mentioned above, reduce mowing time and add visual enjoyment, even in winter as the grasses stand up to snow. Some wildflowers, such as coreopsis, provide winter seed for goldfinches and other birds.

Because most native grasses and wildflowers do best on upland sites, locate this garden in a sunny to partly shaded, well-drained location. The accompanying panel is a list of good plants to consider. If the site you have in mind is moist, big bluestem and switchgrass will likely establish without problems but you might also want to add

prairie and curly dock, swamp milkweed, native impatiens, sedges, and mints. A nursery expert should be able to help you with your plant selections.

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BIRD AND OTHER WILDLIFE FEEDERS



Wildlife can not exist without the four components that comprise their habitat: food, water, shelter, and space. Your property may not be large enough to provide all of the habitat needs for the kind of wildlife you wish to attract. However, you can offer one or more of these habitat components, even in a small backyard environment. Providing a variety of feeding stations will give wildlife, both residential and migratory, added incentive to visit your property. The more habitat components you provide, the more wildlife species you will likely attract. Wildlife feeders provide a supplement to the natural foods already available from nearby trees, shrubs, and flowers. Therefore, planting trees, shrubs, grasses, wildflowers, and groundcovers will increase the chances that wildlife will frequent your yard. For example, a bird feeder that is next to a sheltering evergreen shrub will attract more species than one that is not. This chapter explains how to provide feeding stations for wildlife in your backyard. For information on providing cover for wildlife in your backyard



cardinal

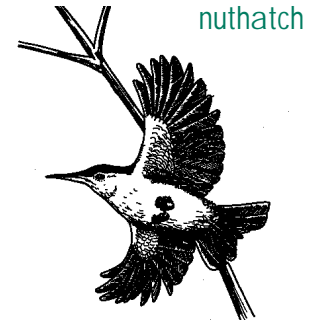
refer to the chapter on **Homes for Wildlife**, and the other chapters in this section.

Wildlife feeders can provide an opportunity to view wildlife from the comfort of your home. The most popular types of wildlife feeders are those for backyard birds. Because this is the most common type of wildlife feeding, there are a wide variety of feeders to choose from. However, feeders can also be provided for other species such as pheasants, bobwhite quail, white-tailed deer, squirrels, chipmunks, rabbits, raccoons, butterflies, and moths. When food supplies are scarce, such as in the very early spring or during bouts of severe weather, wildlife will rely more on your feeders. Do not worry that the animals will become dependent on your feeders. If you have to stop feeding for a month or so, they will find alternate sources.

Backyard Birds

Location

The combination of habitat diversity and the quality of available food are what will attract and keep songbirds at your backyard feeders. Pick a location that can be seen from your house, where the seed hulls and bird droppings won't be a problem, and that you can easily access year-round for filling and cleaning. If possible, locate the feeders near shelter such as evergreen or deciduous shrubbery that will provide protection from



nuthatch

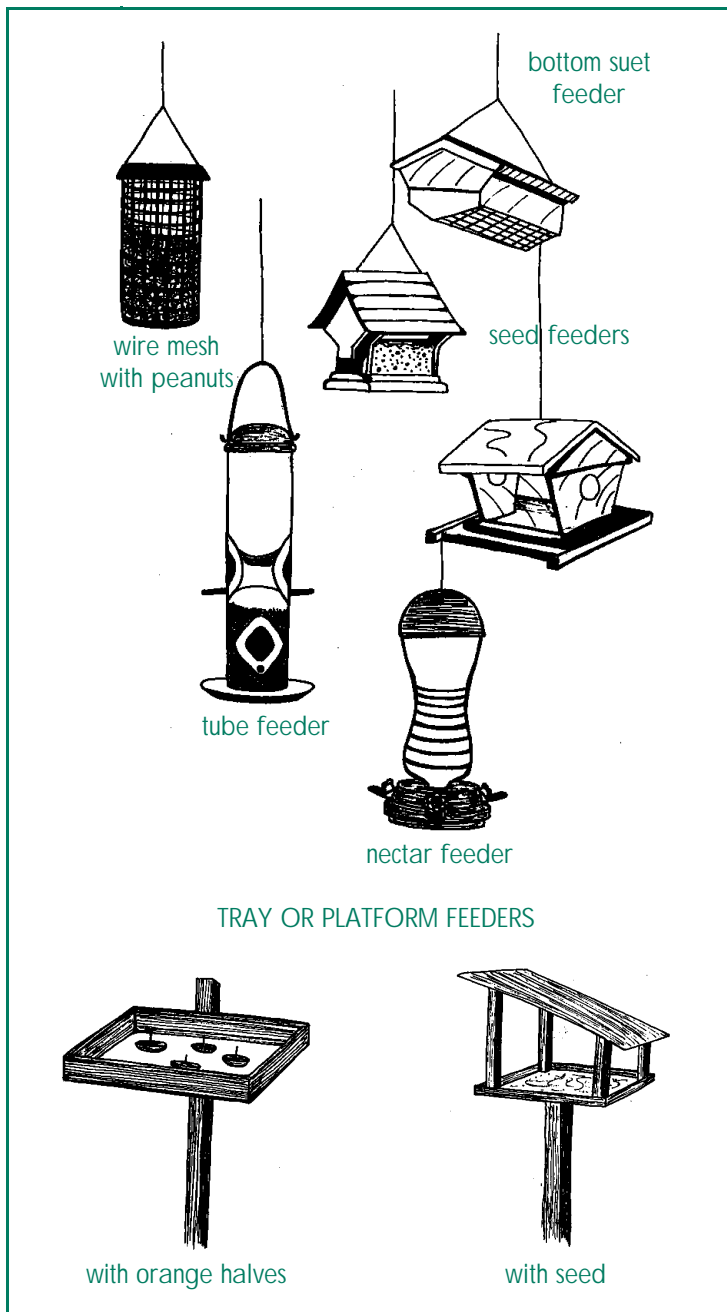
predators and winter winds. Placing a discarded Christmas tree near the feeding stations may help with this winter component. It is best to place hanging bird feeders on a metal pole rather than on a tree limb, as this will help you to deter squirrel problems. Locating feeding stations in several areas in the yard reduces crowding and lessens the chance for avian diseases that can kill birds. Providing a water source in addition to feeders will also help to attract birds to an area. Water that is dripping or splashing is especially attractive to birds. There is no best time to start feeding birds. Once food is presented and the birds find it, they will visit year-round.

Feeders and Food

Bird feeders are made of many different kinds of materials. They range from the simple disposable bag feeders to elaborate steel, plastic, or glass feeders. Disposable feeders are made of cloth, nylon, vinyl, and metal netting. These feeders are inexpensive, but they do not protect the seed from the elements. Other more durable feeders are made of

materials such as plastic tubes; ceramic and terra cotta; woods such as redwood, cedar, birch, pine, and plywood; metal sheets, glass tubes, and bottles. Most of these will keep seed dry, but you should make sure that there are holes in the bottoms to ensure drainage. If the feeders have trays, look for shallow trays that will catch the seed but not collect water. Ultimately the feeder that you choose will depend on the types of birds you want to attract.

You should begin by determining which species are likely to frequent your yard. This is based on the type of habitat that surrounds your house. What you feed and how you present it will determine what kinds of birds, and how many, will visit your feeders. You can offer a variety of preferred foods based on what species you want to attract. Offering commercially prepared mixed bird seed is not as effective as preparing foods customized to the birds you want to attract. Most seeds in commercial mixes get thrown out of the feeder as the birds search for their favorite seed. This favorite is the black oil sunflower seed. It can be used in commercial feeders, tray or platform feeders, and tube feeders. It is generally a safe choice as it is the favorite of most birds that visit these types of feeders. The most effective way to attract the largest variety of birds is to provide separate feeders for each food. Below is



siskins. Adding a tray to this feeder will attract larger species that can not perch on the small feeding holes, such as cardinals, jays, crossbills, mourning doves, and white-throated and white-crowned sparrows. A tube feeder containing *Niger thistle seed* with a tray will attract goldfinches, chickadees, redpolls, pine siskins, purple and house finches, white-throated sparrows, song sparrows, and dark-eyed juncos. In addition, if the tube feeder is an upside-down feeder (has feeding holes below the perches), only goldfinches will use it. When filled with *peanuts*, a tube feeder with a tray will attract cardinals, chickadees, grackles, house finches, titmice, house sparrows, starlings, mourning doves, white-throated sparrows, jays, and juncos.

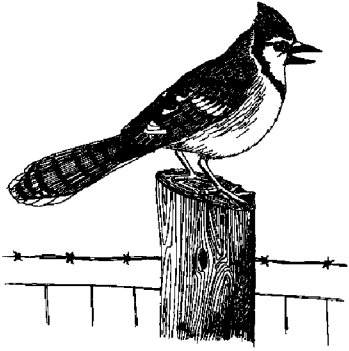
Tray or platform feeders are open feeders that can either be on the ground or raised up on a stand, and have a lip around the edges to help hold seed on the tray. This type of feeder provides easy access for many species of birds. When

a description of the more specific types of feeders and foods, along with the species that each would attract.

Tube feeders are cylindrical tubes with several slots for feeding. When filled with *black oil sunflower seeds*, the tube feeders will attract goldfinches, chickadees, purple and house finches, woodpeckers, nut-hatches, titmice, redpolls, and pine

filled with *black oil sunflower seed* it is a very general feeder and will attract most backyard bird species. When filled with *millet* the platform feeder will attract doves, house sparrows, blackbirds, juncos, cowbirds, towhees, chipping, field, and tree sparrows, and white-throated and white-crowned sparrows. When filled with *corn* the platform feeder may attract starlings, house

BIRD & OTHER WILDLIFE FEEDERS



blue jay

sparrows, grackles, jays, juncos, doves, white-throated sparrows, bobwhite quail, pheasants, and grouse. When filled with *peanuts* the platform feeder will attract the same species as those attracted to a tube feeder of peanuts mentioned above. Adding grit to platform feeders will aid birds in digestion as they use it in their crop for grinding food.

Suet feeders contain suet cakes that are made from animal fat generally derived from beef, pork, or deer. It can be set out as just suet, or mixed with seed, dried fruit, or other foods. Suet is most commonly used in the winter as it is a high energy food used in those times when food is the most scarce. There are several ways of displaying suet. It can be placed in a simple hanging bag such as an old onion or potato sack. Or, it can be placed in a feeder that is rectangular and has a grid-like pattern across it for feeding access. This feeder can either be laid out, or suspended. Suet feeders will attract chickadees, downy woodpeckers, hairy woodpeckers, red-bellied woodpeckers, white- and red-breasted nuthatches, and pileated woodpeckers. A hanging suet feeder will also attract wrens, kinglets, thrashers, creepers, cardinals, and starlings. A feeder containing *peanut butter suet* will

attract woodpeckers, juncos, thrushes, kinglets, wrens, starlings, goldfinches, cardinals, jays, and bluebirds. Suet feeders with access only through the bottom will make it difficult for starlings to feed as they can not hang up-side-down very well.

Nectar feeders are glass and plastic feeders that contain a sugar water solution that can be made at home (four parts boiling water to one part sugar), or purchased commercially. These feeders are most popularly used to attract hummingbirds. However, other birds that have been known to feed on nectar include orioles, tanagers, cardinals, finches, woodpeckers, and thrushes. These birds will not eat out of feeders made specifically for hummingbirds, as they need larger perches. However, there are also feeders made with these perches.

Many birds will feed on **fruit**, such as an orange half, if it is simply placed out on a ledge or speared on a tree limb. Birds that are attracted to fruit are orioles, tanagers, mockingbirds, thrashers, bluebirds, cardinals, woodpeckers, jays, starlings, thrushes, cedar waxwings, and yellow-breasted chats. These birds may also eat grape jelly if it is placed out on small trays. Feeding with fruit is usually done in the summer.



oriole

Potential Problems

After you have set up your feeders you may find that you have unwanted guests. One such problem is that of other animals eating out of, and sometimes

downy woodpecker

monopolizing, the feeders. Squirrels are the biggest culprits when it comes to taking over bird feeders, as they scare off birds when they are at the feeders, and often end up destroying the feeder by gnawing right through it. The simplest solution to the squirrel problem is to place the feeder on a pole away from houses and nearby tree limbs, and place a baffle on the pole. A baffle is a smooth metal sleeve or cone that prevents climbing. The most effective squirrel-proof feeder is the pole-mounted metal house type with a perch that closes the feeder when something as heavy as a squirrel sits on it. You may also want to place feeders specifically for squirrels among your other feeders, as this will deter them from the bird feeders. Other seed snatchers include chipmunks, rats, and mice. Reducing seed spillage under the feeder by avoiding mixed bird seed will deter them. Also, storing your seed in metal garbage cans will eliminate consumption of stored food.



Another problem encountered at feeders is that of predators. Avoid placing the feeders in an area that has a lot of ground cover as this provides good places for mammalian predators to hide. Cats pose a serious threat to backyard birds, especially to nestlings, fledglings, and roosting birds, as they are not natural predators. When a cat is present in your yard you are not likely to see many birds at your feeders. If possible, keep cats indoors, or use a belled collar to warn birds. Other predators that

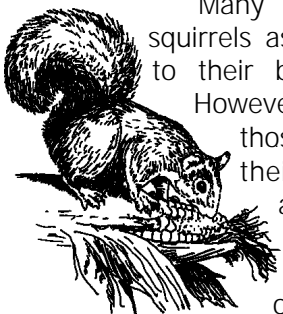
BIRD & OTHER WILDLIFE FEEDERS

you may see that do not present a problem are the Cooper's hawk and the sharp-shinned hawk. These birds are natural predators and play an important part in the natural community. Do not be concerned about the occasional kill these birds may make. Observing all birds in their natural behaviors is one of the joys of feeding them.

A serious problem encountered at many feeders that can easily be avoided, is that of avian diseases. When feeders are not properly maintained they become havens for bacteria. Several precautions can be taken to ensure that the birds visiting your feeders remain healthy. Avoid crowding the birds in a small space, as overcrowding facilitates the spread of diseases. Keep the feeders clean of waste and food droppings. Feeders should be cleaned once or twice a month with a mixture of warm soapy water and a capful or two of household bleach. Clean more often during humid summer months and cool, wet weather to avoid food spoilage.

Other Wildlife Feeders

Spike Corn Feeders



Many people view squirrels as a nuisance to their bird feeders. However, there are those that enjoy their playful antics and would like to see more of them in

their yards. Squirrels can be fed by placing ears of corn on spikes that are fastened to trees or platforms. If the ears are not attached, the squirrels will carry them away. Pheasants and deer may also use this type of feeder, especially if you live near agricultural land.

Log and Stump Feeders

A log or a large diameter branch laid horizontally, either on the ground or slightly raised can be used as a feeding station for squirrels, chipmunks, raccoons, deer, and various birds. One way to present food on this feeder is to create hollowed spots on the top side of the log and fill them with seed, corn, peanuts, or suet. Other options include placing spiked corn cobs or fruit on the top of the log. These methods can also be used in the same way on the top of a tree stump. Drilled holes on the side of a dead tree that are filled with suet may attract woodpeckers.

Butterfly and Moth Feeders

You will attract many butterflies and moths by planting wildflowers. However, supplemental feeders will increase the likelihood that they will frequent your area. Butterflies can be fed by simply placing a small plastic kitchen sponge in a sugar solution in a shallow bowl. They will land on the sponge and lap the solution through the holes just as they would from a flower. Moths are slightly more difficult to feed. There are several "brews" that when painted on a tree at night will attract moths. One such

brew calls for mashed fermented peaches and sugar. Another such brew calls for four pounds sugar, one bottle of stale beer, and some cheap rum. A third recipe consists of fermented bananas, dried apricots, and brown sugar. Checking the trees at night with a flashlight will allow you to spot the moths.

In summary, the more habitat components you have available in your yard, the more wildlife species you will attract. There are many ways that you can add the important habitat component of food to your yard. To supplement the natural food components in your area, you can add wildlife feeders to your yard. These feeders, if properly implemented and maintained, will provide you with the opportunity to view wildlife and learn about their natural behaviors.



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HOMES FOR WILDLIFE

Wildlife depends on four habitat components for survival: food, water, cover, and space. Depending on the species, the amount and type of each of these components varies. This chapter will focus on one of these components, that of cover. Cover types could vary from woodlands to grasslands to wetlands. After assessing what cover types are available on your property, you can determine what species you will be able to attract. If cover is not present, but other habitat components for a species are, then adding cover may make your yard more attractive to certain species of wildlife. By planting trees, shrubs, grasses, and flowers, you can provide cover and attract even more wildlife. In doing so, you will provide a more diverse habitat, and increase the likelihood of attracting wildlife by meeting all four of the habitat components.

Providing homes for wildlife will help fulfill their cover requirements. Wildlife homes can be either vegetative (grasses, shrubs, trees) or structural (stones, underground dens, brush piles, nest boxes, cylinders). These homes offer protection from not only predators, but also weather elements such as cold winter winds or hot summer days. Birds use these homes for shelter, nesting, and brood rearing. This chapter explains what homes can be provided for wildlife to enhance the cover on your property. The supplemental chapter **Homes for Wildlife II** provides the plans for

the homes described here. Refer to the chapter on **Bird and Other Wildlife Feeders** for information on how to provide the habitat component of food to your backyard.

Vegetative Homes

There are many types of natural homes that you can provide for wildlife on your property. In addition to planting trees, shrubs, and grasses that provide a variety of wildlife with places to nest, seek shelter, and raise their young, there may also be other natural homes that could be created on your land that also provide cover for wildlife.

Snags

Snags are standing, dead, or dying trees, which provide excellent natural homes for a variety of wildlife. Wildlife that inhabit these snags, such as woodpeckers, nuthatches, bluebirds, squirrels, and raccoons, are called cavity nesters. The type of wildlife that inhabit these snags will also depend on the kind, size, and location of the snag.

There are two basic kinds of snags: hard or soft. Hard snags have rotten centers with a solid exterior and a few limbs. These usually make the best den trees as the center can be easily excavated to form a home. Trees that usually form good cavities are

large hardwoods that decay slowly such as sugar maple, elm, black and white oak, hickory, and butternut. Soft snags have softer exterior wood, and usually have no limbs. These snags usually make good foraging sites for insect-eating birds, as well as nesting sites for woodpeckers, chickadees, and nuthatches. Trees that often form soft snags have short life spans, and rot quickly. These too are important to wildlife as they produce cavities more quickly than harder wood, as well as habitat for many insects that provide food for birds, mammals, amphibians, and reptiles. Coniferous snags do not usually last as long as hardwoods, and are usually not used for den trees. One exception to this is northern white cedar, as it makes an excellent cavity tree. Other conifers, such as white pine and tamarack, make excellent nest and perch sites for eagles and osprey when located next to water.

In general, regardless of the kind of snag, the larger it is the more wildlife it can support. The best den trees, live or dead, are over 15 inches diameter at breast height (DBH) with a den opening of four inches or more. Keep an eye out for trees that appear to be potential snags. These trees have large, sprawling



branches, and often are fruit and nut producers. Missing or bare branches, fungal growth, wounds, and discolored bark are all signs of a dying tree. Also, look for woodpecker holes, which usually indicate a rotting core.

If you do not have any snags on your property, consider creating some. Remember that it will take a while before newly created snags will be suitable for wildlife. Therefore, to speed up the process, try to pick trees that appear to be dying, and that are over a foot in diameter. With an axe, cut away a two inch band of bark around the entire circumference of the trunk, removing the bark and cutting into the sapwood. This is known as girdling, and will kill the tree as it disrupts the flow of nutrients. To simply create a den, cut off a four to six inch limb about six inches from the trunk. This will wound the tree and allow the decaying process to start, eventually forming a cavity where the limb was cut.

The kinds of wildlife your snag will attract will also depend on where it is located. Snags are most commonly associated with forests. Many forest mammals, such as bats, bobcats, bears, pine martens, porcupines, red squirrels, and gray foxes, use snags for dens and lookouts. Forest birds also frequently use these snags; woodpeckers are usually the primary excavators. Other birds, such as the saw-whet owl, black-capped chickadee, nuthatch, and great-crested flycatcher, move in once the home is vacated. A snag located on a waterway or wetland will attract a different variety of wildlife. Wood ducks, hooded mergansers, common goldeneyes, and buffleheads use cavities for nesting, while herons, egrets, eagles, and osprey use tall snags for nesting and look-



outs. Snags in open fields will provide lookouts for some types of hawks and owls, and homes for flickers, kestrels, and eastern bluebirds. A snag in a backyard setting will provide homes for house wrens, black-capped chickadees, red-bellied woodpeckers, and flying squirrels.

Fallen Logs

Fallen logs are snags that have toppled over or healthy trees that were felled, usually by windthrow. Once these trees fall to the ground, they do not lose their value to wildlife. On the contrary, they are highly beneficial. Fallen logs in or near water provide cover for various species of fish. Male ruffed grouse use fallen logs in their attempts to attract females with their springtime courtship drumming. Chipmunks use fallen logs as runways through the forest. Hollow logs will be used by a number of species for dens, especially in the winter. If the log is big enough, foxes and even bears will use it for this purpose. As the log becomes more decayed it becomes home to salamanders, moles, shrews, earthworms, and many kinds of insects. Eventually, these fallen logs will regenerate the forest as they return to the soil, providing rich nutrients for new plants to grow from.

Structural Homes

Vegetative homes may take

several years to become suitable for wildlife. Therefore, you may want to create structural homes for wildlife that may be more quickly occupied. Structural homes are those that are not grown, but are instead arranged in some manner to create cover for wildlife. This could mean that the structure was arranged naturally, such as a natural brush or rock pile. Providing structural homes will help to diversify your yard, as it will supply a ready-to-use home for wildlife.

Brush Piles

Brush piles, which consist of dead limbs and brush, will provide many species, such as rabbits, chipmunks, ground-nesting birds, amphibians, and reptiles, with escape cover. Brush piles are most beneficial when placed along habitat edges and near food sources. However, do not place a brush pile at the base of a snag, as this will promote predation. The base of the brush pile should consist of larger materials such as logs or rocks, so as to provide tunnels and openings at ground level. The pile should be six to eight feet tall and at least 15 feet wide. "Living" brush piles can be constructed by cutting into small, trees and shrubs so that the tops fall to the ground, while enough of the tree is uncut so it remains alive, forming a base for a larger brush pile. A brush pile that is buried underground forms a hibernation mound for snakes. Refer to the chapters on **Rabbits**, and **Frogs, Turtles and Snakes** for further information.

Rock Piles

Rock piles provide another form of cover for several species. Rock piles near wet areas or in gardens are especially appealing to those species that require moist, shaded areas such as frogs, snakes, sala-



manders, and insects. In areas near habitat edges, species such as rabbits and chipmunks will use the piles as escape cover.

Nest boxes

Artificial houses provide nesting sites for many species of birds and mammals. These nest boxes are usually wooden rectangular boxes of various sizes. Different species also require different sized entrance holes. Making the house for a specific species will lessen competition for nesting sites. A hinged side or roof should be provided, as it will allow for easy access for cleaning. Also, avoid houses made of metal as they overheat in warm weather, killing bird eggs. Do not use birdhouses with perches as this promotes invasion by exotic bird species such as house sparrows and starlings. These birds are not federally protected, and should be removed whenever possible as they will kill native birds and take over nest boxes.

A nest box that is 5 1/4 x 11 1/4 inches in size will attract house wrens, black-capped chickadees, white-breasted nuthatches, mice, and flying squirrels. **House wrens** nest in wooded, shrubby habitats and are one of the most common backyard birds. Their nest boxes are best placed five to 20 feet above the ground, and in a tree or under the eaves of a building. The entrance should be one inch in diameter. Wren houses can be free hanging and should not have a perch. Mice will also use these

sized houses for winter dens. Beware that this may prevent birds from using the house when they return in the spring. **Black-capped chickadees** will nest in these boxes in areas that have mature trees. Their nest boxes should be mounted 5 to 10 feet high in areas that have both sun and shade, have an entrance hole of 1 1/8 inch diameter, and should not have a perch. **White-breasted nuthatches** will nest in areas similar to that of the black-capped chickadee. These boxes should be placed in wooded areas about 12 to 20 feet above ground. They require an entrance hole of 1 1/4 inch diameter. This box will also be used by flying squirrels.

A box that is about 5 1/4 x 10 inches in size, and with an entrance hole that is oblong in shape (1 3/8 inches x 2 1/4 inches), will be used by **tree swallows** and **bluebirds**. These boxes should be placed in pairs approximately 25 feet apart to reduce competition between these two species. The entrance to the box should be placed so that it is facing east. These species will nest in areas comprised of a mix of hardwood forests and grasslands, and tree swallows are more abundant near water. These boxes are often placed on fencerows, and can actually be made in a fence post. Refer to the chapter on **Bluebirds** in the Species Management section for information on how to build this type of nest box.

Purple martins will nest in community houses, as they are not territorial species. This house is large, with many housing compartments in it. The entrance holes are located on all sides of the house, and an empty central space is important. These houses should be eight to 10 ft high and placed at least 30 feet from trees.

Northern flickers nest in farm groves, orchards, woodlots, and in urban areas. They will use nest boxes made of 1 1/2 inch thick boards that are filled to the top with saw dust. The sawdust simulates the soft interior of a dead tree and will be excavated by the flicker. The entrance hole should be 2 1/2 inches in diameter. The sawdust will need to be placed in the box every year before April 1 to be ready for the flicker's arrival.

Bats, those beneficial mosquito catchers, will live together in communities in bat houses near wet areas. Bat houses can be various sizes, but the common feature is a bottom entry made by several slats placed one inch apart. The inner surfaces of the house should be roughened to facilitate climbing, and rough outer surfaces are also helpful. Bat houses should be kept at a temperature of about 80 to 90 degrees. This can be done by covering the top with tarpaper, or by painting the house black. The houses should be placed on a tree trunk, metal pole, or the side of a building, preferably facing east, about 10-12 feet above the ground. If placed on a tree, it should be a fairly isolated one with a sheet of tin around the tree and under the house to deter raccoons. Otherwise, the bats will be heavily preyed upon. Refer to the chapter on **Bats** in the Species



Management section for information on how to build a bat house.

Boxes that are larger, about 9 x 15 inches, will house squirrels and kestrels. **Squirrels** are abundant in back yards, woodlots, and farm groves. The entrance to a squirrel box should be three inches in diameter and is located on the side of the box instead of in the front. A piece of wood can be nailed inside the box just below the entrance hole to provide an observation perch. Squirrel boxes should be placed facing either east or south at least 15 feet above ground in trees at least 10 inches in diameter. **Kestrels** are abundant in agricultural areas with scattered trees. Kestrel houses are the same as squirrel houses except for the entrance hole placement. These houses should be placed on a 10 to 30 feet high post or tree that is near grassy areas. They should have a sheet of tin secured around the tree under the house to prevent squirrels from using it.

Raccoon houses are large (12 inches x 24 inches), with an entrance hole of 4 $1\frac{1}{2}$ inches in diameter. This box should be placed on live or dead trees of at least 12 inches in diameter, at a height of 10 to 20 feet.

Wood duck houses have greatly benefited this species. These houses are 9 $1\frac{1}{4}$ x 18 inches with an oval entrance hole that is three inches high and four inches wide. This hole will exclude most raccoons. These houses should be

placed on an isolated tree or post 16 feet high, and with a tin sheet secured under the house to prevent squirrel use and raccoon predation. Watch for starling occupation in these boxes, and remove any suspect nests.

Shelves and baskets

Robins, Barn swallows, and Eastern Phoebes will utilize nesting shelves. These shelves are open to the front, but covered on the sides and top. **Robins** are often seen in backyards, and their shelves can be placed about six to 10 feet above ground on a wall by a window or on a tree trunk. **Barn swallows** are common on farmsteads, and usually use a mud nest stuck to the sides of a building. Therefore, nesting shelves should be placed on a house or barn at least 10 to 20 feet away from doorways. **Eastern phoebes** are the most common shelf nest builders. Their shelves should be placed under the eaves of houses near lakes, rivers, or most wooded areas.

Mourning doves and mallards will nest in baskets. These baskets can be made of wire mesh formed into a cone. Both baskets are similar, but vary in size. **Mourning doves** will nest in a basket that is 12 inches in diameter and placed in the crotch of a tree limb six to 16 feet above ground as far from the trunk as possible. **Mallards** will nest in larger baskets. Their baskets have a 26 inch diameter, and are placed over water on a seven to eight foot support pipe. Placing nesting materials in these baskets

will facilitate use by these species.

Other structures

An underground den for rabbits can be made by placing a wooden box with two side entrances into the ground and covering it with brush. Each entrance should have three to four field tiles that lead above ground. This den should not be placed in areas that are not well drained.

A squirrel den can be made from discarded automobile tires. The tire den should be placed 15 to 30 feet above ground in a tree with the entrance hole facing the trunk. This is not as aesthetically pleasing as wooden boxes, but it is highly functional and a good way to recycle your tires.

In summary, there are many ways to add the habitat component of cover to your property. Providing homes, either vegetative or structural, is a good way to help fulfill this requirement in your backyard. Observing the wildlife that use the homes you have provided is not only fun, but educational.

FOR ADDITIONAL CHAPTERS CONTACT:

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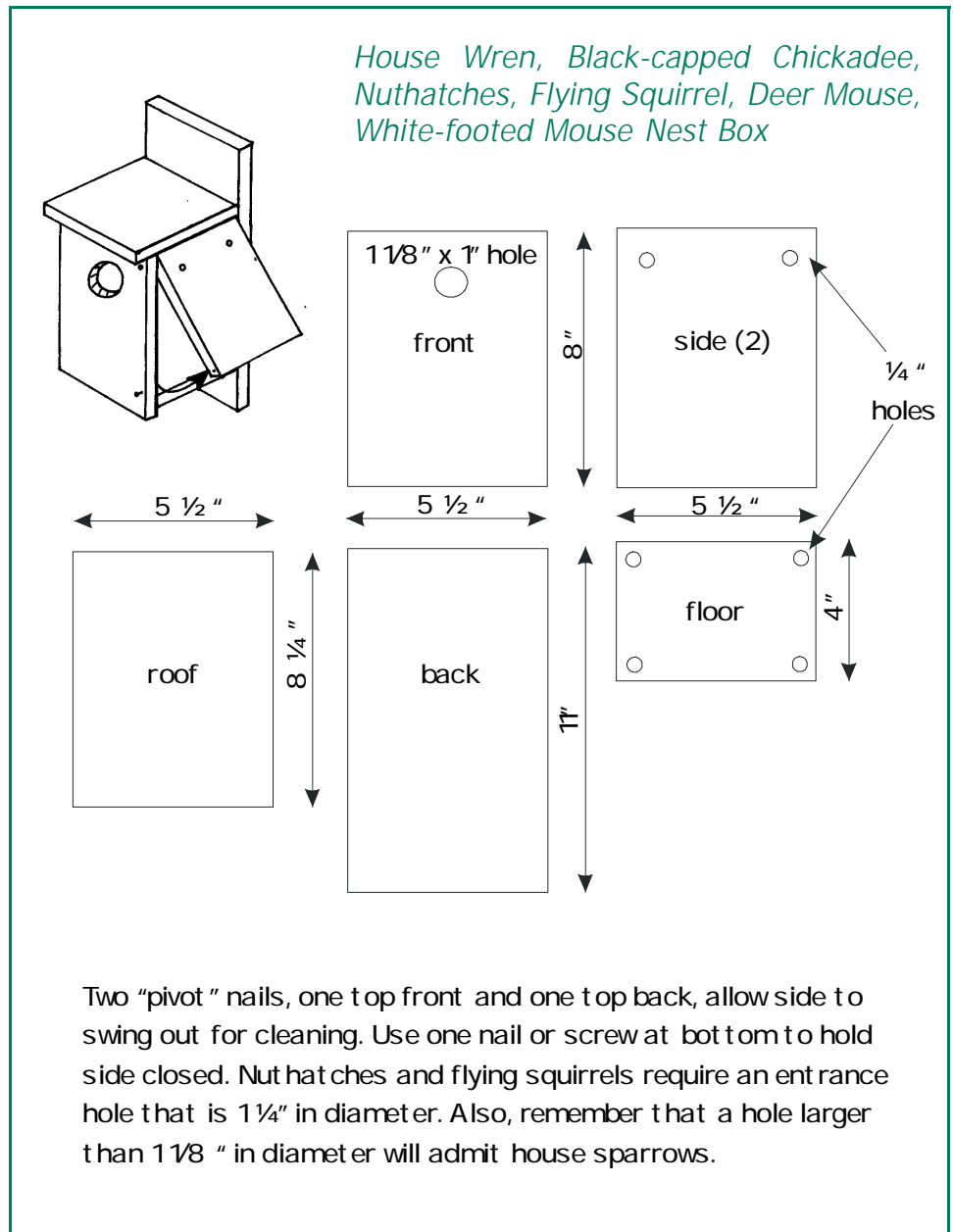
HOMES FOR WILDLIFE II PLANS



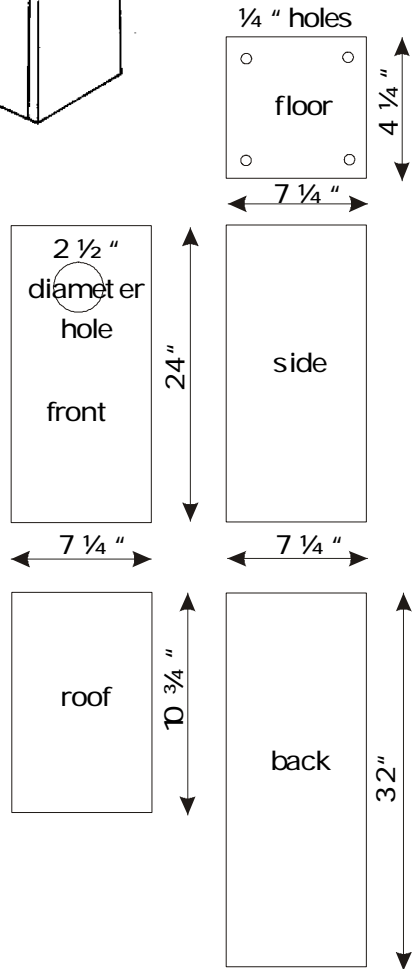
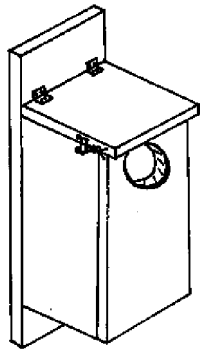
It is essential to provide wildlife with the habitat components of cover, food, space, and water. Providing homes will help provide cover and will aid in attracting a variety of wildlife to your backyard. This chapter furnishes plans for the previous **Homes for Wildlife** chapter. Most of the plans here are for birds, but there are also structures for squirrels and rabbits. The plans for the bluebird house and bat house can be found in their respective chapters in the **Species Management** section. All birdhouses are made from $3\frac{1}{4}$ " wood; do not use metal. Also, to prevent rain from seeping into the cracks enclose the floor with the sides instead of nailing the sides to the top of the floor. Attach birdhouses to a support post, building, or tree. All nest boxes should be predator-proofed to prevent threats from climbing predators such as housecats, raccoons, and squirrels. In most cases this can be done by placing a metal cone or a sheet of tin on poles or around trees underneath the nest box.



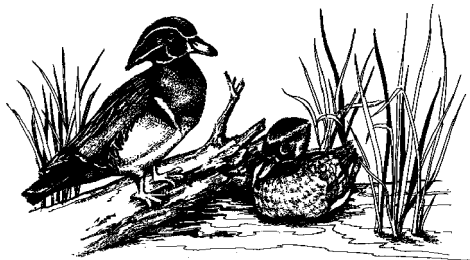
Flying Squirrel



Northern Flicker

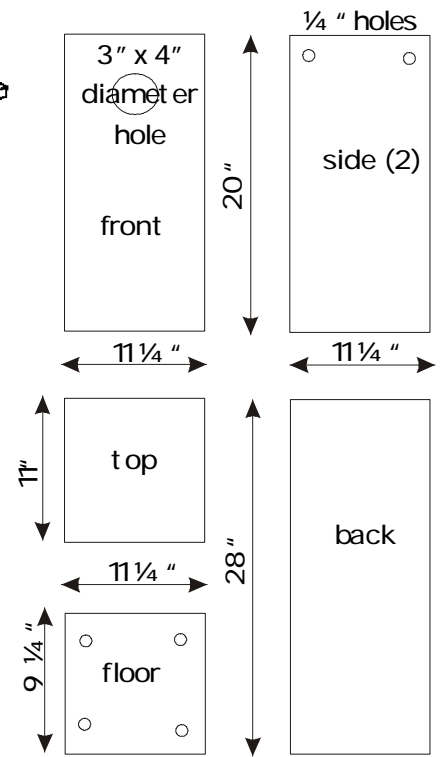
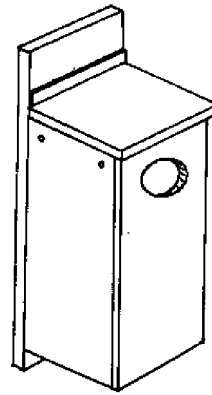


Hinge roof for cleaning, and use a wire to keep the box shut. Place body of box 5" from the top of the back. Fill the box to the top with sawdust.



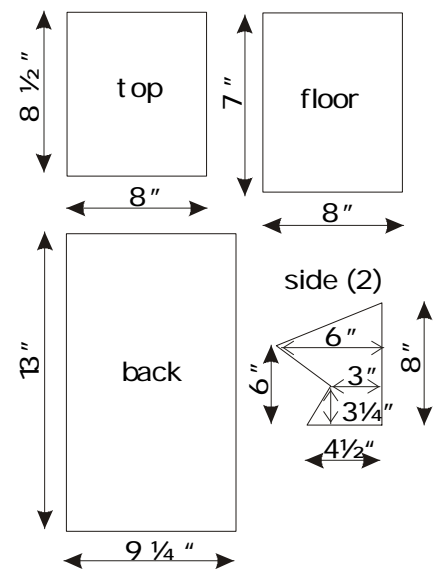
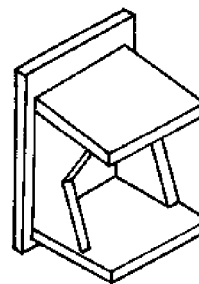
Wood Duck

Wood Duck



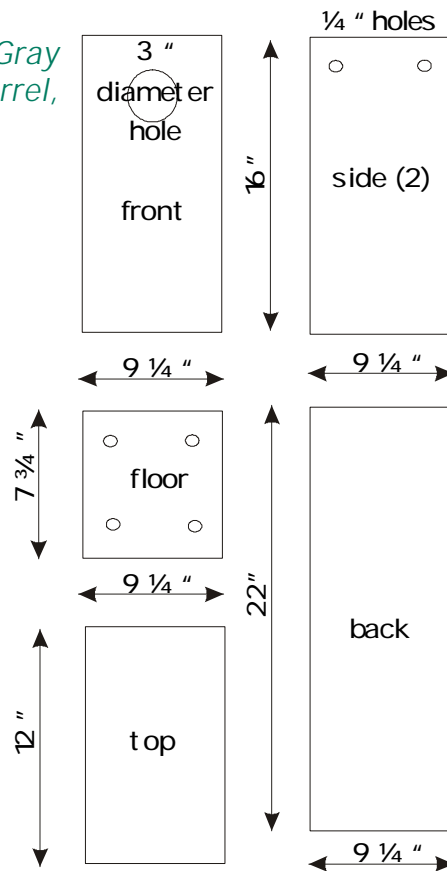
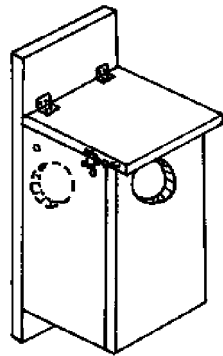
Hinge roof for cleaning, and use a wire to keep box shut.

American Robin, Barn Swallow, and Eastern Phoebe Nest Shelf

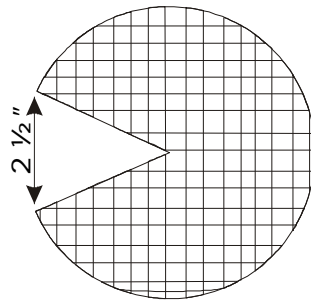
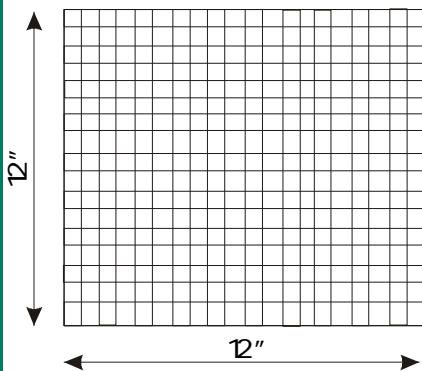


Place body of shelf 2" from top of back.

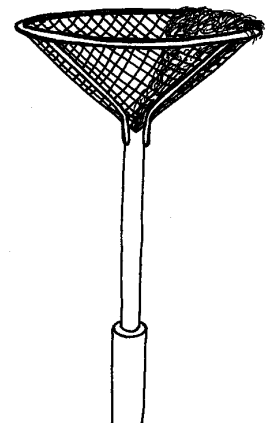
American Kestrel, Gray Squirrel, Red Squirrel, and Fox Squirrel



Hinge roof for cleaning, and use a wire to keep box shut. Place 3" of sawdust in bottom of box. For a squirrel box, place entrance on side of box instead of front.



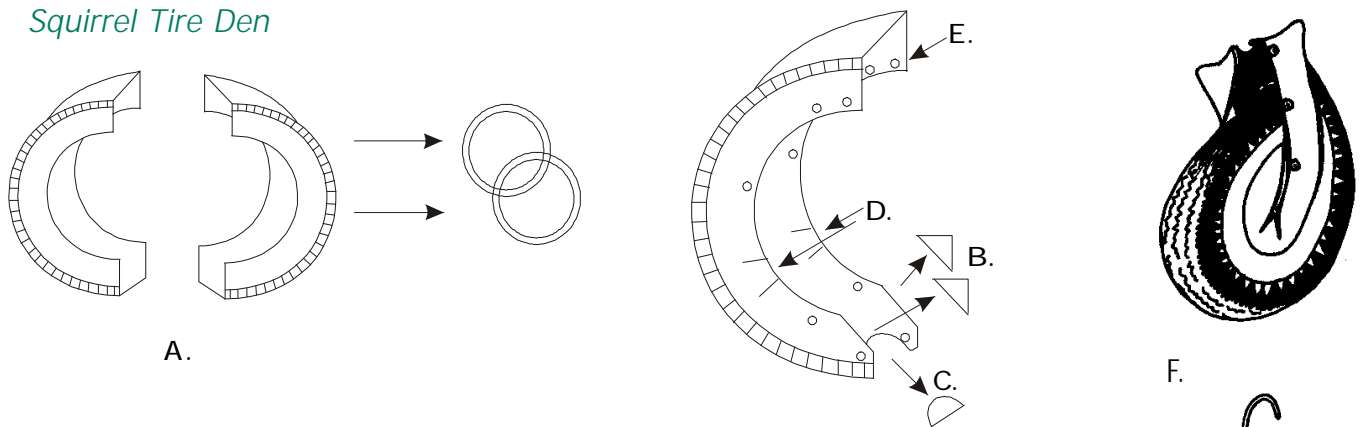
Mourning Dove and Mallard Nest Basket



Cut with tin snips to form a circle. Cut out a pie shape, and wire edges together to form a cone. Place on tree limb with wire. A mallard basket can be made in the same way using 36" x 36" wire mesh, and placing on 2" x 2" basket pipe above water. Vegetation for nesting is placed in the mallard basket and secured with soft wire.

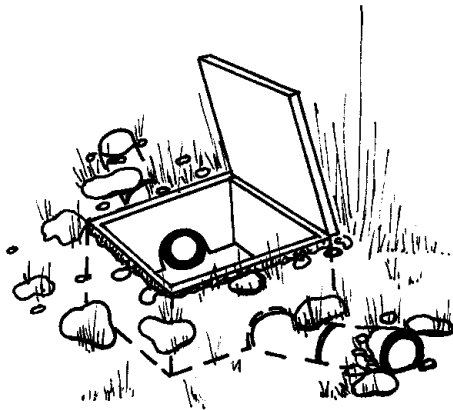
HOMES FOR WILDLIFE II

Squirrel Tire Den



Old tires can be reused to construct a squirrel den. Use a regular, non-steel belted, tire. A) remove the bead from both sides of the tire, and cut the tire in half. B) cut a 3" triangle from each corner of the bottom of the tire. C) In the same end, cut a 3" diameter semicircle (this is the entrance hole). D) Cut 3" flaps in sidewalls about 1/3 distance up from the bottom of the tire. E) Punch holes into the sidewalls as shown. F) Fold the short end of the tire into the long end, and secure with roofing nails and washers. Hang with heavy wire or metal rod.

Rabbit Den



Dimensions of the burrow are not critical. A bottom is not necessary, as it will sit on the ground. Use durable lumber for the box, and bury it at ground level. Two semicircles should be cut on opposite ends at the bottom of the box. The tile should fit snugly into these holes. Bury the tiles at about 45 degree angle from the surface of the ground to the bottom of the box.



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