

Wildlife Habitat Assessment on the Farm

Land Assessment & Planning for Wildlife

Successful habitat improvement begins with a thorough evaluation of your farm for its wildlife potential. After you have made this "wildlife habitat inventory," you can draw up a management plan that will not only increase the numbers and diversity of wildlife but also increase the overall productivity and value of the land.

Evaluating Your Land

Food, water, and cover are the three essential ingredients of good wildlife habitat. When evaluating your land, keep them in mind. Look first at the plants on your property--the amount and distribution of trees, crops, brush and grass. Vegetation largely determines the types of animals that can live on a tract of land. Plants are the basis of nature's "food web", of which every animal is a part. Also note the sources of water. The wildlife in Arkansas has varied water requirements. Salamanders need a fish-free pond for spawning. Bobwhite quail need surface water only during long, extremely dry periods. Water may become the focal point of a wildlife plan because it is a limiting factor for some animals.

Cover is essential for successful wildlife management on your farm. Both natural and man-made cover provide resting, roosting, nesting, protection and foraging areas. Natural cover is managed by planting, pruning, thinning or clearing. Man-made cover includes brushpiles, nesting boxes, rock piles, birdhouses, log piles and similar structures.

Familiarizing yourself with your land will help you know what animals live there and what others you will be able to attract. Walk your land and take notes often and during all seasons. Land and animals change throughout the year, and you will see new signs during each trip. Look for scratch marks, tracks, burrows, nests, and other signs. Listen and learn to identify songs of songbirds on your property. Note the kinds of animals on your land, the areas they are using, and the times you observe them.

In your evaluation, it may help to divide your farm into habitat types. The five main types of farm habitat are

- cropland
- grassland (including pasture)
- woodland
- aquatic (ponds, wetlands or streams) and
- idle areas.

Making a Wildlife Management Plan

Begin the land management plan by obtaining a map or aerial photo of your land. Aerial photographs are available at no charge to the landowner from the Natural Resources

Conservation Service or the Farm Service office in each county. Enlarged copies are available for a small fee.

On the map or photo, mark different habitat types with colored pens. Each type of habitat meets different wildlife needs, so for best results they should be intermixed on your property. Note areas that are isolated from other habitat types. Some animals, such as quail and rabbits, require habitat types be close together; others, like deer and turkey, can easily travel several hundred yards to find food, cover or water. Next, mark areas that might be improved for wildlife. Land can be improved in a general way--for instance, by letting field areas grow up--or it can be improved to attract, maintain or increase certain species of animals. In the latter case, you'll need to learn the animals' habitat requirements: how much territory they need, what they eat and where they find cover.

Usually habitat improvement will involve adding or removing vegetation. In fact, wildlife management is basically plant management; landowners can change wildlife numbers on their property by changing the supply and arrangement of plants that attract, feed and shelter them. You can add plants that provide food for rabbits and other ground feeders, if that's what you are interested in. Or, you may want to cater to songbirds and deer or other animals that also eat taller growing shrubs, brush, and trees. Your wildlife plan should ensure an all-season variety of seeds, berries and plants. This sometimes means controlling the growth of some trees and bushes.

A soils map can help you find the best locations for plantings. A detailed soils map of your area is available from the Natural Resources Conservation Service. This map will also indicate the suitability of sites for pond construction.

Keep a notebook of your progress, including when, where and how the plantings and other improvements were carried out. This record will help you think ahead and avoid mistakes, such as placing plants in an area where they will become problem weeds. Take photos of habitat changes. Before-and-after pictures of the land show whether or not you are getting results. You can also talk to neighbors and representatives from service agencies who can offer insight on the long-term soundness of your plan.

Often, landowners wrongly assume that large numbers of wildlife will permanently remain on their property if they improve food and cover areas. Usually, the improvements are less dramatic. Your acreage may not gain a permanent flock of turkeys or a herd of deer, but it may become an important part of their range. Your efforts along with your neighbors can make a difference, even if wildlife use your land only seasonally or temporarily.

Following are a number of management practices you can include in your habitat improvement plan. Wildlife often respond slowly to changes in habitat, so the main thing is to get started **NOW**.

Cropland Management

Minor changes in an area's crops can have a major effect on wildlife numbers. This section discusses management practices for cropfields and adjacent areas that are practical, profitable and beneficial to wildlife.

Crop Fields

Conservation Tillage

Many land managers consider conservation tillage to be the most promising single practice for reducing soil erosion. It is also very beneficial for wildlife, especially quail and upland songbirds.

Conservation tillage is a broad term that refers to several tillage methods that maintain crop residue--stubble, grain and other plant seeds--on the field surface. These tillage methods control erosion, conserve soil moisture and increase organic matter, resulting in better field soil conditions. Studies have shown that conservation tillage fields can have yields that equal or exceed conventional tillage fields. In addition, production costs are less for conservation tillage systems.

Residues from conservation tillage provide both food and cover for wildlife. In particular, waste grain and weed seeds left after harvesting are staple foods for wildlife in winter. If you must plow in the fall, plow only a portion of the field and leave the field borders for spring tillage.

Currently, conservation tillage methods dictate an increase in pesticide use. Proper application of these pesticides will reduce both production costs and hazards to the environment. See your county Extension Service or Natural Resources Conservation Service Agent for specific assistance in conservation tillage methods.

No-till is a conservation tillage practice becoming more common in Arkansas because it works and also saves soil, time, and money. In addition, by not burning wheat or rice stubble, less pollution is caused and wildlife benefit from the extra cover and food available. If beans are the next rotation after wheat, no-till them.

Rather than burn rice stubble, roll the stubble and catch rainfall to control red rice and other weed seeds. This practice causes red rice to germinate and be killed by frost before seed is mature. Catching rainwater and/or flooding fields may also encourage use by ducks, which eat large quantities of red rice seed. Studies have shown that heavy duck feeding during winter reduced the number of red and white rice grains on and in the soil by 97 percent. Rice fields should be managed to attract waterfowl to red rice infested fields immediately after rice harvest until late February. Contact your county Extension Agent for information on the **Managing Rice for Ducks Program**.

Crop Rotation

Crop rotation is simply the planting of different crops in the same field from year to year. Long-term rotation means planting three or four different crops before returning to the original crop. These practices increase the health of the cropping system and add plant diversity to the land.

Continuous cropping means that the crops in a field do not change each year. Crop disease experts report that the highest risk for crop diseases result from continuous cropping. Insect problems are also more prevalent under this system, so more pesticides are needed. Most corn and soybean diseases and associated pests can be controlled by a simple crop rotation.

Legumes are always a good choice--and often a necessity-- for rotation because they add nitrogen to the soil and reduce fertilizer requirements for next season's crop. Sweet clover, for example, can produce up to 174 pounds of plant nitrogen per acre under ideal conditions. Legumes also make ideal wildlife nesting cover and food if mowing is delayed until after July 15. Clovers and vetch can be seeded into row crops after the last cultivation to reduce erosion, add nitrogen and provide wildlife cover during the winter.

Small grain crops, such as wheat and oats, provide nesting cover throughout the spring and summer. The stubble of these crops, cut high and left undisturbed, makes excellent brood-rearing habitat for quail. The seeds of annual plants associated with small-grain stubble provide food for wildlife.

Legumes and small grains help prevent soil erosion. Good rotation crops for sloping fields include corn or milo, soybeans, wheat or oats, and clover.

Contour Strip Cropping

The practice in which row crops are planted in strips along the natural contour of the slope and next to a grass strip is referred to as contour strip-cropping. It provides erosion control and plant diversity.

The strips of grass, legumes or small grains act as a filter that trap sediment and slows water runoff. The strip width is dictated by the severity of the erosion problem and the slope of the field. Where erosion is severe, permanent grass strips should be maintained between strips of crops. These strips should be seeded to a grass/legume mixture that is beneficial to wildlife. In some years, the seed and hay harvested from these strips can produce more income per acre than the adjacent row crops.

Strips seeded to grass/legumes mixtures serve as travel lanes and cover for wildlife and hunting lanes for rodent consuming barn owls. These strips also provide nesting and roosting cover and, if possible, should not be mowed until mid-July.

Field borders, Fencerows and Turn-Rows

Field borders can be seeded to grass/legumes mixtures that are attractive to wildlife. When planted around croplands, native warm-season grasses such as big bluestem and switchgrass and such tame grasses as redbud and timothy serve as valuable nesting, brood-rearing and concealment cover for wildlife. These warm season grasses may be hayed after mid-July when adjacent crops provide cover.

Turn-rows planted to a grass/legume mixture will help control soil erosion, provide space to turn equipment and serve as a roadway along the edge of the field. Grass/legume borders also provide cover for ground-nesting birds such as meadowlarks and quail. These areas should be clipped at two-year intervals to prevent woody sprout invasion. Clipping should be done in mid-July, after the peak of the nesting season. If noxious weeds are not a problem, you may consider allowing turn-rows to grow of native vegetation and mowed or disked on a two-three year rotation to control woody plants.

Fallow Fields and Set-Aside Acres

Fallow fields are croplands which lie idle during part or all of the growing season.

Every year thousands of acres of land in Arkansas are available for wildlife habitat due to government set-aside programs. These programs help provide wildlife with the old-field weeds and grasses they need for food and cover.

Rules for managing set-aside acres under federal programs allow wildlife food plots to be planted on the acreage. In addition, native vegetation may also be allowed as cover on these acres. At the landowner's request, land improvements for wildlife can be part of annual set-aside programs.

Some plantings that benefit wildlife on set-aside acres are:

- Native warm-season grasses, such as big bluestem, Indiangrass and switchgrass.
- Trees.
- Annual grain food plots.
- Cool-season grass/legume plantings, such as orchardgrass and red clover, white clover and Korean lespedeza, or a similar mix.

Grassed Waterways

Grassed waterways may be used as outlets for water collected from croplands or terrace systems built on farmlands to control erosion. These waterways vary in size according to the size of the drainage area and are seeded to perennial grasses, legumes or both.

A grassed waterway is helpful in all applications where active cropping is disturbing the soil regularly. In many cases a wooded draw may function as an excellent water outlet for terraces or cropland if it is not actively eroding. In addition, wooded draws can provide critical cover for wildlife.

Most of the native warm-season grasses can be planted on grassed waterways to help control erosion, provide wildlife cover and produce high-quality hay. They should be mowed after the peak of quail and upland songbird nesting season which ends in mid-July. This delay in mowing will ensure other ground nesting birds and mammals are spared destruction.

Field Shelterbelts, Windbreaks and Fencerows

Trees planted as windbreaks can reduce wind velocities on their downwind side for distances up to 10 to 20 times the height of the trees, depending upon the species and density.

Hardwood or deciduous trees, which shed their leaves in the fall, are not as effective as evergreens for winter protection. Their bare limbs do reduce wind velocities and offer some amount of protection, however. Field windbreaks reduce soil erosion, conserve soil moisture and provide food and cover for wildlife.

Woody fencerows next to cropfields provide many of the same benefits as windbreaks. Natural woody fencerows can be encouraged by not spraying or mowing next to the fence. When protected from grazing and clipping, fencerows can develop into natural travel lanes for wildlife. Planting clumps of trees and shrubs or spreading seeds of vines and shrubs along the fencerows also helps.

Cropland Management Tips:

- Implement conservation tillage systems.
- Avoid fall plowing unless absolutely necessary. If you fall plow, leave unplowed borders or strips for spring plowing, or planting a cover to wheat or oats on the plowed land.
- Minimize chemical applications.
- Rotate crops to include forage and small-grain crops.
- Use winter cover crops for green browse, erosion control and wildlife cover.
- Plant grass/legume border strips around all or a portion of crop fields. Mow or disc these strips at two-year intervals to control woody vegetation.
- Allow shallow draws to revegetate naturally, or plant to warm-season grasses or a grass/legume mixture. Delay mowing until July 15 to avoid nesting losses and reduce newborn fawn mortality.
- Seed waterways to grass/legume mixtures that are beneficial to wildlife. Delay mowing until after the peak of the nesting season, July 15 to protect nesting wildlife and reduce fawn mortality.
- Establish grass filter strips around crop field ponds to reduce sedimentation and to add wildlife cover.
- Establish or protect woody draws and fencerows.
- Leave a minimum of one-quarter acre of grain crops unharvested for each 40 acres of crop field. Leave crops in patches or strips near cover.

- No-till beans in wheat stubble, don't burn the stubble.
- Roll rice stubble and catch rainfall or flood starting immediately after rice harvest and hold water until the end of February each year.

Grassland Management

Grasslands provide many kinds of wildlife with food and cover. The grasshopper sparrow and meadowlark are open grassland nesters. Rabbits, bobwhite quail and turkeys also nest in grasslands, but prefer areas near woods or brush. Grasslands also help wildlife by controlling soil erosion.

Grasslands can be divided into two categories:

Cool-season pasture (containing grasses such as orchardgrass and legumes such as white clover, which grows best in cool weather);

Warm-season pasture (contains native grasses such as Indiangrass, bluestem and switchgrass, which grow best in warm weather).

NOTE: Native grasslands are all but non-existent in Arkansas, except for a small number of unplowed prairie remnants scattered over the state. Prairie grasslands will not be covered in this text. However, assistance for establishing prairies may be obtained by contacting the Arkansas Natural Heritage Commission.

This section describes some general management techniques for pastures or grasslands. Not all of these techniques are suitable for every grassland.

Grasslands in General

Management is usually necessary to keep grasslands productive. When grasslands are left idle, forage production is reduced as ground litter builds up. However, unmanaged grasslands do produce an abundance of rodents which will increase your farm's population of screech owls, barn owls, red-tailed hawks, bobcats, and coyotes.

Five methods commonly used in grassland management are:

- grazing
- haying
- fertilizing
- overseeding with legumes, and
- prescribed burning.

Grazing

Grazing can be continuous or rotational. Continuous grazing occurs when all animals are placed in one pasture and allowed to selectively graze. Rotational grazing may be as

simple as switching livestock between two pastures; or, if practical, livestock may frequently be moved among several pastures.

Grazing affects both the plants and the soil in pastures and thus the wildlife that can live there. Livestock are selective about the plants they eat. They tend to repeatedly graze some plants and ignore others. This may weaken the more desirable plants and allow unwanted plants to thrive and multiply. Nearly all pastures have areas where livestock concentrate, such as around water, bedding grounds and feeding areas. If the pasture is continuously grazed these areas become overused, resulting in pasture deterioration.

Continuous grazing reduces forage production and eliminates wildlife cover and food. Cattle trampling also destroys wildlife nests. Years of continuous overgrazing can change a desirable grassland into a brushy area where undesirable plants predominate. Grasses that are continually overgrazed will produce less forage each year.

When land is rested--left idle between grazing periods--the vigor of the choice plants increases, giving them a chance to grow and multiply. This gradually increases the number of high-quality plants per acre. Improved grass increases livestock production, improves wildlife food and cover, reduces soil erosion and conserves water.

Rotational grazing allows you to pasture more cattle together and also allows wildlife to use the resting pastures. Rotation permits the harvest of forages when they are at peak production, maximum protein content and palatability. It also encourages growth of legumes (such as clovers) and allows wildlife nests to survive.

Proper grazing management involves keeping desirable plants healthy so stands are adequate enough to support the livestock numbers, so keep stocking rates adjusted so as not to overgraze or undergraze and damage the stand.

Haying

One of the most important landowner-controlled factors in managing grasslands is the timing of hay-cutting. Cutting hay too early may reduce production, but cutting too late will not allow grasses to replenish their root reserves before winter. This weakens a stand of grass. Wildlife cover is also reduced from lack of regrowth. Haying should be timed so that yields and quality are optimum.

Cutting height affects the speed of regrowth. Clipping too low will remove the point on the grass stem where new growth occurs, and regrowth will be slowed. For optimum wildlife production, haying and mowing should be delayed until after July 15th. This practice will likely reduce hay quality on the first cutting.

Haying has a dramatic impact on both the landscape and wildlife. With the ground left barren, wildlife is vulnerable to predation, and the animal must move to adjacent areas for cover.

Fertilizer

Fertilizer and agricultural limestone should be added to a pasture or hayland only after the soil is tested, revealing the need. If you are unfamiliar with soil tests, the results can be interpreted by your local Cooperative Extension Service Agent or your local NRCS office personnel. **BE SURE TO TAKE ALL PRECAUTIONS TO PREVENT FERTILIZER FROM ENTERING STREAMS AND PONDS.**

Overseeding With Legumes

Legumes, such as clovers and lespedezas, remove nitrogen from the air and add it to the soil. It is then available for use by other plants. Improved livestock performance occurs when legumes are added to a cool-season grass diet.

The success of overseeding an established pasture with legumes will vary. Consult the agricultural agencies in your area for the current recommendations on legume varieties, seeding dates and methods.

Prescribed Burning

Burning is an important native grass and remnant prairie management practice when used under the right conditions at the correct time. Fire releases nutrients, controls ground litter and some unwanted plants, stimulates seed production and helps improve plant diversity within the grassland. This helps distribute grazing pressure.

Cool-Season Pasture

Cool-season grasses, such as tall fescue, Kentucky bluegrass, orchardgrass, and timothy, begin growth early in the spring when the soil temperature rises above 40 degrees. Their growth slows during the warmest part of summer when the soil temperature reaches 78 degrees F. and resumes as the soil cools in the fall.

Cool-season grasses have been popular with farmers because they are easy to establish and respond to heavy fertilization. Most of these grasses continue to be productive, but endophyte infested tall fescue has been found to cause some health problems in livestock and wild rabbit populations as well. These problems are still under study.

Cool-season grasses are usually grazed to a 2-4 inch stubble height. Grazing below this height will result in lower production, increased soil erosion and less wildlife use.

These grasses are normally at peak quality and ready for cutting during the nesting season. If the usual cutting height is raised to around 6-12 inches, the disturbance to ground-nesting wildlife is reduced.

Cool-season grasses usually do better in higher pH soils. Soil pH can be raised by adding agricultural limestone.

Tall Fescue has practically no benefit to wildlife and should not be planted if wildlife is a consideration for management. In addition, heavily-grazed fescue has little value to wildlife. Compounding the problem, a lot of fescue contains endophyte infested fungus. Studies have shown that fungus-infected fescue can cause sickness and low conception rates in livestock, rabbits, and other small animals. These negatives are causing landowners to replace fescue with native warm- and cool-season grasses.

Another alternative is to graze fescue close, overseed legumes, and keep the pasture healthy through proper fertilization and management. This practice lessened the toxic effects of endophyte infested fescue.

Consideration should be given to converting fescue pastures to pasture grasses more conducive to cattle production and which will also benefit wildlife populations.

The University of Arkansas Cooperative Extension Service can provide recommendations on eliminating fescue and selecting grasses which will benefit both wildlife and cattle.

Warm-Season Pasture

Many landowners are rediscovering our native warm-season grasses and their value to forage systems. These grasses, such as switchgrass, native bluestem and Indiangrass, are also good for wildlife.

When the soil reaches about 60 degrees in the spring, the warm-season grasses begin growing. They grow best during the warmest months of the year, when the soil is about 90 degrees. Although warm-season grasses have a shorter growing season, they make more efficient use of water and soil nutrients--nitrogen, phosphorus and potassium--than do other grasses.

Warm-season native grasses should not be grazed closer than 8 inches. Since warm-season grasses begin growth later in the year, they are not ready to be grazed until mid-summer, when most of the ground-nesting wildlife have hatched their broods. Warm-season grasses should be hayed in late June or July--again, after most of the broods have hatched. The later the better for ground nesting wildlife.

These grasses should not be cut closer than 6 inches to allow for rapid regrowth. The regrowth should not be grazed, nor should a second cutting be taken. A second cutting will reduce the vigor of the plants, weaken the stand, and eliminate important winter cover and spring nesting cover.

Warm-season native grasses are not as productive but do not require nearly as much fertility as cool-season grasses. However, yields, crude protein, estimated net energy, digestibility, and relative feeding values are increased when the grasses are fertilized with nitrogen. The major increases occur at rates of 50 to 100 pounds of nitrogen per acre,

with 50 pounds per acre giving the greatest return on the dollar. (Note: This applies only to new plantings of warm-season grasses.)

In new warm-season grass plantings, legumes may be overseeded during the second year or after the grasses have become established.

Grassland Management Tips:

- Use both warm-season and cool-season grasses on each farm. Rotationally graze pastures.
- Avoid having hayfields and pastures with only a single species of grass.
- Leave an unmown strip, 20-25 feet wide, around the edge of hayfields.
- Protect shrubby vegetation in drainages and along the field edges with permanent fences.
- Establish legumes in cool-season pastures and hayfields.
- Allow warm-season grasses to regrow to 12-15 inches before the fall dormancy period.
- Convert fescue pastures to warm and cool season grasses.

Forest Management for Wildlife

Forest and woodland habitats are managed over time by the natural forces of nature, wind, ice, fire, floods, insects and disease. Wildlife populations are directly affected by and, for the most part, are dependent upon the results of these disturbances. As our forests are altered by these forces, sunlight is made available to the lower reaches of the forest, generating a dramatic increase in available food and cover plants for animals. Although the tree canopies serve as food and nesting sites for a variety of wildlife, many forest dwelling creatures are dependent upon food and cover at the ground level. This wildlife need provided by forests is only gained when an ample amount of plant producing sunlight reaches the forest floor. The natural system of management takes decades or longer to result in favorable conditions for certain species of animals. As time passes with few or no natural disturbances taking place, we see that wildlife populations come and go. The natural disturbances mentioned above may not even occur in a particular forest or woodland and the tree canopy will close, shading out not only wildlife food and cover, but also the productive tree seedlings on the forest floor.

However, periodical natural disturbances to a forest can be imitated. We call it forest management. The forest can be managed like a garden to produce valuable products in a sustainable supply. By using certain practices we can also improve these habitats for wildlife food and cover.

The main idea behind managing a forest for wildlife is that wildlife needs must be fulfilled at all levels or layers within the forest. The three main levels of a forest are the tree canopy or crown layer where nesting, roosting and mast (such as acorns, nuts, drupes) are important; the mid-story level where different species of trees grow (such as persimmons, hackberries, mulberries); and lastly, the understory or ground level where

many wildlife species live and forage. By understanding the importance of these layers, a landowner can design, through thinnings and other treatments, a multi-tier forest of desirable plants and, at the same time, have plants at the ground level growing in sun patches. No matter what, sunlight is a critical ingredient for food (browse), seed production, and cover in the understory.

Another key to sound wildlife forest management is called "low grading". This term simply means that the decision to cut or remove a tree should be based on taking out the lower quality and less desirable instead of taking the best trees for immediate profits. Should the landowner instead take the best trees he would decrease the overall quality of the entire forest. An example of this would be a woodlot owner cutting firewood each year for his own personal use and selecting trees to cut based upon few limbs of good size, and either oak or hickory. This would be considered "high-grading". A better alternative would be to select the misformed, less desirable species to cut. By "low grading" your forest, you can remove tree and shrub species that have less wildlife and economic value while lessening the competition around the valuable "crop trees". This increases their growth rates and allows their crowns to expand. When your forest is thinned with these objectives, the increased sunlight to the understory will encourage both seedlings from desirable overstory trees and at the same time increase browse and cover for wildlife underneath.

Whatever plan you have for your forestland or woodlots, consideration should be given to how the management plan benefits wildlife and how the forest will replace itself. As you open up the forest canopy and mid-story it is important to try and regenerate desirable tree species that do not grow in shaded conditions. The value to wildlife of the next forest under the current one is directly dependent upon a sound forest plan. The following sections contain valuable information for managing a forest to provide for wildlife needs.

Hardwood Management for Wildlife

Hardwood forests, both uplands and bottomlands, fill a variety of wildlife needs. They serve as nesting sites for many species, such as cavity-dwellers like raccoons, squirrels, and wood ducks, and as temporary nest sites for our migrating and resident songbirds. Hardwood forests are the most diverse in the types of plants they provide for wildlife. Plants include vines, grasses and forbs, hard and soft mast types like acorns, hickory nuts and berries, and a variety of shrubs. However, left undisturbed, these forests slowly lose the richness of this variety due to the differing ability of plants to grow in more shaded conditions. Although most plants have some value for wildlife, some plants are less desirable if they dominate the forest understory in lieu of more desirable ones having more nutritional value. If allowed to remain, these "undesirable species" will become the future forest in place of the oaks that dominate the canopy today. We refer to controlled disturbance such as timber cutting and thinning as "forest wildlife management". It's through managing these forested habitats that we can help ensure continuous benefits to both game and non-game wildlife through the years.

Hardwood forests are usually managed on a "selection system" (uneven-aged) where individual trees in the forest are chosen for harvesting. The forest or woodland is periodically thinned and products removed. For wildlife, these thinnings should result in the favoring of species desirable for their food value such as oak, hickories, blackgum, cherry, dogwood, and persimmon. As the forest is opened up to sunlight, the secondary benefit is the releasing of seedling oaks that will replace the older ones. In each forest gap created by tree removal during the thinning, resulting sunlight will generate a plant response that will serve as browse and cover, two critical habitat components that the forest normally lacks. When managing a hardwood forest or woodlot for wildlife benefits, care should be taken to always leave an ample number (3-5 per acre minimum) of den or cavity trees to serve as rearing habitat for the species mentioned above. If your wildlife objective is directed at tree cavity dependent wildlife, you will want to protect even more dens. These provide nesting sites for a wide variety of forest wildlife species.

Along with selective (commercial) thinning in hardwoods, the landowner may need to use another tool called "Wildlife Stand Improvement" or "WSI". This treatment is simply the selective removal of undesirable and competing species of trees in a non-commercial fashion. This is normally a cost to the landowner in his own manpower or contracted labor and materials. The removal of selected trees and shrubs is done with either chainsaw or by injection with approved herbicides. Under normal conditions, the landowner would use this treatment in areas where there is no market for the trees. Following a timber harvest this tool could be used to treat undesirables that couldn't be sold. The benefits of WSI are the shaping of the forest mid-story and understory for wildlife benefits. This tool can also be used to deaden large overmature trees to serve as standing "snags" for long term roosting and cavity use by wildlife. This treatment, like firewood harvest, is a beneficial tool where the forest or woodlot owner can make major improvements to their property by themselves.

Firewood cuts and WSI work are good techniques to use in low quality hardwood forests where either commercial means are not suitable or production facilities are not available. Firewood cutting or WSI as a management tool can be very useful to most landowners and can be fairly profitable around local rural communities. Care should be taken to avoid "high-grading" the forest or woodlot, as mentioned earlier. One should utilize the inferior trees for firewood and leave the quality trees.

One important characteristic of hardwoods is their ability to sprout from an existing root system. Conifer species (pine, spruce, cedars) do not sprout. After a hardwood tree is cut, unless its root system is destroyed, it may sprout many stems off of a single root or stump. These new sprouts can form the next forest and also provide a great source of browse for deer and other wildlife species.

Hardwood forests that result from the planting of seed (acorns, hickory nuts, etc.) or seedlings in old fields or reverted row-crop land are even-aged forests. That is, the primary forest trees are all the same age. These forestlands will require an even-aged management plan for a portion of their lifetime. These stands, if well-stocked, will become stagnated as they grow and the trees crowd together. Thinning is required in 15-

25 years (depending upon soil potential). This can be best accomplished by removing every third or fourth row of trees and selectively thinning along the remaining rows favoring the most vigorous and well formed individual trees. This thinning harvest will be a pulpwood or chip sale and will offer very limited economic returns. Subsequent thinning harvests every 10-20 years should focus upon improving timber stand quality. Eventually these hardwood forests (primarily oak) can become a diverse forest if care is taken to allow other species of trees to become established in the mid and understory.

The management of large tracts of hardwoods for both wildlife and a sustained yield of forest products can be very complicated and requires professional advice. A landowner in this situation should give serious consideration to employing the services of a qualified consultant forester and wildlife biologist. The consultant's business is to lend the owner both scientific and financial alternatives based upon the landowner's objectives. This advice should contain a long term plan for the forest. Avoid a "one shot" deal. This caution is to protect the inquiring landowner from enlisting the services of a one-time timber buyer rather than a qualified professional. The wildlife biologist's business is to offer the landowner biological recommendations to meet the landowner's wildlife objectives.

Pine Forest Management for Wildlife

There are two major types of pine forests that occur in Arkansas, those that are naturally occurring and those that have been artificially planted. Historical records from surveyors in the early 1800s show that much of the coastal plain and southern slopes of the mountains were expansive pine forests of loblolly and shortleaf. Because of the geographical area, soil type, and weather, these pine stands were formed. Although the pine tree in the form of pine plantations does not foster much love or attention from wildlife enthusiasts, the fact remains that these forests are rich in wildlife heritage in our state. Pine forests throughout south Arkansas are industrially managed for pine pulpwood and sawtimber. They provide owners with substantial rental payments from sportsmen for hunting rights. Deer and turkey populations respond favorably to well managed disturbances of cutting and prescribed burning in these forests. Pine forests can provide a good diversity of food and cover that wildlife need. In addition, pine seed can be a major supply of food at times of the year for some creatures such as turkey. These types of forests offer excellent opportunities for landowners to receive profitable income while benefiting wildlife.

Also, if your first objective is wildlife, keep in mind that hardwood sites should not be converted to pine plantations.

On good soils, natural, mature pine forests normally have a mid-story and understory of hardwoods and vines. The owner can manage these forests and woodlots commercially through various harvests and/or thinnings. Where wildlife benefits are concerned, the mid-story and understory of these diverse plants should not be removed. Most natural pine stands have some mix of hardwoods that should be maintained for different food values.

One of the most economical tools of management in pine forests, besides thinnings is "prescribed burning". Fire used in a periodic and controlled fashion will encourage succulent plant growth on the forest floor. Pine trees have a very thick protective bark which protects the tree from fire. Prescribed burning requires a certain amount of care and knowledge, and advice can be obtained through the Arkansas Forestry Commission offices. Keep in mind, however, if there is a component of hardwoods in your pine stand, even a control burn could damage this very important element of wildlife habitat on your land.

Landowners can increase the wildlife use of these pine stands by developing and planting permanent firelanes (12 feet wide) around woodlots or stands that are to be burned. These planted strips function as firebreaks and supplemental food plots for wildlife. A combination of winter wheat or ryegrass and clover are excellent choices for planting in these firelanes.

Pine forests that result from planting seedlings (plantations) are normally stocked with over 650 seedlings per acre. This stocking level is intended to discourage encroaching hardwoods from dominating what is intended to be an economical and profitable pine forest in the future. It should be stated here that in order for wildlife benefits to be part of the objective on these forests, the landowner must give serious considerations to providing tangible wildlife treatments throughout the life of these stands. You don't usually get something for nothing and this is also true in the case of forest wildlife management. When forests are managed for maximum profits, wildlife populations may be severely limited, depending on what species or group of wildlife populations the landowner is desiring to manage for. The landowner must view wildlife as one of the products for which he is managing these pine forests.

This is not to say these pine plantations are devoid of wildlife benefits. To the contrary, the first 5-10 years of these forests provides extremely important food, cover, and nesting to a variety of wildlife like deer, turkey, bear, fox, and many migrating songbirds. However, as the thick pine canopy closes, wildlife benefits decrease because the variety of fruit and seed bearing plants are crowded out. To increase wildlife benefits these plantations must be thinned as soon as economically feasible. Wildlife benefits will soon return as the stand becomes more open and mixed. Eventually, through periodic thinnings and prescribed burning, these plantations can be allowed to become more mixed with an understory and mid-story hardwood component. By doing this, these commercial forests can once again abound with a diversity of wildlife.

Wildlife Openings and Edge

Two fundamental aspects that are very important and can dramatically improve wildlife habitat on forested property are "openings" and "edges". In this context, openings are defined as areas within forests or woodlots of less than 10 acres, usually 2-5 acres, that are maintained in early stages of grassy growth. These same areas are sometimes referred to as "food plots" when they are annually fertilized and planted in supplemental foods like annual grains and legumes. Food plots are only one type of opening. There are many

types that will benefit wildlife. Some openings can simply be clearings maintained periodically by bushhogging, mowing, or burning. Some can be temporary openings that are allowed to grow up into thick cover eventually becoming a forest again. Openings are useful as they provide a diversity of habitat types within the forest. They provide different food plants along with rearing places for wildlife. Forest animals that are dependent upon open areas for "bugging" and "foraging", such as wild turkey and deer, will normally frequent these openings. Turkeys will often nest near these openings due to the dependency of young poults on various insects. Openings well distributed across the forest provide a diversity in cover and food and therefore enhance the woods' ability to raise more wildlife. Many non-game species, including certain songbirds, are dependent upon some type of opening within forested acres to provide year-round habitat needs.

Openings can be created in various ways but are most economically developed during a timber harvest. As the forest is accessed by logging equipment, the landowner can design the best locations for openings and allow the loggers to create them and use them as loading areas. When the operations are complete, the landowner can have the openings dressed up and planted in grasses and legumes by the loggers. Several federal programs offer cost-share assistance to assist landowners in the expense of improving wildlife habitat. You should consult with an Arkansas Game & Fish Commission Private Lands Biologists for additional information about these programs.

The term "edge" refers to that linear area of transition between two different habitat types. This wildlife management term can best be illustrated from the example of an area where forests and fields meet. Although there are many different types of edge, this illustration is the easiest to visualize. The transition zone or "edge" is typically a mix of the two neighboring habitat types, containing qualities of each. On the edge of a forest the increased sunlight generates a thicker and brushier understory and mid-story compared to a few yards inside the forest interior. This edge is very good wildlife habitat. It not only satisfies some of the needs of forest dwellers but also those animals birds that are field dwellers. In addition, the transition zone provides a much more diverse food and nesting source which further attracts more species of wildlife. "Edge" is considered to be the best habitat for the greatest number of creatures and thus should be increased on your property. To increase the amount of edge on the property, one should avoid straight lines along transition areas. An example would be field lines along woods. The landowner can nearly double the amount of edge on the property by simply meandering the wood's edge in a wavy fashion. Management of fields and forest along elevation contours or terraces will provide this natural curve that contains a greater proportion of edge habitat than the squared-off rectangular system of straight lines.

The creation of "edge" is best accomplished through detailed landscape planning of the property with the use of aerial photographs and topographic maps. The landowner should become familiar with all aspects (soils, topography, cover, streams, etc.) of the property before selecting areas for openings. This will also help in the creation of more edge habitat for wildlife.

Protection

Although there are many ways a landowner protects the interests of his or her property (gates, fences, and signs), protective steps for natural resources are not as commonly adhered to. One of the most important is protection from soil erosion. The topsoil on your property is its life's blood for productivity. No matter if you are raising crops, trees or wildlife, the basic building block is the soil. If any treatment on your property results in disturbance to the topsoil, the last measures taken should be to seed some type of cover crop to prevent wind and water erosion. All woods roads should be seeded with a fall/spring mixture of lespedezas, clovers, or grasses.

Another protective measure for woodlot and forest owners that is often disregarded is the prevention of grazing within timbered areas. Grazing by domestic animals damages the understory vegetation needed for many wildlife species. Fences that enclose domestic animals seldom restrict wildlife movements, and should be in place to safeguard the woodlands from soil compaction and depletion of wildlife foods by domestic livestock.

When managing forested land for wildlife benefits it is important to retain an ample number of cavity or den trees (at least 5 per acre and more if non-game wildlife is your objective). There is a tendency in strict forest management schemes to continually increase the health, vigor, and economic value of the forest. It is necessary to select some trees throughout the forest for their wildlife value instead of future economic value. The retention of den trees and snags will greatly enhance the property's ability to hold a more diverse wildlife community.

One last measure that should be considered by the forestland owner is stream management zones (SMZs). Any watercourse running through the wooded portion of the property should be protected by leaving a substantial amount of trees along it. It is best to dedicate a zone of at least 150 feet from either bank where very limited management takes place. These low impact areas will remain a filter from erosion and help maintain good water quality for your property and your neighbors. These SMZs also serve as a diverse habitat type for wildlife.

Forest management, if not conducted properly, can have significant impacts on fish populations in streams and creeks that transverse your private property. Changes in water quality, such as increases in temperature or turbidity, generally favor less desirable fish species over those forest stream fish that you desire such as smallmouth bass, rock basses, sunfish, and other sport fish. This is also true of forage fish that are food for the predatory fish.

Converting hardwood stands to pine stands also can be especially detrimental to stream fishery populations. Streams have evolved with the energy source common to the watershed and this source helps determine the fisheries community in the water. Predominant hardwood or mixed hardwood forests should not be converted to pine forests since pine input into streams requires different processes to break it down into a useful energy form utilized by the resident fish population. Studies have shown a net energy loss to a stream system resulting from these conversions.

Road construction should be kept to the minimum necessary to access the timber and be kept open only as long as is absolutely necessary to transport the timber out of the area. Stream crossings should be as few as possible and placed only where absolutely necessary.

In addition, in-stream habitat should not be degraded by gravel removal from the streambed, even if the removal constitutes a short-term economic gain.

By taking all of the above recommendations into consideration when managing your forest, only marginal impacts will occur to fishery resources present in streams which may cross your property.

Influence of Grazing on Erosion Potential in Forest Land

Influence of Grazing on Erosion Potential in Forest Land		
Forest Land	% Ground Cover	Erosion Potential
Non-grazed	95+	Minimal
Lightly grazed	85-95	8 times
Moderately grazed	50-85	30 times
Heavily grazed	0-50%	110 times

Forest Management Tips

- Think of the forest in three layers: canopy, mid-story, understory.
- Create browse and cover by thinning the overstory.
- Always "low grade" when harvesting forest products.
- Encourage fruit-producing tree and shrub species.
- Use a chainsaw or herbicides to remove "undesirable" tree species.
- Seed and fertilize disturbed soils in openings and logging trails and roads.
- Create small openings within large forests or woodlands.
- Retain an ample number of den and cavity trees on your property.
- Protect forests and woodlands from grazing.
- Leave brush piles from firewood cutting.
- Protect streamside zones.
- Install squirrel den boxes where natural cavities are missing.
- Fence a 150 foot wide zone along all wooded streambanks to exclude livestock. Stop all cutting and mechanical activities inside this area.
- Where forest borders agricultural land, plant field borders in annual and perennial food mixtures.
- Use controlled burning on pine sites to stimulate growth of legumes and other wildlife food plants.
- Leave "key" areas of large diameter mast-producing hardwoods scattered

through the area. These should be at least 1/4 acre or larger.
- Prepare a written plan for the future of your forestland.

Idle Area Management

Nearly every farm has some land that is unsuitable for cultivation, grazing or haying due to its steepness of slope, soil type, wetness or small size. These idle areas--old fields, abandoned house sites, pond edges, wetlands, stream banks or corridors, brushy draws, ditch banks, and erosive areas--can be very useful to wildlife. With a little management, they can provide wildlife food and protection, and sites for nesting and brood rearing.

This section contains information on developing idle land for wildlife.

Old Fields

Abandoned pastures and crop fields provide good wildlife habitat. When left undisturbed, these areas naturally produce plants which provide some food and/or cover for wildlife.

Old fields are in the early stages of plant succession, the natural process by which an area passes from bare ground to the "climax" stage of vegetation. The earlier stages are more productive for wildlife such as quail and rabbit, many species of songbirds, and small mammals. Old field habitat can be encouraged by using some of the following techniques:

Mow 30-foot strips and leave 30-foot strips in late fall to stimulate new growth. After three years, mow the uncut strips again to generate new growth.

- Disk strips through the field on the contour to disturb the top soil. Seed the strips at the rate of 5 pounds of Korean annual lespedeza and 1/2 pound of ladino clover per acre.
- Leave unmowed clumps of woody growth, about 20 feet in diameter, to provide wildlife cover.
- Hinge-cut large cedars by cutting two-thirds of the way through the trunk and bending the tree parallel to the ground. Many cedars will continue to live in this position, creating a living brush pile.
- Where emergency winter food is needed, plant a grain food plot.
- Control burn or disc fields on a 2-3 year rotation to promote natural warm season grasses and weeds.

Abandoned House Sites

The shrubs, lawn grasses, weeds, fruit trees, and shade trees found around old home sites are beneficial to wildlife. Old home sites can be improved by placing tree limbs and old lumber on old foundations for wildlife cover. Fruit-bearing shrubs and trees--such as walnuts, autumn olive, wild plum, cherry, mulberry, and hawthorn--can be planted. Mow strips around and through the lot to stimulate new growth of grasses and legumes. Early spring before the start of the nesting period or early fall after nesting is complete is the best time for mowing.

Pond Areas

Pond sites can be developed into prime areas for wildlife, fisheries and nongame , fishing, or other types of recreation. Trees and shrubs may be planted around the pond for protection, shade, and cover. Windbreaks help check wave erosion and provide food and nesting areas for wildlife. Trees and shrubs may be purchased at low cost from the Arkansas Forestry Commission. To avoid damage to the dam by root penetration, do not plant trees on the dam. Levees should be mowed in late summer to maintain grassy cover and protect the levee from invading trees.

All ponds are used at times by wildlife. By locating the pond near good wildlife cover or by developing good cover around the pond, a landowner can increase this use. If the watershed is grazed, fencing off an area around the pond that is one to one and a half times the water acreage permits the development of ideal wildlife cover. If the area is much smaller, it will not provide sufficient cover and food for continued use by wildlife. Areas less than an acre will attract songbirds and small mammals, but not larger species such as wild turkey or furbearers. Ponds should be fenced off from livestock usage as soil erosion will cause the pond to fill up with sediment. Water troughs can be built to allow livestock use of fenced ponds. Cost-share benefits may be available from FSA for construction and material costs. Gently sloping ponds sides with shallow areas will provide foraging sites for migratory shorebirds during late summer and early fall, and again in spring. Aquatic vegetation will grow in the shallows, providing nursery habitat for young fish.

For information on managing your pond for fishing or fish production, contact the Arkansas Game & Fish Commission.

Streams Banks or Riparian Corridors

Many wildlife species depend on riparian woodlands for all or part of their habitat needs. Some wildlife species spend their entire lives in this zone. In addition, trees stabilize stream banks, protecting them from erosion and sedimentation which can raise water temperatures and negatively affect the aquatic food chain. Stands of trees growing along streams are called riparian woodlands.

In the farming regions of Arkansas, a strip of riparian woodland may be the only woody cover to be found in landscapes dominated by fields and pastures. More heavily forested portions of Arkansas often have solid forest cover down the hillsides and into the stream bottom. However, the kinds of trees that grow along streams are different from those on the adjoining slopes, making riparian woodlands biologically unique. The large variety of trees, shrubs and other plants, plus the proximity to water, are what make riparian woodlands important to wildlife.

For wildlife management purposes, the important part of a riparian woodland is a strip about 100-200 feet wide on each side of the stream. Where the riparian strip is very narrow or nonexistent, it can be widened or reestablished by allowing natural tree

invasion or by planting seedlings. Consult an AGFC private lands biologist or your county Extension Service Agent for specific recommendations on what to plant along riparian areas.

Indiscriminate timber cutting can be very damaging to streams and can endanger riparian and stream wildlife. All roads and trails close to waterways should be kept in suitable vegetative cover.

Avoid removing trees that have fallen into the stream or appear ready to do so. The tree roots are keeping the bank from eroding. When a tree eventually falls, it creates important in-stream habitat for fish and other aquatic life. Trees that are causing problems in the stream can be removed, but never use heavy equipment to dredge the stream channel.

Livestock that are allowed to graze along stream banks cause damage to riparian woodlands and aquatic resources. Vegetation is destroyed and stream bank erosion increases. **Fence cattle away from stream banks. Where access to water is needed, a fence chute can be used to restrict cattle to one area of the bank and reduce the potential for erosion.**

The primary pollutant of water systems in Arkansas is sediment. This type of pollution can be just as detrimental as a chemical spill. The erosion of croplands contributes from 10 to 50 percent of all sediment deposited in the streams and rivers. The effects of sediment on aquatic biota are: 1) Reduced light penetration resulting in the reduction of algae production, 2) Reduction of stream invertebrates which are an essential part of the food chain, 3) The loss of feeding and spawning habitat for aquatic organisms, and 4) Increasing ambient water temperatures, causing aquatic community changes. Sediments also carry contaminants that are detrimental to aquatic biota. However, sediments can be controlled or reduced if landowners use "Best Management Practices" (BMP's) on their property.

The most effective method of reducing sedimentation is having forest and other vegetative cover along riparian corridors. This is accomplished by establishing buffer strips around the agricultural lands and maintaining the vegetation year round. Different types of legumes and perennial grasses can be planted in buffer strips to reduce the flow, and cause the sediments to fall out of the water before reaching the stream channels. The drainage ditches that carry runoff away from agricultural lands deposit sediments in the streams. This can be corrected by reducing the degree of slope in the ditch and allowing vegetation to grow on the banks and, if possible, in the bottom of the drainage ditch. The vegetation will slow the flow and trap the sediments before it reaches the stream. This does not mean that drainage ditches should be allowed to fill in with vegetation and lose their functional abilities. Maintain the ditches in a manner that serves both purposes by controlling woody vegetation and allowing herbaceous vegetation to grow. If trees are present along the riparian corridors on your property, it is advisable to manage the timber in a manner that perpetuates the stand of timber. If too many trees are removed, the banks will become unstable and erosion will cause the banks to wash away. This also causes the area to lose its ability to control sediments. If there are no trees in the riparian corridor,

numerous programs are available to offset part of the cost of planting trees and establishing forested cover. Contact an Arkansas Game and Fish Commission Private Lands Biologist for assistance with programs providing cost-sharing benefits.

Another source of stream pollution that occurs in conjunction with sedimentation is contaminants carried by soil particles. Phosphates and ammonium-nitrogen adhere to soil particles and enter streams through overland flow and erosion. When heavy rains occur after the application of the fertilizer, surface runoff carries the fertilizer into the streams. This can cause toxic levels of unionized ammonia concentrations which can kill stream biota due to high biological oxygen demands and the subsequent low dissolved oxygen levels.

Pesticides deposited in the stream may become absorbed by suspended solids, deposited on the sediments, or absorbed by aquatic organisms. Pesticides can kill, impair reproduction or decrease growth rates of aquatic life-forms that are important parts of the food chain. This in turn reduces the availability of food sources. The overall response is a drastically altered stream system with greatly reduced wildlife benefits.

Once again, these problems can be rectified by the "Best Management Practices" mentioned previously. It is also essential that pesticide applications are monitored closely. Make every effort to control chemical drift. Try to eliminate the introduction of chemicals into streams and drainage ditches. It is also important to dispose of chemical containers properly. Even though the chemicals have been removed from the containers, residues of the chemical remain.

For further information on reducing erosion and improving water quality contact one of the following agencies: **Arkansas Game and Fish Commission, Natural Resource Conservation Service, Farm Service Agency, Cooperative Extension Service, or Arkansas Forestry Commission.**

Brushy Draws

Brushy draws extending well into crop or hay fields can be quality habitat for wildlife and help control soil erosion. A brushy draw should contain a mix of vines, shrubs, grasses, and trees. These areas are even more attractive to wildlife when borders strips (30 ft wide) are planted in a mix of perennial ryegrass, Korean annual lespedeza and ladino clover. Livestock should be excluded from these draws. Cattle can quickly destroy the low-growing shrubs important to wildlife as sources of food and cover.

Brushpiles can be constructed along the edges and at the head of the draws. To avoid clogging the drainage, don't place the brush-pile in the bottom of the draw.

Springs and Seeps

Springs and seeps are found throughout Arkansas. Many springs are still used as water sources for homes and livestock. A seep along a hillside can usually be developed into a

reliable wildlife water source by constructing a small basin or collecting box. Livestock water can be provided below the collecting structure. Fence off springs and seeps to prevent livestock damage to soils and vegetation in the immediate area.

Erosive Areas

Certain field areas will erode more than others, depending on the soil type, steepness of slope and land use. Erosion-prone land can be seeded to various plants that will benefit wildlife and help conserve soil.

Select a good seed mixture appropriate to the soil type and location. Wildlife prefer a legume and grass mixture to a single seeding of one seed type. Lightly disk or rake the area to expose some bare soil for a seedbed. Broadcast the seed mixture and then spread three bales of wheat straw mulch for each 1,000 square feet of area.

A cutting of hay may be possible after a few years. Cut hay only once a year, leaving about 6 inches of stubble. Cut hay in alternating strips every other year to keep the plants growing vigorously. This will provide nesting sites, food and cover for wildlife.

Highly erodible areas may also be planted to pine or hardwood trees. Preferably, the rows should be planted along the contours or terraces and a sufficient number of seedlings should be planted to retain soil from erosion. A good number is 300-450 seedlings per acre.

Fencerows

Fencerows provide woody cover and travel lanes for wildlife. A shrubby or brushy fencerow can become an extremely important connecting link between different habitat types.

An overgrown fencerow connecting several habitat types is an ideal place to start habitat improvement work. The larger trees in a fencerow can be cut for firewood. The tops can then be piled as brushpiles.

If the fencerow is bare, shrubs can be planted for cover. Plant seeds of vines and shrubs in rows along the fence. Cultivate to eliminate grassy competition and mulch the seedlings with straw or dead vegetation. Protect the fencerow from livestock and fire. A good travel lane will develop naturally.

The simplest way to make a travel lane is to stop mowing, grazing, or cultivating the strip next to the fence. On farms with heavy grazing, it may be necessary to install a double-fence in order to protect a travel lane. Electric fencing is effective and inexpensive for this purpose.

Idle Area Management Tips:

- Disk strips on the contour to encourage native vegetation.
- Mow alternate strips, but protect woody vegetation.
- Hinge-fall cedars and cull trees for quick cover.
- Plant annual grain food plots.
- Plant grasses and legumes around brush piles and along brushy draws.
- Fence to protect pond areas from livestock.
- Fence to protect stream banks from livestock.
- Develop springs and seeps as watering holes.
- Plant grasses and legumes or trees on eroding area.
- Protect fencerows for wildlife cover and travel lanes.

Wetland Management

By definition, a wetland is a tract of land containing so much soil moisture (hydric soils) that it supports certain types of water-tolerant vegetation. Land that fits this description can vary from permanently flooded sloughs to areas that have only saturated soil during part of the year.

Wetlands function as biological filters that remove sediments and pollutants from surface waters. They also act as natural sponges, reducing flood severity by slowly discharging excess water back into the stream or groundwater.

Wetlands are biologically rich with a greater diversity of plants and animals than found in drier habitats. They are excellent habitat for all kinds of waterfowl, shorebirds and songbirds. Natural wetlands along streams and rivers are important as fish spawning and rearing areas.

Many of the wetlands in Arkansas today are "developed"--that is, they were constructed on previously dry or seasonally flooded land and are maintained by levees and water-control devices. For information on construction and development of private wetlands, contact your county Extension or NRCS Agent.

Most wetland management today is directed toward creating good waterfowl habitat. In this type of management, waterfowl food production is a primary concern.

Diverse groups of plants grow naturally on moist or wet soil; these plants produce seeds that contain essential nutrients for waterfowl. Wetland management techniques encourage the growth of these moist-soil plants. Moist soils also provide excellent growing conditions for invertebrates such as small snails, clams and insects, which are good waterfowl foods.

Following are some procedures that produce wetland habitats containing many kinds of waterfowl foods, both natural and cultivated, under a variety of wetland conditions.

Moist Soil Management - grassy, weedy areas

On constructed, developed or reclaimed wetlands, moist-soil plants are encouraged in flooded fields by drawing the water from the fields during the growing season. This allows germination of the many seeds such as sprangletop, smartweed, barnyard grass, sedges, rushes and others that are present naturally,

The timing and rate of the drawdown are important for good plant growth. Generally water should be held on the wetland until early spring (March to April). The rate of drawdown should be slow enough to prevent rapid drying of the soil. This will discourage undesirable species while stimulating desirable moist-soil plants. The wetland is then re-flooded prior to and during winter migration to make these foods available for waterfowl. A slow re-flooding of the marsh is best, starting around the first of September for teal, or the first of October for many other wetland species.

Moist-soil areas should be disked and or burned at 2 to 3 year intervals to control invasion by undesirable plants. Disk and/or burn as early in the spring as possible to allow time for rainfall and seed germination.

Contact an AGFC Private Lands Biologist or DU Biologist for specific recommendations on your moist-soil areas.

Flooded Cropland

Flooded grain crops can be very beneficial to waterfowl, especially late in the winter when the weather is extremely cold. Rice, corn or grain sorghum should be flooded from October 15 to March 30. These small grains decompose at different rates when flooded and persist well when flooded for extended periods. Soybeans are not recommended as a waterfowl planting because they deteriorate rapidly when flooded for extended periods.

Crops planted specifically for waterfowl need not be kept clean of weeds because the weeds will provide additional food. Japanese millet can also be sown (15 pounds per acre) to supplement the cultivated crops. Cropland should be flooded 1-18 inches with 4-8 inches being optimal. Flooded croplands are also extremely valuable in spring, late summer, and early fall to migratory shorebirds which feed on the macro-invertebrates (aquatic insect larvae) found in shallowly flooded fields.

Contact your county extension Agent for information on the Managing Rice for Ducks Program.

NOTE: Caution should be taken with the manipulation of unharvested crops or native vegetation to avoid baiting violations. Contact your county Wildlife Officer for details regarding the baiting laws.

Flooded Timber

Green-tree reservoirs (GTRs) are forested lowlands that are temporarily flooded during fall and winter to attract ducks. They are designed to hold water while trees are dormant.

This prevents permanent tree damage and possible death; hence the name "green-tree" reservoir.

GTR's are normally created by the construction of levees and the installation of water-control structures. Levees should be low and wide to reduce erosion damage, with approximately two feet of free board above desired flood pool level. After construction the levee should be planted with a perennial grass to control erosion. A water-control structure is needed to retain captured water and to control water depth. The structure is also needed for the release of water and to allow normal drainage to occur without any long term (1+ weeks) flooding from March-September. The structure needs to accommodate complete drainage of the GTR within one week.

Landowners are cautioned that a high degree of management is required to prevent severe damage to trees within GTRs. Water left standing during the late spring and summer will cause excessive mortality to trees.

Forested areas should not be flooded before November 1 and should be completely drained by March 31. **IF THIS CANNOT BE ACCOMPLISHED, THEN METHODS OTHER THAN GTR SHOULD BE LOOKED AT TO ADDRESS WATERFOWL NEEDS ON YOUR PROPERTY.** Flooding dates, depths, and duration should vary from year to year to maintain the productivity of the forest.

Forest management can improve the site's value for ducks by adjusting the species composition and density of the trees present. One objective is to maintain a variety of mast producers as no single species will produce suitable quantities of mast every year. Timber management should be conducted to remove or kill low-value trees, making room for better mast producers. All den trees should be retained. A few standing dead trees may provide desirable nest sites for wood ducks and other cavity-nesting wildlife.

Water impounded on forested land by beaver is a constant threat. If prolonged inundation occurs during the growing season, timber will be killed. For this reason, control of beaver activity and expedient dewatering of beaver-impounded forested acreages are of the highest priority. Contact your local Wildlife Officer for information on nuisance beaver control.

Ponds and Small Lakes

If water-level control of a pond or lake is possible, it should be drawn down 1-2 feet in early March or April to encourage beneficial plants, then allowed to refill with rainfall and runoff. Mud-flats around ponds can be seeded to Japanese millet through August.

Natural Sloughs

- If water control is possible, sloughs can be managed as described above.
- If not, the following techniques can be used where feasible:
 - Plant food and cover strips and encourage native plants along edges of

slough.

- Plant pin oaks or other beneficial trees along the water's edge.
- Install water control structures which will allow proper summer drawdowns and winter flooding.
- Contact AFGC or DU Biologists for information to obtain water control structures which allow proper drawdowns.

Wetland Management Tips:

- Natural waterfowl foods can be produced by encouraging the germination of favorable seeds through spring drawdowns in moist-soil units (March-April).
- In the fall, flood waterfowl areas to 4-8 inches for migrating and wintering waterfowl, shorebirds, and other wetland species of wildlife.
- Rice, sorghum, and other agricultural row cropped fields can function as seasonally flooded wetlands by rolling crop stubble after harvest or left standing, then shallow flood to 4-8 inches by catching rainfall or by pumping. Contact your county Extension Agent for information on the Managing Rice for Ducks Program.
- Nesting structures for wood ducks, Canada geese, prothonotary warblers and other wetland birds can be erected in wetlands. Plans for these nesting boxes are available from the Arkansas Game and Fish Commission's Wildlife Management Division.
- The AGFC Wildlife Management Division's field staff can furnish technical assistance with private wetland development and management.