PRIVATE LAND PARTNERSHIPS
WORKING TOGETHER FOR WILDLIFE

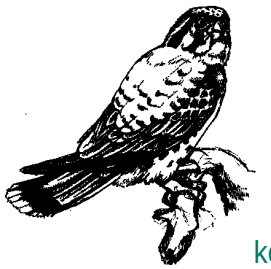
INTRODUCTION TO CROPLAND MANAGEMENT

About half of the earth's land surface has been converted to agriculture use. In some areas, including parts of Michigan, the figure is closer to 90 percent. The change of land to agriculture use began with the earliest of Euro-American settlers. After they realized the depth and richness of the prairie and savanna soils, these areas were cleared for agriculture, leaving only traces of the original plant community. Farming also occurred on cleared forest areas. Eventually some of these forest areas did begin to regenerate but were very different from earlier forests.

In 1850, the population within lower southern Michigan was mostly farmers. Farmland acres in Michigan peaked at 19 million in 1940. Since then, agricultural land has decreased to 10½ million acres. This decline is due to the increase in urban development and the loss of family farming. Nevertheless, Michigan is a key agricultural state, currently leading the nation in the production of tart cherries, blueberries, cucumbers, and dry navy, black, and cranberry beans.

Family farming for subsistence has given way to a modern mixed agriculture/industrial buisiness. As a result, opportunities for maintaining or creating wildlife habitat occur mostly on those former farmland acres taken out of production. In an effort to help keep farmers solvent by reducing crop production and raising crop prices, the U.S. Department of Agriculture has created various programs which pay landowners to set land aside--to keep it out of production. The current federal conservation programs attempt to reduce erosion by keeping soil in place, limiting the use of pesticides and fertilizers, maintaining ground and surface water quality, and recommending wildlife-friendly plantings.

About three percent of the state's agricultural land, or some 250,000 acres, is currently enrolled in the Conservation Reserve Program (CRP), which is administered by the United States Dept. of Agriculture, Farm Service Agency (FSA) through their county offices. Land typically eligible for enrollment includes croplands susceptible to erosion that fall within conservation priority areas. Cost share money is often available to establish shelterbelts, shallow wetlands, and filter strips of grass or trees.



kestrel

Information is available from USDA offices, Conservation District offices, and Michigan State University Extension offices.

Conventional Versus Conservation Tillage

Conventional crop production practices that include moldboard plowing affect wildlife in several ways. First, they reduce and isolate the amount of natural habitat so that all that remains in heavily farmed areas are scattered remnant patches, wet depressions, and linear strips in a sea of cropland. Second, few native plants and animals adapt to, or can tolerate, heavily managed croplands. Third, the practices leave little food or shelter for wildlife during the winter months. The greatest impact to wildlife is the practice of fall plowing, which is often used with conventional tillage.

Conservation tillage is a broad term referring to several tillage methods that maintain crop residue (stubble or other plants) on the field surface. These tillage methods reduce wind and water erosion, conserve soil moisture, and increase organic matter, which

red-winged blackbird

result in better soil structure. Studies have shown that conservation-tillage fields can have yields that equal or exceed conventional-tillage fields, and the practice cuts production costs considerably. The approach varies from "minimum tillage," where about 20 percent of the previous year's crop residue is left, to "no till", where at least 90 percent of the previous year's crop residue remains on the soil surface. Although not as productive for wildlife as unfarmed habitat in various stages of succession, conservation tillage is far superior than conventional tillage.

Conservation tillage causes less compaction of the soil, (compaction occurs when heavy equipment and implements cross the field over and over), which has a positive effect on the soil, allowing water to perculate into the soil instead of causing erosion and washing pesticides and fertilizers into the surface water. The soil's better permeability also favors soil invertebrates. Invertebrates account for 90 to 95 percent of all animal species, and play a critical role in soil health. Growers need insects, spiders, worms, snails, and nematodes because the invertebrates act as decomposers, pollinators, soil conditioners, food sources for higher organisms, and control agents for other organisms, which may be harmful.

Conservation tillage overall is better for wildlife than conventional tillage. Crop residues serve as mulch, safeguarding soil from wind and water erosion while conserving soil moisture. The crop residues furnish nutrients, shelter, and micro-climates that soil organisms need. Pheasants, grasshopper sparrows, and meadowlarks will nest in no-tilled fields where residue is sufficient. Migrating waterfowl, shorebirds, and songbirds such as snow buntings, Lapland longspurs, and common redpolls--along with pheasants, quail, and other winter residents--rely on waste corn, soybeans, other grains, and weed seeds for food. Vesper sparrows show a clear preference in spring and summer for foraging in fields with the most crop residue, probably because one of their favorite foods--spiders--live in the residues. Cover is also increased and song perches are elevated.

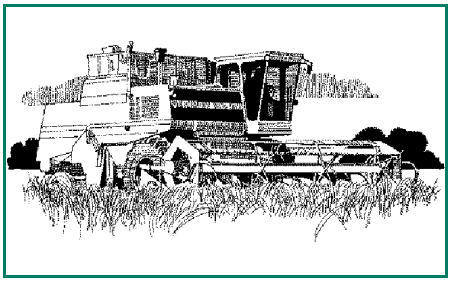
Large, open fields with no natural cover only attract a few bird species such as the brown-headed cowbird, horned lark, Vesper sparrow, and killdeer. Similarly, few mammals use these open fields, such as deer and white-footed mice, voles, and ground squirrels. Many more species--and as many as five times more birds--prefer the edge over the middle of such clear fields. Consequently, as field size increases, the proportion of field edge decreases and so does the average abundance of birds per field. Road-to-road farming operations that remove old fields, woody cover, and edge habitats can lead to a huge decline in the number and kinds of wildlife.

Other Conservation-minded Farming Practices

Most wildlife depend on a number of habitat types for food and cover. Greater wildlife abundance and diversity are possible through management of the entire ecosystem rather than management of an individual area or species. For the greatest impact, consider the total picture--how croplands, forests, and wetlands can provide good living conditions to a variety of wildlife. If some food and cover types are available on nearby areas, best results may be achieved by providing an element of the habitat that is missing. Management is also more effective when neighboring lands are involved. Greater varieties of food and cover will result in more abundant wildlife. Here are several practices to consider. In addition, the **Cropfields** chapter will have additional information.

Crop rotation is a time-honored farming practice that reduces plant diseases and increases soil nutrients and yields. When alfalfa, clover and other legumes are worked into the rotation, valuable nitrogen is produced, along with insects and nesting cover for wildlife.

Organic farming practices that rely on composting and manuring of fields may help improve the compatibility between



crop and animal production practices and wildlife conservation. Organic farmers usually use less conventional tillage, avoid manufactured fertilizers and pesticides, have greater crop diversification, rely on crop rotations, and cultivate smaller fields.

alfalfa

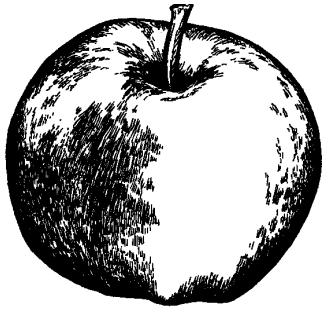
Field borders, shelterbelts, and fencerows between fields and around the perimeter of fields can help wildlife if the borders contain grasses, legumes, and fruit-bearing shrubs. The more diversity, the greater the attraction to more wildlife species. Wider is always better. At a minimum, borders should be at least 30 feet wide. Such linear borders are important for wildlife because they provide edge cover and travel lanes (corridors) between habitats. For more information see the chapter in this section on **Field Borders and Corridors.**

Hayfields will provide desirable plants used by livestock and preferred by wildlife. Lack of vigorous growth and an increasing amount of undesirable plant species that invade hayfields may be signs of low fertility, low pH, and a need for replanting. Burning, mowing, and grazing are three common practices to rejuvenate hayfields and retard natural succession. Burning and mowing should be done before April 15 or after July 15, so nesting wildlife will be spared. Separat-ing pastures into units and grazing them alternately will prevent over-use by livestock and allow wildlife to nest undisturbed in unused units. Grass areas next to ponds and other wetlands, where wildlife naturally congregate, should be fenced off to protect water quality and nesting wildlife. A minimum of 100 feet of perimeter protection is recommended.

Hayfields can be established with either native or introduced grasses and legumes. Lands that have been taken out of production are often planted with cool season grasses such as timothy or orchard grass, or legumes like ladino and sweet clover. Native, warm season grasses--switchgrass, big bluestem and Indiangrass--have their greatest growth in mid-summer and give landowners an option to continually mowing or grazing cool-season grasses and legumes. Planting a field of cool season and another with warm season grasses provides different heights and densities, which wildlife find attractive. Refer to the **Hayfield** chapter in this section for more information

fencerow

Other areas such as field corners, rocky and low-yield fields, eroded gullies, rights-of-way, and old orchards can be planted with a mixture of trees, shrubs, and grasses. Orchard fruit is a delicacy for many wildlife species. Ripe apples and pears attract grouse, quail, rabbits, raccoons, foxes, opossums, squirrels, skunks, and deer. Wherever fruit trees are found, along fencerows, next to farm buildings and homesteads, in old orchards, they become centers of activity for wildlife in fall and winter. It is important to leave some old trees, which will provide cavities for a variety of wildlife. A few rows of grain next to brushy areas increases their value during winter. The management of other areas will vary depending on what is currently there.



In summary, even though your goal may be financial, studies indicate that new crop management methods increase your overhead while helping wildlife. Indeed, cropland management can be both beneficial to the landowner and to wildlife. The following chapters in this section explain a variety of management options that do just that.

FOR ADDITIONAL CHAPTERS CONTACT:
Michigan United Conservation Clubs
PO Box 30235
Lansing, MI 48909
517/371-1041

Private Land Partnerships: This partnership was formed between both private and public organizations in order to address private lands wildlife issues. Individuals share resources, information, and expertise. This landowner's guide has been a combined effort between these groups working towards one goal: Natural Resources Education. We hope this manual provides you with the knowledge and the motivation to make positive changes for our environment.

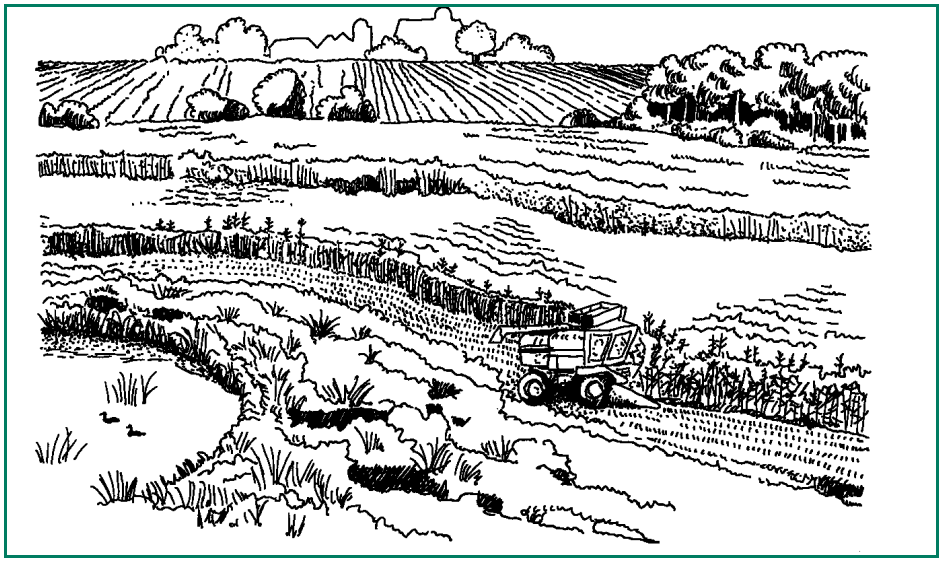
FOR ADDITIONAL ASSISTANCE: *CONTACT YOUR LOCAL CONSERVATION DISTRICT*

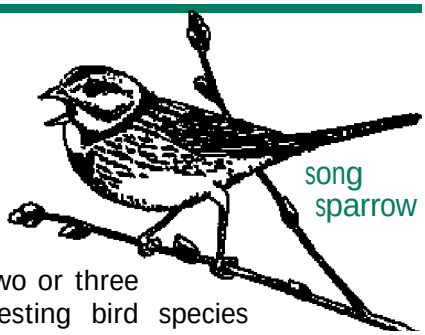
CROP FIELDS

Of all the private lands in the United States, 27 percent is in cultivated cropland, which produces an enormous variety of grains, fruits, vegetables, and other products. In Michigan, about 10 1/2 million acres, or some 30 percent of the state's land base, is active farmland. In a typical harvest year an average of seven million of these acres yield nearly 25 million tons of production.

Because of its size and scope, farming impacts wildlife perhaps more than any other land-use practice. The trend to fewer, larger, more intensively managed farms over the past several decades has been detrimental to many wildlife species. Although farm crops are eaten by deer, rabbits, pheasants, waterfowl, and many kinds of songbirds, many farming practices fragment good wildlife habitat or create open habitats used by relatively few species. Increased reliance on pesticides and herbicides, removing fencerows to create bigger fields, fall plowing, and early and late cutting of hayfields are farming methods that negatively impact wildlife. It is difficult for farmers to make sacrifices for wildlife if the sacrifices mean reduced income. However, there are some management techniques that cost nothing or increase profits, and yet are beneficial to wildlife as well as to the landowner and community. Farmland that contains good habitat will support a broad mix of wildlife, which, in turn, will provide a continuing source of beauty, inspiration, and recreation.

Four types of habitat exist in most farmland: open cropland areas, farmstead and wooded sites, haylands, and wetlands. Results have shown that rowcrop areas of corn and soybeans support only




song sparrow

two or three nesting bird species and a total of only up to 88 birds per 100 acres. Pasture and haylands support seven to 11 nesting species and a total of up to 386 birds per 100 acres. Marshland supports 13 nesting bird species and up to 702 birds per 100 acres. Croplands, then, are the biggest challenge for wildlife, and this brochure offers cropland management considerations that will lessen negative impacts.

Conservation Tillage

Conventional crop production practices that include moldboard plowing and total harvesting reduce and isolate native habitats. Unless it is plowed under, about three percent of a grain crop is left on the ground for wildlife. For example, in an area that produces 100 bushels of corn per acre, there would be three bushels available to wildlife. However, the practice of fall plowing, which is often used with conventional tillage, turns this available food resource under the ground reducing the food available to wildlife at this time of the year.

Conservation tillage is a broad term referring to several tillage methods that maintain crop residue (stubble and other plants)

on the field surface. These tillage methods are intended to control erosion, reduce compaction, conserve moisture, and increase organic matter, which result in better soil conditions. Studies show that conservation-tillage fields cut production costs overall and provide yields that approach equal or exceed conventional-tillage fields. For example, one study showed that conventionally tilled compacted soil yielded only 90 bushels per acre of corn, compared to conservation tilled uncompacted soil yields of over 120 bushels per acre.

The **conservation approach** varies from "minimum tillage," where about 20 percent of the previous year's crop residue is left, to "no till", where at least 90 percent of the previous year's crop remains on the soil surface. Although not as good as native wildlife habitat in various stages of plant succession, conservation tillage is far superior to conventional tillage for wildlife. A Michigan study, for example, showed that fields of wheat stubble contained an average of 212 pounds per acre of weed seed on the stem in October. When not plowed, such fields provide food for wildlife all winter and the following spring. U.S. Department of Agriculature, Natural Resources Conservation Service (NRCS) offices have detailed guidelines on how, when, and where to plant crops using conservation tillage methods.

Crop Rotation

Crop rotation is a time-honored farming practice that reduces plant diseases increases soil nutrients and increase yields. When alfalfa, clover, and other legumes are worked into the rotation, valuable nitrogen is produced, weeds are more easily controlled, compaction problems decrease, and insect food and nesting cover are increased for wildlife. It has been shown in previous studies that the highest yields of corn occurred when corn planting followed a grass-legume meadow. In addition, plowing down first-year sweet clover produced up to 113 pounds of nitrogen per acre. Plowing down after the second year resulted in 162 pounds of nitrogen per acre.

Periodically rotating crop fields in grass or legumes also improves soil tilth, aeration and drainage--mostly because earthworms and other invertebrates are more active under sod than in row-crop cultures. An Illinois study that measured the number of breeding birds per acre in a variety of cover types found 12.0 birds per acre in mixed covers of hay, 5.6 in ungrazed grassland, 5.0 in pastures, 3.5 in red clover, 2.2 in fallow fields and only .08 in cornfields.

Integrated Pest Management

Although conservation tillage is less harmful than conventional tillage to wildlife, it still relies on considerable chemical usage to control weeds and insects. The reduction of pesticide use can be best accomplished by crop rotation and integrated pest management. The incidence of epidemic insect damage on croplands is greatly increased when the same crop is planted on the same acreage for several years in succession. Crop rotation where no more than two

kestrel

successive years of the same row crop are planted on the same acre is recommended. This will reduce plant specific insect pests below threshold levels, making the use of prevention insecticides less necessary. The monitoring and collection of adult insect pests before egg-laying time will predict potential problems. Then and only then will insecticide use be recommended. This practice not only reduces cost of crop production, it also reduces the possibility that insect pests will not become resistant to chemicals due to their continued annual use. Likewise, the soil invertebrates, which make up 90 to 95 percent of all animal species and play such a critical role in soil health, will be spared the unintentional application of pesticides into their habitats. Growers need certain kinds of insects, spiders, worms, snails, and nematodes because the invertebrates act as decomposers, pollinators, soil conditioners, food sources for higher organisms, and control agents for other organisms which may be harmful.

Other Practices that Benefit Wildlife

The following are options to consider when managing your cropfields:

CROP FIELDS

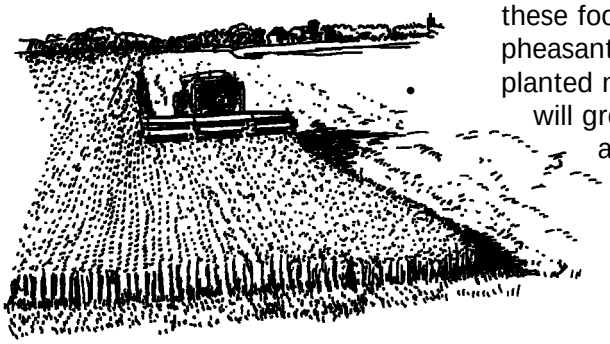
Preserve and restore wetlands on your property. Establish a minimum of 100 ft. of grassy nesting cover around each area of wetland.

• Establish 30-foot-wide borders of grass or legumes around the field along wooded borders to provide nesting cover, check erosion, and trap soil particles and nutrients. Keep these buffer zones free of chemical spraying.

• Create smaller fields by strip cropping to provide narrow fields of grain next to narrow fields of forage. You can also create smaller fields by planting shrub hedgerows and field windbreaks, which wildlife will use for food, cover, and travel lanes.

• Establish grass or legume cover on all bare fields, even if the area is planted in another cover type the following spring. This ground cover provides soil stability and erosion control, reduces evaporation, and maintains steadier soil temperatures. Plantings of crops, shrubs, or trees that follow will grow better. Winter wheat, winter barley, and annual rye are good cover crops to consider because deer and Canada geese will graze them without decreasing crop yields the following summer. When possible, space such cover plantings with croplands to create diversity.

• Leave a few rows of grain on field perimeters to help feed wildlife in winter.



• Plow across slopes (contour plowing to reduce erosion, which conserves valuable topsoil and prevents sediment from washing into unfarmed areas.

• Plant native grasses and forbs along roadsides, which may be used by 40 species of birds and animals. Mow or burn these areas only before April 15 or during the month of August.

• Maintain vegetation along roads and uncultivated strips because they provide food, shelter and travel lanes for wildlife.

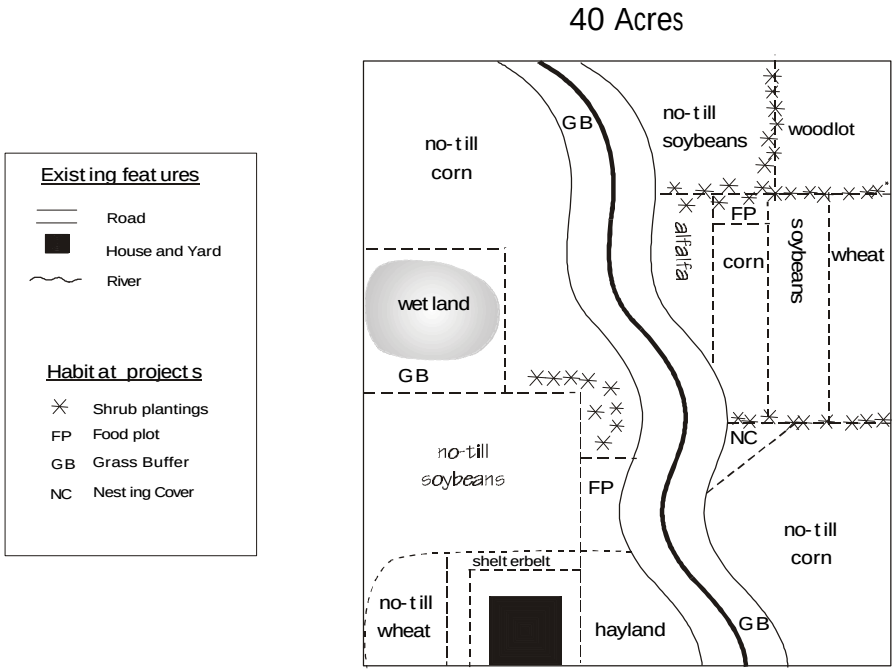
• Plant food plots of corn, grain sorghum, sunflowers, soybeans or buckwheat. Protect the food plots on their north and west sides with natural habitat such as woods, wetlands or shelterbelts. If placed near wetlands or idle grasses, these food plots will greatly benefit pheasants, songbird, and quail. If planted near woodlands, food plots will greatly benefit turkeys, deer, and squirrels.

• Plant shelterbelts around farmsteads and windbreaks around farm fields and other woody covers in odd corners and edges. Windbreaks reduce erosion and increase crop yields; shelterbelts reduce fuel costs and increase livestock production. Thick hedges or shrubby fencerows help stop wind erosion, trap snow, and can be used as livestock fences. Evergreens supply nest sites for doves and other birds and winter cover for a variety of wildlife. Gray and silky dogwood, highbush cranberry and hawthorn are recommended food-producing shrubs.

• Abandoned farmsteads and other old buildings or structures can be important habitat for rabbits, squirrels, raccoons, deer, woodchucks, red-tailed hawks, screech owls, barred owls, gopher snakes and garter snakes. They also attract crows, blue jays, various woodpeckers, cedar waxwings, brown thrashers, barn swallows, song sparrows, robins, catbirds, goldfinches and other songbirds. Although it might be necessary to remove some of the old structures, save any trees and shrubs and consider planting others.

• Plant field corners, rocky and low-yield fields, eroded gullies and other odd areas out of cultivation with a mixture of trees, shrubs and grasses. Do not disturb the areas by grazing, burning or mowing any more often than once every five to 10 years.

• You may wish to manage your entire farm for the greatest overall benefit to wildlife. Rather than trying to improve conditions in a certain area for one species, manage existing agricultural lands, forests and wetlands for the total picture. More habitat types and greater varieties of food and cover will result in more abundant wildlife. Involving your neighbors in a local



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.

plan will pay dividends for all.

Agricultural Odd Areas

Low-lying areas where cropped fields drain and often form eroded trenches or gullies could be planted to native wildflowers, prairies grasses, or shrubs. Also, plant areas where natural depressions lay, usually across fields. Designed to slow water and trap soil particles and nutrients during heavy rains, these plantings also provide food to deer and geese and cover to small mammals and birds.

Plant grains or legumes on all bare fields, even if the area is planted in another cover type the following spring. This ground cover provides soil stability and erosion control, reduces evaporation, and maintains steadier soil temperatures. Legume or mixed grass-legume borders will also help to stabilize soil at field edges and provide a place to turn farm machinery. Adding buckwheat or grain sorghum to these out-of-the-way places will also provide energy food for seed eaters in fall and winter.

Field corners, rocky and low-yield fields, eroded gullies, and other odd places that cannot (and should not) be cultivated provide good wildlife habitat if planted with a mixture of trees, shrubs, and grasses or left so that plants recolonize the area -- which is less work than planting. Turn them into shelterbelts by planting alternating rows of trees and shrubs. Fruit-producing plants furnish food and cover for many species. A few rows of grain next to these grown-up odd areas increases their value during winter. Do not disturb these parcels by grazing, burning, or mowing more than once every five to 10 years, preferably treating a small segment at intervals rather than the entire piece.

In summary, there are many options available that create high producing cropfields and adequate wildlife habitat. However, remember that the poor choices you make may have detrimental effects on a variety of wildlife.

FOR ADDITIONAL CHAPTERS CONTACT:
Michigan United Conservation Clubs
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517/371-1041
MUCC

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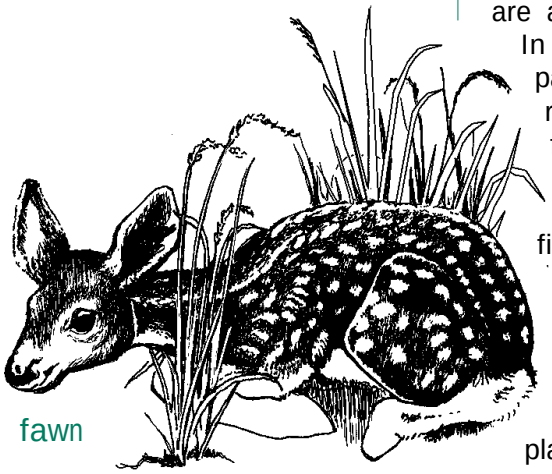
PRIVATE LAND PARTNERSHIPS
WORKING TOGETHER FOR WILDLIFE

HAYFIELDS

A hayfield is a general name given to any field which has been planted with a grass or legume or a combination of grasses and or legumes with the purpose of harvesting the plants for use as food (hay) for livestock or allowing livestock to graze in that field.

Hayfields can provide many kinds of wildlife with food and cover. Meadowlarks, bobolinks, and pheasants are examples of open-ground nesters that use hayfields. Waterfowl, rabbits, deer, and wild turkeys nest in grassland located next to woods, wetlands or brushlands. Besides providing nesting cover, hayfields:

(1) yield browse for deer and rabbits
(2) provide habitat for protein-rich insects that serve as food for songbirds and young gamebirds
(3) furnish limited winter cover for many species of wildlife.



fawn

Kestrels, foxes, skunks, and red-tailed hawks use hayfields as hunting areas for insects and small rodents such as mice and voles. Deer often use hayfields for feeding and resting sites. Does frequently place their fawns along the wooded edges of hayfields where the fawns remain hidden while their mothers feed.

Hayfields that are an integral part of the overall management plan on your property provide great value to wildlife. In conjunction with woodlands, brushlands, and wetlands, hayfields contribute to the habitat mosaic to which wildlife respond. Because hayfields and pastures are not tilled annually, they help retain moisture, reduce erosion, and aid in soil building. Depending on the type of grasses and legumes planted, some hayfields that are properly managed will last five or six years before they need to be worked up and replanted. They also help keep valuable nutrients in the topsoil where they are available for future crop use. In addition, when hayfields are part of the landowners crop rotation, less herbicides and fertilizer may be needed because of weed contol and nitrogen benefits of hayfields.

Field Size Considerations

Any wildlife management plan will help some kinds of

bobolink

wildlife and harm others, and that is why landowners should consider the impacts of their decisions. Many predominant grassland species such as pheasants, Henslow's sparrows, bobolinks, and meadowlarks do better in areas where at least 25 percent of the cropland acres are in grass. Fields larger than 40 acres are more secure to ground nesting wildlife than fields smaller than 40 acres because nesting birds are less vulnerable to predation. This is not to say that hayfields smaller than 40 acres are not important or productive to many kinds of wildlife for nesting or feeding areas. Hayfields larger than 80 acres, however, have lower nesting density for rabbits, quail, pheasants, and other wildlife that are somewhat edge dependent. Also, converting several smaller fields to one large field may require the removal of fences, which will eliminate natural travel corridors.

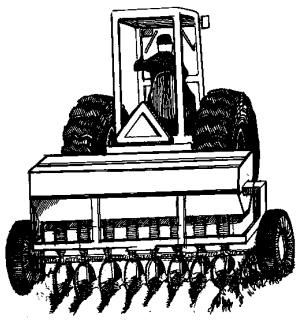
Mowing Considerations

The timing and height of hay cutting can have a dramatic impact on both wildlife and the production of your fields. With the ground bared, wildlife that use hayfields become vulnerable to predation, and the animals must move to nearby areas for cover. The size and vegetation types planted in your hayfield will also impact the types and amount of wildlife using the area.

Delaying mowing until after the primary nesting season will be the best practice for wildlife. The problem for landowners is that the best livestock forage often occurs prior to the end of the nesting season. Alfalfa is best managed for forage production when it is cut at quarter-bloom (when 25 percent of the field is blossoming). After cutting, the alfalfa will once again be at quarter-bloom in four to five weeks. The cycle of harvesting every 30 to 35 days is what spells doom for pheasants, which require a period of 40 days in which to successfully lay their eggs (about 13 days) and incubate them to hatching (23 days on average). Therefore, a landowner who mows on June 1 will likely destroy any egg clutches from hens who happened to begin nesting on April 20 or later. Although most hens attempt to renest, success is thwarted by the same set of circumstances.

Undisturbed nesting habitat is the key to the survival of wildlife who use hayfields. Nesting waterfowl, for example, may benefit even more from permanent vegetation in hayfields than upland gamebirds do. So what can landowners who need to harvest their hay crop do? One management option is to delay mowing as long as possible. Even a one-week delay, to June 8, for example, will result in higher nesting success.

Different hay crops have different peak harvest times. By having diverse hayfield plantings, some planted to pure stands of alfalfa and others planted to a grass/clover mix can alter the timing of the harvest. Some grasses and/or clovers actually produce more hay if harvested later in the spring or early summer. Planting diverse hayfields can also spread out your harvest time and effort. Also, more and more hayfields and pastures are being planted to warm season grasses such as switchgrass, big bluestem, and little bluestem. Since these grasses are not usually harvested until midsummer they provide outstanding nesting and brood rearing cover before being grazed or cut for hay. Another option is to cut your hayfield late in the fall. Nesting wildlife choose nesting sites based on spring vegetation heights. For most grassland nesting wildlife, fields with short vegetation height in the early spring are not preferred. Since these fields will not be preferred nesting sites there wil be less negative impact to wildlife when the fields are harvested.



Planting Recommendations

Solid stands of any one kind of grass or legume are not nearly as valuable to wildlife as a mixture of plants. A mixture provides the greatest diversity of growth, which in turn offers vertical and horizontal densities, a variety of plant heights, and different palatability to insects and wildlife throughout the food chain. The mixtures also establish better and adjust to different soil types across fields. They often have longer growth periods and higher yields. And, they are also less susceptible to total loss from drought, wetness and insects.

Cool season grasses such as orchard grass, redtop, and timothy grass grow most rapidly during spring and early summer and again at the end of summer and early fall when cool nights follow warm days. Mixed with clovers, they offer an outstanding variety of wildlife food and cover, provided they are not mowed aggressively. Clovers to consider are medium-red, ladino, and alsike. Cool season grasses are popular with landowners because they are easy to establish and respond to heavy fertilization. They do better in 6.0-7.0 pH soils than other cover types, and they continue to be productive for many years. Landowners increase soil pH by adding marl, lime or some other calcium-based material. Fertilizer rates and types are based on soil tests, easily obtained for a nominal fee with a soil sample kit available from Michigan State University Extension offices.

timothy

A recommended mix of cool season grasses and legumes that provide excellent nesting, and brood rearing cover would be 7 lbs. of medium red clover, 6 lbs. of timothy grass, and 2 lbs. of ladino clover per acre. This planting will produce high quality hay when cut around July 15, which is past the prime nesting season for most birds and mammals. The mix will grow well on most soil types and well to poorly drained conditions.

Warm season grasses have a shorter growing season and are usually planted for grazing or wildlife purposes, but can be used as a hay crop as well. They grow most rapidly during the peak of summer when warm nights follow hot days--especially the months of June, July and August. When soil temperatures begin to drop, growth slows dramatically. Because these warm season grass stands are used primarily as pasture or hay in the summer months, songbirds, gamebirds, and other wildlife will have completed their nesting activities before livestock is allowed into the grass stands. Warm season native grasses species are big bluestem, little bluestem, switchgrass and Indiangrass. Often mixed with wildflowers (forbs) to represent the diverse grass stands of our prairies, they are usually referred to as prairie grasses. They make more efficient use of water and soil nutrients (nitrogen, phosphorus and potassium) than do cool season grasses, and they do not require as much fertilizer. Their value to wildlife is exceptional--standing up well in snow to offer warm, secure winter shelter; providing nesting habitat diversity when mixed together; and yielding food in the form of insects and seeds.


switchgrass

Warm season grass seeds tend to be fluffy and bulky. Pure Live Seed (PLS) takes into account that a pound of warm season grass contains inert materials and seeds that will not germinate. You can use the following formula and information from the seed bag to determine the percent PLS of your seed. Percent PLS = Percent (%) pure seed muliplied by (percent germination plus percent dormant seed). For example:

% pure seed = 0.90
% germination = 0.80
% dormant = 0.10

0.90 X (0.8 + 0.1)=0.81 (%PLS)

Thus, for every 10 lbs. of bulk seed you would have 8.1 pound of pure live seed.

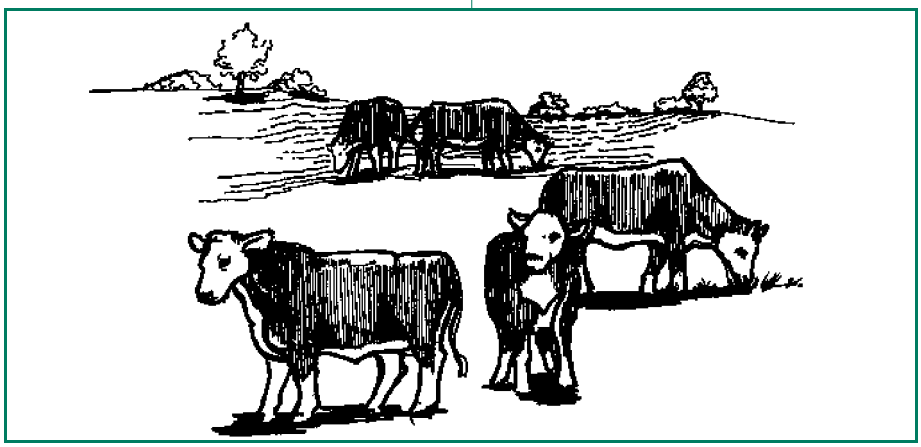
To calculate the pounds of bulk seed needed per acre, take the desired PLS divided by the percent PLS (figured above) for your seed. For example:

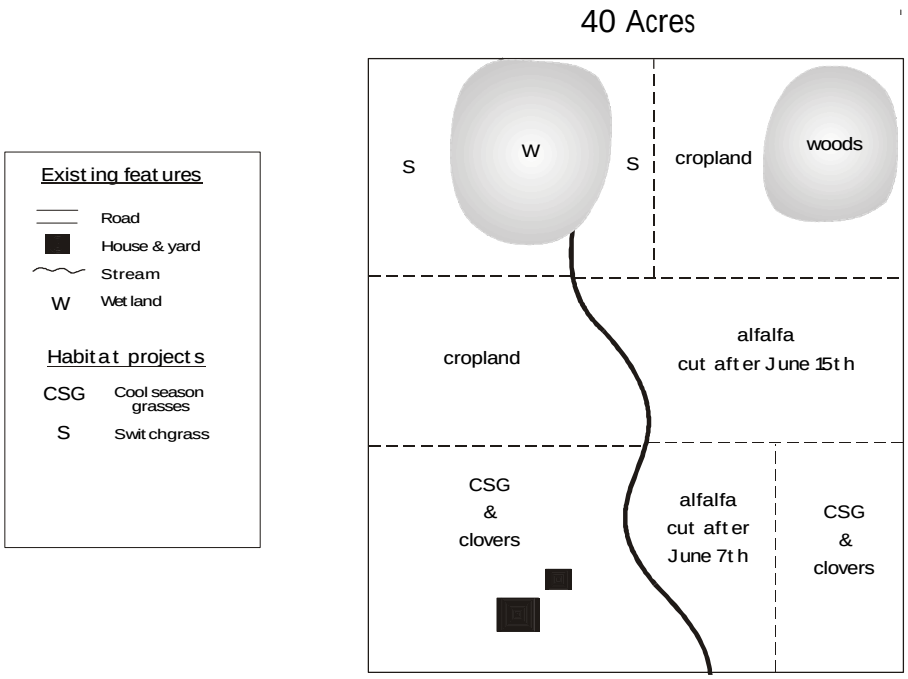
Desired plant rate = 8 lbs/acre
Percent PLS = 0.81
8/0.81 = 9.5 bulk lbs/acre

Most warm season grasses will range from 50 to 95 percent PLS per bulk pound due to the difference between each bag of seed or each grass type.

When planting warm season grasses for pasture or hay production, plant pure stands of switchgrass at 5 to 8 lbs. of pure live seed (pls) per acre or 8 lbs. of pure live seed of big bluestem or Indian grass, which would produce quality wildlife cover as well good forage for livestock. A mixed stand of warm season grasses will also produce good forage for livestock and because of the plant diversity be very attractive to wildlife. A recommended mix is 3 lbs. of big bluestem, 3 lbs. of Indiangrass, and 2 lbs. of little bluestem, all pure live seed, planted per acre.

Several stands of warm and cool season grasses, with or without legumes, provide the broadest habitat diversity. Horse fanciers, who typically harvest hay only once each year, like such a mix for its high forage value. Light grazing or rotational grazing lessens livestock's impact on wildlife. When mowing or grazing, warm season grasses should not be cropped lower than eight inches to allow for rapid regrowth. By comparison, cool season grasses are typically cropped as close as four to six inches. For more information on planting, maintenance and management

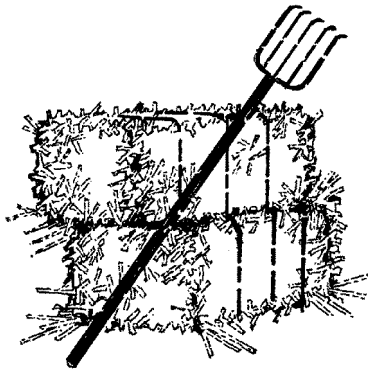




This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

see the respective **Warm** and **Cool Season Grass** chapters in the Grassland Management section. Also refer to the **Wildflowers** chapter in the Backyards section.

In summary, hayfields are essentially grasses and/or legumes that are planted for livestock. However, while providing food for livestock, hayfields can also provide food and cover for a variety of wildlife. The most critical management option is to mow hayfields before April 15 or after July 15 to ensure successful nesting and brood rearing.



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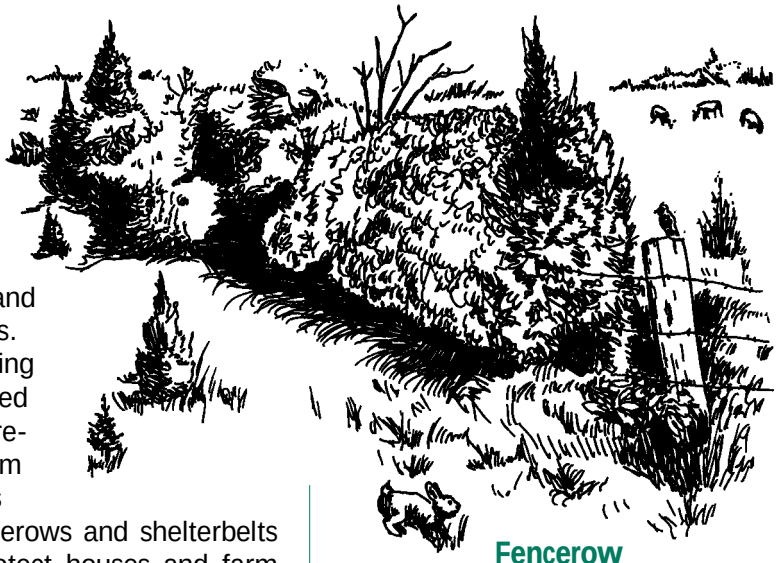
PRIVATE LAND PARTNERSHIPS
WORKING TOGETHER FOR WILDLIFE

FIELD BORDERS AND CORRIDORS

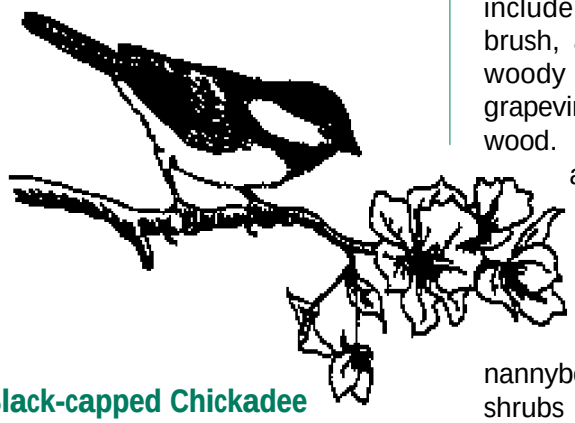
Vegetated fencerows, farm lanes, field borders, roadsides, ditch banks, shelter belts, and other linear features of the rural landscape can provide key habitat for many species of wildlife. These strip-type covers often lie next to large nesting and feeding areas, they provide edge habitat, and they give wildlife secure travel lanes between unconnected habitats. Pheasants and rabbits escape into the thickets that often grow there. Wild turkeys, ruffed grouse, cardinals, and chickadees regularly feed on the fruits and seeds found along fencerows.

Naturalized field margins are species-rich sanctuaries for worms and other invertebrates and are important for the conservation of overall species diversity in croplands. Tree corridors improve habitat for birds, both as breeding territories and as feeding zones for migrants and residents. Corridors also serve as environmental filters, windbreaks, and streambank stabilizers. When snow is driven by west winds, fencerows and buffer stips that are oriented north and south keep snow on the land and out of ditches. Gradual melting of accumulated snow later prevents soil from drying out as quickly. Fencerows and shelterbelts may also protect houses and farm buildings from harsh weather conditions, decreasing energy needed to heat in winter and cool in summer.



Fencerow

If you have such field borders and corridors on your property, consider enhancing them for wildlife. As travel lanes, the best fencerows are at least 30 to 50 feet wide and contain a mix of fruitbearing shrubs, conifers, and ground covers such as goldenrod, and aster along with weeds such as foxtail, ragweed, and smartweed. Other corridors may include sumac stands, piles of brush, and other micro-habitats of woody vegetation such as grapevines, blackberry, and dogwood. Wider is usually better, but any corridor is better than none at all. Selective cutting, prescribed burning, and planting of low-growing trees, highbush cranberry, silky and gray dogwood, nannyberry, crabapples and other shrubs can rejuvenate fencerows. These and other plants can be puchased through your county Conservation District and local nurseries.



Black-capped Chickadee

Fencerows

In heavily farmed areas of Michigan, such as the thumb region, fencerows offer one of the last traces of wildlife habitat. Clear farming practices have removed fencerows or reduced their width and eliminated their weedy and shrubby vegetation. Many people do not realize how important fencerows are to wildlife. Result show that 12 different bird species use herbaceous fencerows. When the fencerows contained scattered trees and shrubs, the number of bird species increased to 38. Those planted to continuous trees and shrubs attracted 48 species. Similarly, Michigan researchers found the density and diversity of bird nests increased as the number

of fencerow shrubs increased because the shrubs added habitat variety through layers of understory structure.

Vegetated fencerows that are 30 feet or wider lessen the impact of predation, especially on ground-nesting birds, and increase the opportunity for habitat diversity. Selective mowing, cutting and burning can increase the habitat mosaic, giving wildlife varying heights and densities of vegetation, especially grass. On the other hand, protecting the fencerow from grazing or burning encourages development of shrubs. Piling rocks and stones from adjacent fields along the fencerow gives reptiles and small mammals a place to hide. Planting or preserving trees provides opportunities for birds to nest and to rest. They also give hawks and owls perches. The management practices you employ will either encourage or discourage certain wildlife species, and that is why the wise landowner has an overall management plan.

Hedgerows

Hedgerows, which may contain trees, shrubs, or a mixture of both, grow naturally along fences that are protected. Where there are no fences, hedgerows can be created. Set fence posts in a line or staggered every 20 feet down the center of a plowed strip. String wire or twine about three feet high between the posts so they can serve as bird perches. Bird droppings are usually full of viable seed, and the plants from such deposits will often grow as fast as those from rootstock. Hedgerows protect farm fields from wind and water erosion, they provide borders for farmland that may be adjacent to your property, and they attract wildlife by providing secure travel corridors. Some people plant hedgerows to draw deer and other wildlife to their backyards where they can be observed.

If hedgerows do not already exist on your property, create them by planting shrubs or a shrub-conifer mixture. Consider locating the hedgerows across big, open fields, along present fencerows, in gullies, along streams, and around ponds, springs, food patches, nesting and breeding grounds, and other well-used wildlife sites. After site preparation, plant shrubs eight to ten feet apart. Plant evergreens (conifers) at the rate of one per every eight to twelve feet. Shrub rows should be spaced eight feet apart and conifer rows 10 feet apart to provide contiguous cover in eight to 12 years. A hedgerow with one row of conifers and two of fruitbearing shrubs will provide a strip that is 20 to 25 feet wide. Plan on thinning the conifers at 10 to 15 years of age. For hedgerows containing shrubs only, at least four rows spaced eight to ten feet apart should be planted in early spring and weed control should be used for the first three years. Control the weeds manually or with a selective herbicide or use mulches or clippings. Protect from fire and grazing.

Some of the most effective hedgerows are those planted on south-facing slopes. For a second choice consider east- or west-facing slopes. On level ditch banks, planting the north and west edges will be most effective. If your plan is to divide a large field, exposure to the southeast works best. On slopes exceeding four percent, separate hedgerow and row crops with a six-foot wide border of sod. When planted across a natural waterway, space the shrubs and trees wide enough to allow a vigorous understory of grass and forbs to develop.

Roadsides

Roadsides offer one of the best opportunities for habitat management because at least 40 species of wildlife use the associated grasslands. Species include pheasants, quail, mallards, goldfinches, meadowlarks, mourning doves, cottontails, and woodchucks. Although the acreage of roadside along a mile of road may seem small, collectively the figure in Michigan is at least several hundred thousand acres.

Hedgerows may contain a mixture of trees and shrubs.

Unfortunately, such habitat becomes a death trap for many nesting birds and mammals since most landowners mow or spray their roadsides throughout the nesting season.

The key is to curtail mowing, at least until July 15 when birds have had a chance to complete nesting and brood rearing broods. When weed control is necessary, use spot mowing or spot spraying. To improve visibility for drivers, highway shoulders should be mowed 12 feet wide or not past the ditch. After July 15, clipping the grass to a height of 10 or 12 inches will leave nesting cover for the following spring. To establish grasslands along roadsides, consider planting a mixture of native warm season grasses (little bluestem, big bluestem, switchgrass, Indiangrass) or a cool season grass mixture (timothy, orchardgrass).

Shelterbelts

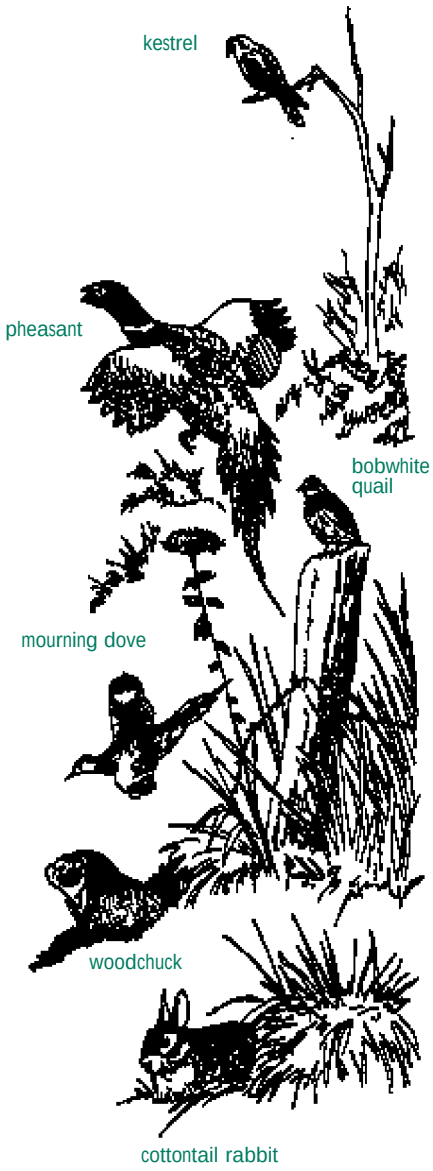
Creating shelterbelts around farm homes and outbuildings keeps snow out, cuts wind erosion, and provides a cooler environment in the summer and warmer environment in the winter. They also reduce livestock feed costs and increase crop production. Wildlife benefits include nesting, rearing, roosting, and escape cover. Mourning doves and other songbirds nest in evergreens of the shelterbelt, which also provide food and protection from predators. A study found an average of 22 bird nests per shelterbelt, which averaged less than two acres each in size. Species, which are native to Michigan, included grackles, mourning doves, robins, gray catbirds, chipping sparrows, blue jays, black-billed cuckoos, Brewer's blackbirds, indigo buntings, brown thrashers, goldfinches, yellowthroats, and red-winged blackbirds.

The porosity of a shelterbelt determines how effective the shelterbelt is. Wind that encounters resistance either sifts through the resistance or sweeps up and over or both. Once it reaches the other side of the resistance, the wind begins to gather strength again. How densely you plant shrubs and trees in the shelterbelt itself determines how effective it will be at stopping wind and checking drifting snow. Shelterbelts with close-growing trees and shrubs contribute to unnecessary drifting in the farmyard. They also have a shorter life span than more porous designs.

Four rows each of deciduous trees (non-evergreens) and conifers (evergreens) make good shelterbelts when planted 20 feet apart in rows that are 20 feet apart. Locating the taller deciduous trees on the outside (windward side) of the shelterbelt will help achieve the primary purposes of protection and long life. Placing two additional rows of black cherry, black walnut, butternut, chokecherry, hawthorn, hickory or oak in the center (between rows 3 and 4 and 4 and 5) will help provide wildlife food and homes. To provide even more food and cover, add one to three rows of chokecherry, red-osier dogwood, gray dogwood, Juneberry, highbush cranberry, elderberry, crabapple and American or beaked hazel.

Keep several features in mind as you develop a farmstead shelterbelt:

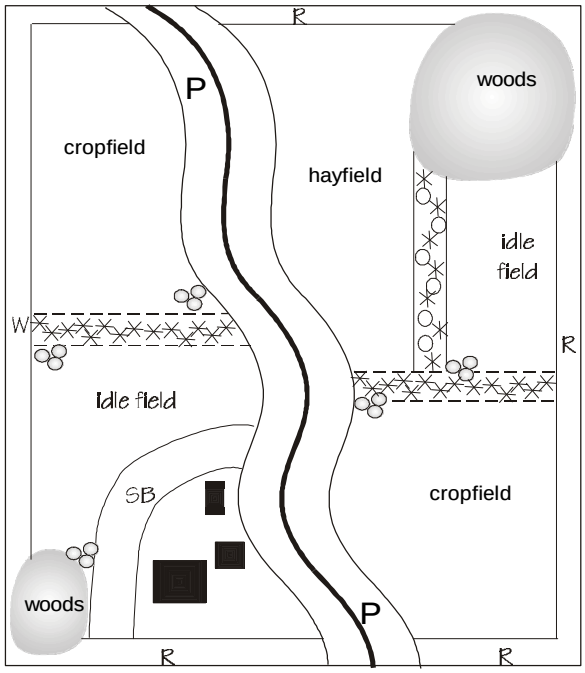
- The innermost row should not be too close to the house, barn or feedlot. Close spacing can cause problems with drifting snow and reduce other benefits. Your county Natural Resource Conservation Service office (NRCS) has detailed advice to consider, including what tree and shrub species are best suited to the soils and special conditions on your land. NRCS personnel can also advise you on proper spacing of trees and shrubs.



Varying heights and densities of vegetation attract a variety of wildlife.

FIELD BORDERS AND CORRIDORS

40 acres



Existing features

- Road
- House & yard
- Stream
- P — Permanent grass strip

Habitat projects

- SB — Shelter belt
- W — Windbreak
- R — Roadside for wildlife (wider, no mowing)
- Rockpile
- Fencerow (grass,trees, shrubs)
- Hedgerow (shrubs, conifers)

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.

•Avoid planting under or near powerlines or other utilities. If this plan is not possible, consider using shorter-growing trees and shrubs.

•Do not create driving hazards or other obstructions that will deposit snow on highways or blind corners. Locate the downwind row of any shelterbelt no closer than 100 feet north or west of a road or rights-of-way.

•The shelterbelts should extend at least 50 feet and preferably 100 feet beyond the last main building at the east and south ends of the farmstead to provide maximum protection from snow drifting. Rows of trees should be spaced 20 feet apart. In order to be effective, a farmstead shelterbelt may require an area from 200 to 225 feet wide.

•You can simplify the establishment of a new shelterbelt by maintaining conifer seedlings in plastic containers for a couple years until they are at least two feet tall. When planted, they will compete better with weeds and save initial herbicide costs. Also, container stock grows two to three times faster, when planted properly, than bare root stock.

•Order about five percent more trees and shrubs than are needed. Excess plants that aren't used for replacement can be planted elsewhere and transplanted back into the shelterbelt later if needed.

In summary, field borders and corridors not only provide a variety of benefits to wildlife, but also provide numerous benefits to you, the landowner. Enjoy watching and helping wildlife thrive in these areas around your home.

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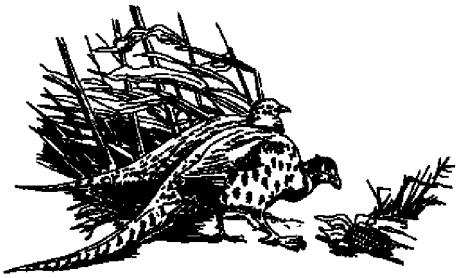
PRIVATE LAND PARTNERSHIPS
WORKING TOGETHER FOR WILDLIFE

GRAIN PLOT PLANTING



Pheasants use grain plot plantings for food and cover.

Annual grain crops such as corn, sunflowers, buckwheat, millet, wheat, and grain sorghum can provide food for wildlife in late fall, winter, and early spring. This chapter explains how to plan and design effective grain plots, how to choose sites and prepare them for seeding, and how to plant and manage them for maximum benefit to wildlife.

Limiting Factors

Many landowners mistakenly believe that grain plots provide everything that wildlife need. On the contrary, small plantings of grain are the last part of the habitat puzzle because all wildlife also need water, cover, and space to survive. Unless quality secure cover is available next to the grain plot, it could become hunting grounds for predators, especially in winter. In addition, another type of food needs to be available during the spring, summer, and early fall. Another myth is that grain crops need only be planted and then can be forgotten. Fertilizer and weed control are also necessary for success of most grain crops.

In many parts of Michigan, deer consume grain crops more than any other wildlife species. Unless you want to attract deer, arrange grain plots away from woods, swamps and other deer cover, or plant the crop so that it is perpendicular--and not parallel--to the deer habitat. On the other hand, plots of grain can be used successfully to lure wildlife from a more valuable crop. Some farmers, for example, plant buckwheat between forested areas and valuable cashcrop fields of beans. Foraging deer eat the buckwheat and have less impact on the beans.

To be suitable for wildlife, food must be nourishing, readily available, and near cover. A grain crop such as corn that stands above the snow is especially valuable in winter. Although nutritional needs and preferences of different species change season by season, winter is the most critical period for most wildlife. For example, a pheasant will eat an average of 4 ounces of corn daily for a total of 23 pounds over 90 days. A deer will eat 6 pounds of corn daily for a total of 540 pounds over the same period.

Because grains are an annual crop, their value to wildlife is generally one year. However, if allowed to lie idle a second year, the decaying grain stalks and weeds that grow will help attract insects, which supply valuable protein to young-of-the-year pheasants, songbirds, quail and wild turkeys. The idle fields also offer protective cover. The most effective grain crops are located next to these idled, weedy fields.

Planning and Design

Careful planning can make the difference between projects that are buried by the first winter blizzard and those that will help wildlife make it through and beyond the storm. Size, location, and shape are key considerations. If grain plots are part of your management plan, allocate no more than 10 percent of your property to them. The ideal size of each plot is 1/2 acre to 1 1/2 acres. Larger plantings of 5 to 10 acres help lessen the impact of predators, but smaller sites attract less-mobile wildlife. The reason is because smaller plots can often be incorporated within or adjacent to secure winter cover, such as switchgrass, brushlands, or timber. Songbirds, for example, rarely venture to food sites more than a quarter-mile from secure winter cover.

Location, therefore, is at least as important as size. Shape is also a key consideration. The most effective food plots are square or rectangular in design and at least 60 feet wide.

If your property is long and narrow, a grain crop 60 feet wide by 700 feet long takes up only one acre of land. Such plantings make food readily available.

Seed	Planting Rate/acre	Planting Time	Planting Depth (Inches)
Corn	12 - 15#	4/15 - 5/15	2 - 3
Grain - Sorghum	6 - 10#	5/1 - 6/1	1 - 2
Buckwheat	50 - 60#	5/15 - 7/1	1 - 2
Japanese Millet	10 - 15#	5/15 - 7/1	1 - 2
Winter Wheat or Barley	120#	9/1 - 10/1	1 - 2
Rye	55 - 75#	9/1 - 10/1	1 - 2
Sunflowers	6 - 10#	5/1 - 6/1	1 - 2

Several types of grain have value to Michigan birds and mammals. Most wildlife managers put corn at the top of their priority list. Other grains, in order of their overall value, are sunflowers, buckwheat, millet, wheat, grain sorghum, and soybeans. Each food type has advantages and disadvantages. **Corn**, for example, stands well above snow and is available through the winter and well into spring.

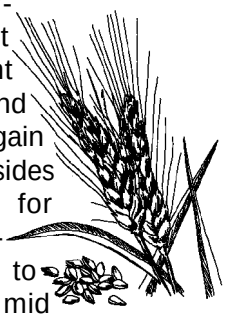
When planted from late April through mid-May and treated properly with fertilizer and herbicide, a field of corn should produce 100 bushels or 5,600 pounds per acre. Because it is a row crop, corn will often require weed control before or after planting.

The black oil variety of **sunflowers** provides an outstanding source of fall food for songbirds, upland birds, mice, and other small mammals. Drought-tolerant and early maturing, the four to six feet tall plants are so highly favored that--on the negative side--little or no seeds are left when winter arrives. Also, sunflowers compete well with weeds. Broadcast or drill at the rate of 5 to 10 pounds per acre in May. A typical yield of sunflowers is 40 bushels or 2000 pounds per acre.

Buckwheat needs little or no fertilizer or weed control because its roots produce its own toxins. But, it does not stand up well to snow. A good yield is 30 bushels per acre or 1500 pounds per acre. Buckwheat is able to produce a mature crop in 65 days. Thus, it can be planted as late as July 1 and produce a crop of mature seed by September 6. It is ideal for a wet site or a site prepared for another crop that was not planted because of wet weather.

Millets grow 1 1/2 to 3 feet tall and do better than other grains in moist soils although they are not prime winter foods for wildlife because they do not stand up to snow. Varieties include Japanese, red proso, white proso and German foxtail. Japanese millet actually favors damp lowlands, mud flats, water courses and river bottoms. When solid-seeded, millet is usually able to compete with weeds if they are controlled before planting. Plant from mid-May to early July at 8 to 10 pounds per acre. Expect to get 30 bushels per acre.

Wheat and winter barley grow best in areas of moderate moisture with cool weather for early growth and sunny, warm days when the grain is ripening. Planted in fall, winter barley and wheat becomes dormant in winter and begins to grow again in spring. Besides green browse for deer, grain becomes available to songbirds by mid summer, and provides fall roosting sites for pheasants. Winter food and cover value are reduced when snow covers the ground. Plant from September to October at the rate of 120 pounds per acre; a good yield is 50 bushel/ acre or 3,000 pounds/acre.



Grain sorghum has excellent drought resistance, grows well in hot dry conditions, and stands well in snow. Its key drawback is that it is not well-suited to Michigan, except for the extreme southern counties. Grain heads are two to four feet high, and the small seeds produced attract pheasants, quail, songbirds and deer. Like corn, grain sorghum needs about 100-120 days to mature; plant it according to the same schedule. A good yield is 70 bushels or 3,920 pounds per acre.

Although "pure" stands of the above grains are easier to plant, fertilize and control weeds, certain grain mixes--especially those containing buckwheat and Japanese

millet--are growing in favor among wildlife managers. Research to determine ideal combinations of grains is ongoing. Check with your county Conservation District (CD) for current information.

Choosing and Preparing Planting Sites

Site conditions to consider before planting include potential weed problems, drainage, erosion potential, and soil type, depth, texture, and fertility. Plant grains on the best soils you have, avoiding dry or wet sites. Eliminate from consideration any slopes greater than six percent to avoid erosion problems. Level, fertile sites are not only easiest to manage, they will produce the greatest amount of seed and forage per acre. Your local Conservation District office will have a county soil survey map, which will include your property, and may help you decide what to plant where. Also, for more information, refer to the **Crop Fields** chapter in this section.

Proper soil pH and fertility are necessary for the intended crop. A soil test will determine pH needs and recommend rates of nutrient application. Your county Michigan State University Extension office has soil-test kits available for a nominal charge and can analyze samples for you. Before planting any grain plot, the soil pH should be between 5.5 and 7.0. If lime is needed to raise the pH level, apply it in the fall before your planting season or at least three to six months before planting.

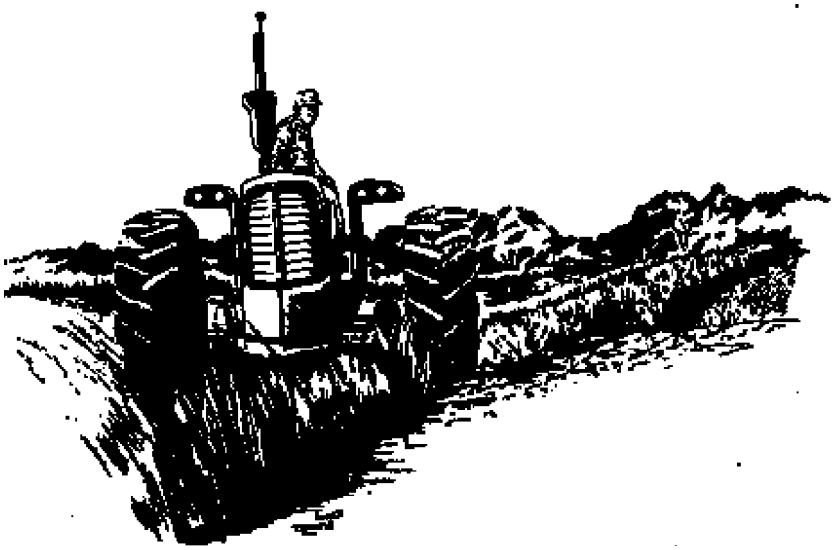
Planting and Managing

If your planting site is an old field, pasture, or was recently grass, mow it first. Use a relatively safe, broad-spectrum herbicide such as glyphosate (Roundup), at least ten days before soil work is to begin to kill all vegetation and give the grain crop a chance to compete against weeds. Be sure to read and follow label directions. If you are using conventional tillage, plow and disk the field and plant. Planting equipment includes three choices: a corn planter, grain drill, or broadcast planter. If the field is small, you may want to spread seed by hand or use a crank broadcaster. After broadcast planting, lightly disk or drag the field to barely cover the seed, or go over the field with a cultipacker or roller.

If you are using conservation tillage (usually referred to as "no-till"), you can eliminate the steps of plowing, disking, and rolling. Whatever method you choose, however, row-crop grain plantings will need additional broadleaf weed control. Provide control through another application of selective herbicide and/or cultivation. Perfectly clean rows, however, are not critical because weeds do have value for wildlife--adding diversity to cover and providing protein-rich seeds such as smartweed, ragweed and millet for food. As a general rule, if weeds have taken over only 10 to 30 percent of your food plot, do not be concerned. Slightly reduced yields of 60 to 80 bushel/acre corn and 40 to 50 bushel/acre grain sorghum that result from some weed competition are still acceptable for wildlife value.

Plantings of clovers and/or grasses can also provide valuable wildlife food for wildlife. For more information see the chapters in the **Grassland Management** section.

In summary, grain plots can make a big difference toward improving your property's appeal for many wildlife species. Careful planning, attention to detail, and not expecting the plots to provide all wildlife habitat needs are key considerations. Grain plots are just one piece of the overall "puzzle".



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