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A Practical Guide to Food Plots

In the Southern Great Plains




Oklahoma Cooperative Extension Service
Division of Agricultural Sciences and Natural Resources
Oklahoma State University

$15

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Food Plots

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To purchase copies of this guide, visit the Quality Deer Management Association website www.qdma.com.

All photos are by Blayr Gourley unless otherwise stated.

Contents

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Introduction

Many landowners wish to understand the role of food plots in wildlife management. Therefore, we created this guide to provide basic ecology for select game species, as well as science-based and realistic information on how food plots may relate. This guide is not intended to be a complete list of plants that wildlife may consume as that is covered in many other documents.

Like any tool, food plots have significant limitations that must be understood. Food plots have been shown to have positive impacts for some species under some conditions, but they often have no impact. As typically used, food plots rarely improve animal survival, body condition, or antler development. Food plots primarily impact wildlife distribution which can aid in harvest and population management. Food, cover, water, space, and arrangement are all required for quality wildlife habitat. Therefore, landowners should not rely solely on food plots for maximizing the wildlife potential of their property. Food is only one aspect, and often food is not the limiting factor, but rather cover and its arrangement on the landscape. When any of these habitat requirements are not met for a wildlife species, they become limiting factors. Therefore, managers should determine limiting factors for desired wildlife species on a property before implementing any management practice. When too many animals are present and sharing limited resources, food may appear to be limiting, but population reduction may be the best management practice rather than trying to increase food. Even when food is limiting, management of native plant communities is typically more practical and cost effective for improving wildlife nutrition than are cultivated food plots. The importance of cover for wildlife cannot be overstated. Often cover can be manipulated with disturbance such as timber harvest or prescribed fire. When the appropriate native vegetation is not present on a site, cover may be established with a planting, such as establishment of grassy field buffers. Often these plantings provide both food and cover. While cover establishment is an important aspect of wildlife management, it is beyond the

scope of this food plot document and therefore we will focus primarily on planting plots or manipulating vegetation for wildlife food value. Water can also be a limiting factor, however many wildlife species get the majority of their water requirements from their food.

Finally, while this guide primarily addresses food production (either by food plots or disturbance), it does briefly discuss population management and cover as all of these factors are interrelated.

Setting Goals

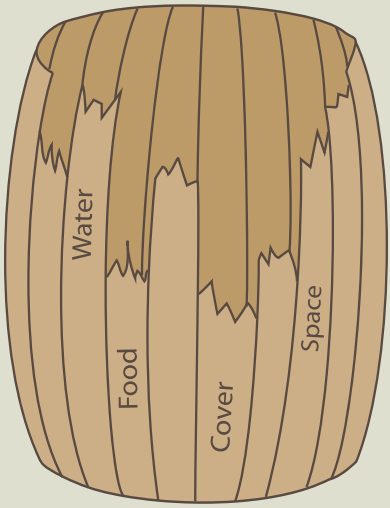
The first step in any wildlife habitat improvement program should be the development of goals. When contemplating a food plot program, determine if food plots are needed. Is food the limiting factor on the property? Is the desired outcome to increase food and nutrition for wildlife or attract animals for easier hunting or viewing? Which species, or group of species, will be impacted the most? Goals should be specific, such as, which wildlife species(s) will be managed. Goals must be measurable in order to determine level of success. Some measurable goals include: acres of additional cover created, changes in plant community, animals present that were previously absent, white-tailed deer antler quality, and enhanced viewing of animals. It is important that goals be attainable, realistic, and timely. Also, consider whether or not the time and resources are available to achieve the goals.

Determining Limiting Factors for Wildlife

Limiting factors are defined as constraints that work against wildlife and decrease their populations by themselves or in combination with other constraints. They are issues that limit attainment of goals or objectives. A good example of a limiting factor controlling a population is cover for northern bobwhite. There may be abundant food in an area, but if cover is lacking, northern bobwhite will be relatively scarce as they are unable to take advantage of the food because of the need for cover to avoid predators and for thermal regulation. To determine which resources are limiting, a manager must first understand the needs and ecology of the target species. Resource requirements vary greatly from species to species. Some habitat requirements of game species are covered later in this guide, but more detailed descriptions of habitat can be found in Oklahoma State University Cooperative Ex-

tension publications and Samuel Roberts Noble Foundation publications. These publications are available online and in print (see Relevant Publications and Suggested Readings on page 63). Some examples of relevant publications include *Ecology and Management of Deer in Oklahoma (NREM-9009), White-Tailed Deer Habitat Evaluation and Management Guide (E-979), White-Tailed Deer: Their Foods and Management in the Cross Timbers (NF-WF-11-02), Northern Bobwhite Quail Habitat Evaluation and Management Guide (E-904), Management of the Wild Turkey in Oklahoma (NREM-8700), and The Ring-Necked Pheasant in Oklahoma (NREM-9017).*

One of the most important things you can do as a wildlife manager is learn to identify native plants that are food sources for the species of interest. Trees, shrubs, vines, grasses, and forbs (broadleaved, herbaceous plants) provide food and cover for wildlife species. The OSU Cooperative Extension publication, *A Checklist of Prairie, Shrubland, and Forest Understory Plants of Oklahoma: Characteristics and Value to Deer, Quail, Turkey, and Cattle (NREM-2872)*, lists native plants and their value as food and cover for wildlife. Good references for identifying plants include the following books, *A Field Guide to Oklahoma Plants: Commonly Encountered Prairie, Shrubland, and Forest Species* and *Trees, and Shrubs and Woody Vines: A Pictorial Guide (NF-WF-08-01)*. Additional helpful resources are *Grasses of Southern Oklahoma and North Texas: a Pictorial Guide (NF-FO-04-01), and White-Tailed Deer: their Foods and Management in the Cross Timbers (NF-WF-11-2)*. The Noble Foundation webpage *Plant Image Gallery* is also an excellent resource for identifying plants. See Relevant Publications and Suggested Readings on page 63 for information on accessing these resources.



Just as the shortest slat in a barrel limits the amount of water the barrel will hold, the most limiting factor limits the number of animals that a landscape can hold.

Developing A Plan

Once goals have been set, it is time to develop a realistic plan to achieve them. Available resources, such as time and money are important things to consider when developing a plan. Most hunters and managers do not run short on enthusiasm or motivation, but rather financial and time resources.

Critical to any management plan is access to equipment and/or livestock that are needed to manipulate the plant community or plant a food plot. Proper use of timber management, grazing, rest, and prescribed fire is usually adequate for a successful wildlife management plan. Properly managed plant communities using these tools provides wildlife with all their habitat needs. If providing an additional attraction for wildlife viewing, hunting or other reasons is important, food plots may be an option to consider.

To establish food plots, many different pieces of equipment can be used, such as a tractor or ATV, disk, harrow, seed drill, hand tools, fertilizer spreader, broadcast seeder, sprayer or mower. It is important to determine if the area planned for the food plot can be accessed by the equipment. Road locations and conditions often dictate where food plots can be located. Also consider the timing of site preparation and planting, and extra trips to or across the property for these activities. The landowner should consider how much money will remain in their budget after planting a food plot. If the food plot manager is not the landowner, it is important to determine if a landowner will allow food plots to be planted and access will be available long enough to benefit from the food plots.

When the area is grazed, the manager must determine whether livestock fencing is necessary to keep livestock out of the food plot. When a property is small, the manager needs to determine whether suitable habitat exists on neighboring properties as this will influence animal numbers and distributions. All these issues should be addressed while developing a plan.

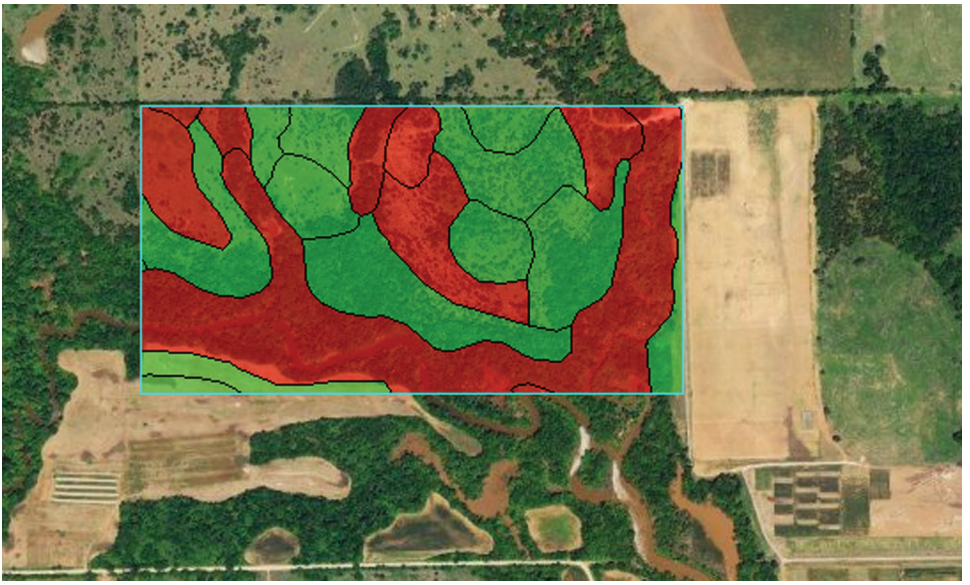
Where Should the Plot Be Located?

Food plots should be located in areas frequented by the target species. For example, a plot for turkeys should not be planted in places where they are never seen or where the surrounding habitat is unsuitable. Suitable food plot locations can include old fields and other open flat areas, which require the least amount of preparation for establishment. Food plots generally need to be located near suitable cover. However, for some migratory birds (particularly geese), cover may be a deterrent. In addition, while deer might use food plots located 0.25 mile or more from cover, it will typically be at night. If an objective for the food plot is to attract deer for hunting, the plot should be located adjacent to cover or it will have less than desirable results. If suitable areas for food plots do not exist, openings can be created with heavy equipment. However, be careful not to remove topsoil when clearing existing vegetation and consider the soils and slope of the area to be cleared. Avoid areas with particularly infertile soils, rocky soils, wet soils or slopes greater than 7 percent (sites should have less slope when long, tilled hillsides exist). A food plot requires an area large enough to allow for sufficient sunlight. However, this may not be a concern if planting a cool-season crop near deciduous trees.

If the objective of the food plot is to attract animals for hunting or viewing, position food plots near travel corridors and upwind of predominant wind directions from hunting or viewing locations. For example, a small food plot could be created between a bedding/roost area and a large feeding area. Avoid placing plots in locations that encourage poaching; plant in locations that are out of sight from roadways and property boundaries.

Soil Considerations

Soil nutrient levels and drainage are additional considerations which can vary greatly across soil types. This can lead to increased fertilization costs and/or moisture problems (too much or too little). A great resource for information about the soils on a property is available on the internet from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), http://soils.usda.gov. These web soil surveys detail the different soils types and their characteristics. These surveys can assist a manager in identifying potential sites with the best soils on a property. When using the soil survey, pay close attention to the detailed land capability classification and only use areas classified as 1, 2, or 3 for cultivation of food plots.



The USDA-NRCS Web Soil Survey was used to generate this map showing suitable locations for planting small food plots designed to intercept deer on their way to the fields. The green areas are suitable for food plots while the red areas have site characteristics (soil classification, slope, etc.) that make them unsuitable.

Soil Considerations

Proper soil fertility is very important in food plot management. Collecting a representative soil sample for analysis is the best way to determine fertility needs. Soil test analysis is relatively inexpensive (around $15 per sample) and helps ensure the proper type and amount of fertilizer is applied. Plants act as a transfer agent to deliver the nutrients in the soil to the animals. If adequate nutrients are not available in the soil then the plants will do poorly and the animals will receive very little benefit. If you are not willing to fertilize food plots, then you should carefully examine the benefit of planting them. Information detailing how to collect accurate and representative soil samples can be found in the OSU Cooperative Extension publication *How to Get a Good Soil Sample* (PSS-2207).

In most food plots, fertilizer is needed to correct nutrient deficiencies and in some cases lime may be needed when soil acidity is excessive. The soil test analysis indicates levels of nitrogen (N), phosphorous (P) and potassium (K) present and the pH of the soil. Plants use nitrogen for growth and seed production. Nitrogen also increases the palatability of forage crops. Phosphorous and potassium aid in photosynthesis, help protect against diseases, affect root growth, and provide efficient use of nitrogen. The required level of each nutrient varies depending on the crop and soil characteristics. If the intended crop is known at the time of soil sample submission, include the crop information with the soil sample to obtain more appropriate crop fertilizer and lime recommendations.

Fertilizer is sold either as a single nutrient or a mixture of nitrogen, phosphorous and/or potassium. The levels of nutrients in a fertilizer are displayed as a number sequence such as 10-10-10. The first number indicates nitrogen (N), the second phosphate (P_2O_5), and the third number is potash (K_2O). Each number corresponds to the percentage of the nutrient present in the mixture, so a 50-pound bag of 10-10-10 would contain 5 pounds of N, 5 pounds of P_2O_5 and 5 pounds of K_2O. There are many different formulations of fertilizers and a manager should pick the one that most closely meets the needs of the soil and crop at the least cost. More fertilizer or lime is not always better, so it is very important to use only the amount needed. Excess nitrogen and phosphorus from fertilizer in rainfall runoff can be detrimental to water quality and should be avoided by following the soil test report recommendations.

The pH level reported in the soil analysis is a measure of soil acidity. The pH scale ranges from 0-14 and a pH value of 7 indicates a soil with a neutral pH.

A soil analysis determined nitrogen and phosphorous were needed to correct deficiencies in this soil. A hand spreader works fine for small food plots such as this.

Lower values indicate acid soils and higher values indicate alkaline soils. Soil pH level is one of the most important properties that affect the availability of nutrients for plants. Most plants prefer neutral or slightly acidic soils. The application of lime will raise pH levels to correct acidity, while sulfur can be used to lower pH to correct alkaline soils.

The figure on page 11 shows an example of a soil test. The results of the test are located in the middle of the page. The lab was given information about the type of crop that will be planted, so specific recommendations are provided. The recommendations tell the amounts and types of nutrients needed to resolve deficiencies in the soil. Recommendations are displayed in an amount-per-area format, so a manager needs to adjust these amounts to the actual plot size. Therefore, it is important to measure the size of a food plot.

The results displayed in the example report recommend 1 pound of nitrogen per 1,000 square feet and 2 pounds of phosphate per 1,000 square feet to correct

deficiencies. If the plot is 2 acres (43,560 square feet in an acre), it has an area of 87,120 square feet. The plot area should be divided by 1,000 square feet, which is the unit given in the report. So in this example, the plot needs 87 pounds of nitrogen and 174 pounds of phosphate. The potash requirements are displayed in a per-acre format, so multiply it by the number of acres in the plot. In this case, 12 pounds of potash (6 pounds per acre x 2 acres) can be applied to the plot, but probably is unnecessary because it is a relatively insignificant amount. The food plot would require eight 50-pound bags of 18-46-0 fertilizer (each bag would contain 9 pounds of nitrogen, 23 pounds of phosphate, and 0 pounds of potash) and one bag of 34-0-0 fertilizer (each bag contains 17 pounds of nitrogen, 0 pounds of phosphate, and 0 pounds of potash). Potash would need to be purchased separately since it is not included in this formulation. A formulation of 15-15-15 would not be a good choice for this plot because the plot needs different levels of nitrogen, phosphorous and potassium. The 15-15-15 fertilizer would waste money on excess nutrients and potentially pollute nearby water sources.

Soil, Water & Forage Analytical Laboratory

Oklahoma State University Division of Agricultural Sciences and Natural Resources
045 Agricultural Hall
Stillwater, OK 74078
E-mail: soiltesting@okstate.edu
Website: www.soiltesting.okstate.edu

SOIL TEST REPORT

PAYNE CO EXT OFC
315 W 6th
SUITE 103
STILLWATER, OK 74074
(405) 747-8320

Name :

Location :

Lab ID No.: : 582200
Customer Code : 60
Sample No. : 8580
Received : 10/27/2010
Report Date : 10/28/2010

- Routine Test -		- Secondary Nutrients -	- Micronutrients -
pH:	7.1	SO4-S (lbs/A)	Fe (ppm):
Buffer Index:		Surface:	Zn (ppm):
NO3-N (lbs/A):		Subsoil:	B (ppm):
Surface:	9	Ca (lbs/A):	Cu (ppm):
Subsoil:		Mg (lbs/A):	
Soil Test P Index:	28 (14 ppm)		
Soil Test K Index:	98 (49 ppm)	- Additional Tests -	

INTERPRETATION AND REQUIREMENTS FOR *Wildlife Plot* **(No Yield Goal Needed for N recommendation)**

- Test -	- Interpretation -	- Requirement -	- Recommendations and Comments -
pH	Adequate	No lime required	
Nitrogen	Deficient	1 lbs/1000 sq. ft. N	
Phosphorus	86 % Sufficient	2 lbs/1000 sq. ft. P2O5 annually	
Potassium	67 % Sufficient	6 lbs/Acre K2O annually	

Signature

Soil test example. Note the recommended amount of N, P and K listed at the bottom of the report. Also note the "location" section at the top of the form. If multiple food plots are used, be sure to identify (name or number) samples from each food plot. They will be entered in the "location" section of the form so the recommended amount of fertility can be matched to each food plot.

Conducting Soil Tests

Soils should be tested often (at least once every 3 years) to ensure nutrient levels are adequate. The mailing, testing, and interpretation process takes around 2 weeks, so the sample should be collected about a month before you plan to fertilize in order to allow time to acquire fertilizer. Cooperative Extension educators at your local county Extension office can provide sample bags, tools and techniques for collecting, and will assist with mailing the sample to the lab and interpreting results. Additionally, the Noble Foundation can provide assistance with soil samples. Soil cores (10 to 20) should be collected and mixed together to represent a sample for each plot. The cores should be collected from different spots throughout the plot to ensure a representative sample to address the variation that occurs in the soil. If the soil in a plot varies greatly, it may be necessary to divide the plot into more than one sampling area and apply the required nutrients and lime according to each sampling area. For most food plots, the top six inches of soil should be sampled. After collecting each core, dump them all into a clean plastic bucket and thoroughly mix the cores. If the soil is too moist to mix, spread them out to dry and then mix them. After the cores are mixed, put about a quart of the mixture in a plastic or cloth bag and take it to the local county Extension office or mail the sample directly to the Soil, Water and Forage Analytical Laboratory at Oklahoma State University, 045 Agricultural Hall, Stillwater, OK 74078.

Size, Distribution, Season, and Rotation of Food Plots

Food plot size may vary due to a number of factors such as: target wildlife species, property size, available time and money, available equipment, and objectives. Food plots that are too small are often over utilized by wildlife, rendering them ineffective unless several are established on the property. There is a balance between optimum size, number, and distribution of food plots on a property depending on the target species and objectives. If food plots are for supplementing white-tailed deer forage, then they should be well distributed throughout the property to increase availability. If food plots are for hunting purposes, fewer should be planted and they should be more concentrated in order to better attract the species hunted. They may be smaller in size for an archer to ensure close encounters or larger for a firearms hunter to see more area. The shape of a food plot will sometimes be dictated by the existing opening or topography of the area, but can often be manipulated. Distance from cover is very important and should influence the shape of a plot. Some sources recommend plots be irregular in shape to provide a more natural environment, but this can lead to problems planting and maintaining the plot. Irregular edges are hard to seed at proper rates and cause overlap when applying herbicides, pesticides or fertilizer. The width of a plot should correspond to equipment being used. If the disk is 12 feet wide, then create a plot in increments of 12 feet. Larger plots may need to be rectangular to minimize distance to edge. A checkerboard pattern can be utilized to better facilitate equipment use if a natural environment is desired. Keeping distance from cover relatively the same throughout the plot will encourage cover-dependent animals to utilize the entire plot instead of just the areas closest to cover. Additionally, long linear plots may intersect more home ranges for some species, than the same size plot in another shape.

Size, Distribution, Season and Rotation of Food Plots

If food is the limiting factor for wildlife, then additional forage should be provided year-round, not just during hunting season. The best way to provide food year-round is by managing native plant communities using timber management, grazing, rest, and prescribed fire. This should be the fundamental approach to managing wildlife habitat on a year-round basis, because food plots are not always successful each year. Native plants provide food and cover for wildlife on a consistant year-round basis.

Planting only cool-season (herbaceous plants that actively grow during fall and winter) food plots is generally sufficient if the objective is to increase white-tailed deer harvest opportunities. If the objective is to increase mourning dove harvest, then planting only warm-season (herbaceous plants that actively grow during the spring and summer) food plots may be sufficient. Site preparation and planting must be conducted each year for warm or cool-season annual food plots, which increases expense. Perennial (warm or cool-season herbaceous forages that last for more than two growing seasons) food plots can be used to reduce expense over time, but forage selection is more restrictive. Depending on goal(s) or target species, both cool- and warm-season food plots can be used on the same property. Cool-season grain plots continue to provide food past the dates for planting warm-season plots, so it may be important to divide or allocate plots among both seasons.

A crop rotation system is best for successful food plots and can be accomplished by simply alternating the crop species planted in the plot. A rotation helps prevent or reduce fungal diseases, weed problems, and insects that decrease forage productivity. Avoid planting the same crop in the same food plot year after year. Sometimes it is good to just let a plot remain fallow. For example, plants such as corn and milo can take advantage of excess nitrogen produced when a food plot remains fallow for a year. During this fallow period, seeds of many native plants in the seed bank may sprout, some of which are very beneficial to wildlife. Native plants such as common sunflower, crotons, and ragweeds often germinate and provide a good source of forage and seeds. In fact, simply carrying out some type of disturbance on an area such as disking, timber harvest, grazing, or prescribed fire is often the only “food plot” needed.

Preparation and Planting

To control weeds in preparation of planting, this plot was treated with herbicide. Remember a weed is simply a plant out of place for the manager's goals. What is considered a weed in one spot can be highly desirable in another. In this case, many of the plants killed by the herbicide were actually beneficial to wildlife.

Site preparation for a food plot is not always as simple as disking an area. Weed problems are best dealt with before the soil is prepared. A weed is simply a plant out of place. Plants that are undesirable in a food plot due to competition with cultivated plants may be desirable on the remainder of the property. For example, areas targeted for food plots with abundant perennial warm-season grasses should be sprayed with glyphosate herbicide to kill the grasses before soil preparation. Note: learn several native plants important to the target wildlife

before using herbicide. Herbicides may eliminate plants that are more valuable to wildlife than the planned crops. Only treat the areas needed to meet the objectives. The vast majority of a property managed for wildlife should consist of native plants to provide the habitat that wildlife require. Keep cultivated land to a minimum. When preparing any type of food plot, be sure and watch for invasive plants such as musk thistle and sericea lespedeza. These invasive plants typically establish on disturbed areas and can be controlled with mechanical or chemical methods. The following OSU Cooperative Extension publications can assist with identification and control of invasive plants: *Thistles in Oklahoma and Their Identification* (PSS-2776), *Integrated Management of Invasive Thistles in Oklahoma* (EPP-7318), and *Ecology and Management of Sericea Lespedeza* (NREM-2874).

When the goal is to establish a perennial food plot, it is a good idea to plant an annual forage during the first year to reduce weed problems. Repeated herbicide applications may be necessary to control weeds before planting a perennial forage. For instance, exotic and invasive grasses such as Old World bluestem, tall fescue, johnsongrass, ryegrass and Bermudagrass may require several herbicide applications for effective reduction. For information on which herbicides are best suited to handle weed problems in plots, refer to *OSU Extension Agents' Handbook of Insect, Plant Disease, and Weed Control* (E-832). This book is available at Oklahoma county extension offices. If a plot is cultivated yearly for an annual crop rotation, repeated herbicide applications may be less important. Additionally, if a food plot area has a lot of vegetation, mowing or burning may be necessary to prepare the area before disking and planting.

After weed problems have been taken care of, it is time to prepare the seedbed. There are two approaches used to manage plots: conventional tillage and no-till (or low-till). When using conventional tillage, the soil should be disked to a depth of around 6 inches to allow for optimal initial root growth and water infiltration. If the area being planted is an old agricultural field, it may be necessary to use an implement such as a chisel or plow to break up a hardpan layer that might have formed after years of soil compaction from farm equipment. Lime amendments should be incorporated into the soil during cultivation. Other fertilizer amendments can be incorporated during cultivation or applied later. The next step is to ensure the seedbed is firm enough to plant. Seeds need a firm seedbed to avoid being buried too deep in a rainfall event. A good rule for determining seedbed firmness is when a boot print is more than an inch deep, the soil

is too loose. A cultipacker is excellent for firming a seedbed. Seed drills will often have packer wheels that help with this problem as well.

Conventional tillage is most often used to create a suitable seedbed for a food plot.

If a plot is broadcast planted, seed and soil amendments (if needed) should be broadcast onto the soil soon after the final disking before the plot receives a rain. With several non-legume crops, nitrogen fertilizer can be spread at the same time as seed when weed problems are not excessive. When weeds are a suspected problem, it may be beneficial to postpone nitrogen application until after crop emergence to insure the crop captures a significant portion of the nitrogen. Many crop species can be mixed with and spread with the fertilizer; however, small seeded species (e.g., turnips) and freshly inoculated legume seeds (e.g., white clover) should not be mixed with fertilizer. Small seeds do not broadcast evenly with larger fertilizer particles; fertilizer can also be lethal to bacteria in inoculations when in close contact. Immediately after broadcast planting, a plot should be harrowed to cover the seed, fertilizer and lime, and to firm and smooth the seed bed. Several implements can perform the harrowing function such as a spike-tooth harrow, a tandem disk set to run only 1-2 inches deep, a railroad iron, I-beam, heavy log, or utility pole.

A seed drill provides more exact seed placement and distribution, which usually results in a better crop stand. However, drills are relatively expensive, need to be calibrated, and fewer managers have access to them than have access to broadcast equipment. If seed is to be drilled, the next step after disking is to ensure the seedbed is firm enough to plant.

Preparation and Planting

No-till and low-till methods of planting have several benefits. A primary benefit is minimal stimulation of the weed seed bank through minimal disturbance of the soil, so weeds are less of a problem. Also, soil is less susceptible to erosion when using no-till and the crop residue covering the soil helps improve water infiltration and limits evaporation. Not having to till the soil before planting reduces fuel and labor costs. Some drawbacks of a no-till or low-till operation are the initial cost of a drill, and weed problems must be handled with the use of herbicides and herbicide application equipment. However, no-till drills are available for rent from some county conservation districts.

Site Selection and Planting Information for Legume Crops

Legume crops such as white clover, alfalfa, cowpea and soybean should be inoculated with their crop specific rhizobium bacteria immediately prior to planting. Rhizobium bacteria form nodules on legume roots and transform atmospheric nitrogen into a form that plants can utilize. If the specific legume crop has not been successfully grown on a site during recent years, the appropriate rhizobium bacteria probably is scarce or absent in the soil.

White clover and alfalfa require productive soils with adequate seedbed preparation, potassium, phosphorus, and pH. White clover is a perennial crop that does not persist well on most Oklahoma upland sites. In most of Oklahoma, except the highest rainfall areas, white clover should be planted only in moist bottomlands. Alfalfa requires a fertile, well-drained site. It prefers loamy or sandy textured soils. Alfalfa is a short-lived perennial crop that generally lasts 5 to 7 years when properly planted on appropriate sites and managed well after planting.

Seed Mixtures

Many food plot seeds available from retailers are seed mixtures. Some mixtures consist of varieties that are adapted locally, and have been tested and selected for desirable traits like drought and cold tolerance, and may be worth the expense. However, mixtures should be considered with caution. Some mixtures contain both large and small seeds and sometimes even warm and cool-season species. Some companies do this to ensure something will germinate and grow regardless wherever and whenever the mixture is planted. Yet, much of the seed in such a mixture is probably not suited to a site, season of planting, planting depth, and climate. A well-developed food plot plan involves using seed or mixtures that are best suited for the local growing season and conditions, plus avoids wasting money on a portion of a mixture that is likely to fail.

Make sure most of the seeds are not buried too deeply when using an implement to cover broadcasted plantings. Many plantings fail because the seeds are buried too deep.

Seed mixtures, whether bought or self assembled, also require special attention when planting. Problems are created when a mixture contains both large and small seeds. Large seeds should be planted deeper (typically around an inch deep) than small seeds which should be no more than 0.25 inch deep. Seed mixtures can also present problems in seeding boxes, planters and handheld spreaders. The small seeds will tend to move towards the bottom of the mixture when walking or driving in the field and cause them to get planted first, which will result in an uneven distribution of the crop types.

Seed Mixtures

Attempting to plant different sized seeds using a broadcast spreader can be quite difficult. Adjusting the opening in the bottom of the spreader to achieve the desired seeding rate can be problematic because the larger seeds will often not flow through an opening set for small seeds and small seeds flow too fast through an opening set for large seeds. Mixtures involving legume seeds that are mixed with other crop seeds can be problematic too. Most legume seeds should be inoculated with appropriate species of rhizobium bacteria immediately prior to planting, whereas, other crops do not require such inoculation.

This plot was planted with a broadcast spreader. The seed mixture was complex and the different sized seeds caused these gaps in the planting. Having bare spots is not necessarily negative as it allows northern bobwhite, dove and other birds to better use the site. However, forage for deer probably is reduced.

Monitoring the Success of Food Plots

To determine whether food plots are providing the desired amount of forage and to estimate the level of utilization by wildlife, exclosures should be placed in the plots. Exclosures should be about 4 feet in diameter and 4-5 feet tall. An exclosure can be constructed from a 16-foot welded wire livestock panel wired together at the ends to make a circle or cut into fourths to make a square and then wrapped with small wire mesh or chicken wire. It is important to use some type of small wire mesh on the exclosure to keep animals from reaching through and to exclude rabbits from eating the forage inside the cage. Exclosures also should be staked down with t-posts driven into the ground firmly to prevent deer, feral hogs or wind from knocking them over.

A low cost exclosure can be constructed from welded wire panels wrapped in chicken wire.

Establishing exclosures is a good way to monitor forage growth and utilization of food plots. These exclosures clearly show the plot has been heavily utilized.

Exclosures allow a manager to determine how much forage the plot produces over the season. In areas where deer densities are high and food availability is low, food plots often will be over utilized, with no obvious plant material from the planted species. In the absence of exclosures, it would be easy to assume the planting failed when in fact, it was over utilized by wildlife.

Forage in a food plot that is consumed to the ground is an obvious sign of over utilization. Over utilization can be a result of planting a highly preferred or novel forage, small food plot size, high animal densities, or other variables. Be careful not to assume that over utilization is due to poor habitat or limited food resources. To accurately determine the level of forage produced and consumed, you will need to clip the area inside the exclosure and an equal area outside of the exclosure (several feet away from any fence or exclosure boundary) and weigh them. Divide the weight of the forage outside the exclosure by the weight of the forage inside the exclosure to determine the percent utilization. Alternatively, a visual inspection is often sufficient to monitor forage production and utilization.

White-tailed deer often over-utilize food plots. Waterfowl and feral hogs may also over-utilize food plots. Food plot over utilization is usually not a problem

with upland game birds or other species of wildlife in Oklahoma. Using population estimation techniques can help estimate wildlife densities on a property (see Carrying Capacity and Overabundant Deer Considerations on page 30).

Placing trail cameras around food plots is a good way to monitor the plot's effectiveness at attracting the desired species of animals. Successful plantings can outgrow camera stands, so remember to account for growing vegetation when placing cameras around plots.

Managing Firebreaks and Roadsides for Wildlife

Managing native vegetation with prescribed fire should be an integral part of any land management plan. Information about developing and implementing a prescribed fire program on your property can be found in several OSU Cooperative Extension publications and videos including: *Fire Prescriptions for Maintenance and Restoration of Native Plant Communities* (NREM-2878), *Using Prescribed Fire in Oklahoma* (E-927 and video VT112), *The Effects of Fire* (VT1139), *Patch Burning: Integrating Fire and Grazing to Promote Heterogeneity* (E-998), *Burning in the Growing Season* (E-1025) and several others. See Relevant Publications and Suggested Readings on page 63 for information on how to obtain these resources. Firebreaks, especially those that are mowed or tilled, and roadsides may be the only accessible and open areas for food plots in some circumstances (e.g. in forested areas or in native untilled prairie). Firebreaks can be disked annually or seasonally and used for warm and or cool-season annual food plots.

This food plot was created by disking a firebreak around shinnery oak habitat in western Oklahoma. Notice the sunflower, croton (doveweed), and ragweed which provides forage for deer and seed for dove and northern bobwhite.

Firebreak food plots can also be planted with perennial forages, but because of residual plant material, they need to be mowed on a schedule to maintain a reliable firebreak. Disking could also be used, but may result in plant mortality and the need to replant a perennial food plot. Firebreaks can also be left fallow to allow germination of native forbs. Often native species such as sunflowers, crotons

This firebreak has been planted to oats to provide additional forage during the cool-season. Notice the width to increase the amount of sunlight. The extra width aids in containing prescribed fires within the adjacent pine stand.

(doveweed), and ragweeds germinate in fallow firebreaks depending on the time of year when they were disked. Fallow food plots can be very attractive to wildlife and are inexpensive to create. In forests, another option is to simply widen roadsides or cleared strips by cutting the timber back further. Cleared openings in timber stimulate native forbs and woody plants (browse), such as dogwoods, elm and greenbrier to regenerate, which are important deer forages. These open areas should be periodically burned, cut, shredded,or disked to stimulate new growth in successive years. Resist the urge to use broadleaf or woody herbicides or clean-up road edges when managing for wildlife.

Areas along roads may be the only feasible place to plant food plots in heavily forested areas. Remember to plant only along private roads to minimize poaching issues. Sunlight can be a limiting factor for summer plots if the roadside is narrow. Cool-season food plots generally do well in hardwood areas, although sunlight may still be limiting in pine stands.

Planting in Log Landings after Timber Harvest

In forested areas, log landings from timber harvests can be excellent locations to plant food plots. These spots are often relatively flat, are already cleared, and have an access path. Avoid planting forages that are counterproductive for wildlife such as tall fescue, orchard grass, Old World bluestem, or Bermudagrass, because they provide little food for wildlife, compete with beneficial plants and grow too thick for small wildlife to move through. Annual cool-season grasses, such as wheat, oats, or rye establish faster than perennial cool-season grasses, which is important for soil stabilization if the site is on a slope or has a highly erodible soil type. If the site is not at risk of erosion, it can be left alone to allow native grasses and forbs establish. If the site will be used for food plots beyond the initial planting, the soil may need to be worked thoroughly to reduce compaction which may have occurred from the logging operation. Forest soils can suffer from leaching and lack adequate nutrients to support productive plantings. Therefore, it is beneficial to conduct a soil test on these areas before planting.

Timber harvest often leaves small openings that can be used to plant food plots such as this cool-season mix of wheat and turnips that was planted for deer and turkey.

White-tailed Deer

Deer are attracted to recently burned areas to take advantage of high-quality forage in much the same way they are attracted to cultivated food plots. This area was burned late in the summer and the photo was taken in January. These deer are feeding on the emerging rosettes of numerous native plants such as Scribner's panicum.

White-tailed deer are the most sought after big game species in North America, and much research has been devoted to managing habitat and populations. Research has shown food availability is one of most important factors affecting habitat use and daily movement of deer. Food availability varies greatly across an area throughout the seasons, therefore a deer's diet varies greatly through the seasons. The diet of deer consists of leaves, hard and soft mast, buds and twigs of woody plants, and cool and warm-season herbaceous plants. Soft mast is obtained from warm-season woody plants such as persimmon, plums, and grapes. Hard mast utilized by deer primarily includes acorns from many species of oaks. White-tailed deer utilize many species of native plants as food. Managing native plant communities through proper timber management, grazing, rest, and prescribed fire is more important than a food plot program. Lists of the numerous native plants utilized for food by white-tailed deer can be found in the *White-tailed Deer Habitat Evaluation and Management Guide (E-979)* and *White-tailed Deer: Their Foods and Management in the Cross Timbers (NF-WF-11-02).*

Prescribed fire impacts much larger portions of deer habitat than typically are impacted by food plots. Prescribed fire improves production, quality and

availability of many deer food plants while food plots increase production and availability of only a few deer foods. Prescribed fire can put woody browse plants within reach of deer (at heights less than 5 feet) and temporarily improves browse nutritional quality. Using a patch-burn rotation (an approach that involves burning a portion of the property each year) provides habitat that varies in structure and composition. A recent burn intermixed with patches having 2, 3, 4 and more years following fire provides areas with diverse plant maturities and associated qualities. This benefits white-tailed deer by providing a diversity of high quality foods and year-round as well as thermal, escape, and fawning cover.

The tips of this greenbrier have been browsed by deer. Greenbrier is a highly preferred, native forage for white-tailed deer.

Cultivated food plots for white-tailed deer are often advertised as the best way or an important way to manage a deer herd (see appendix for list of food plot plants on page 61). For example, it is often claimed that food plots can grow larger antlers and increase carrying capacity of the property. However, research has shown in most cases food plots do not improve the quality of white-tailed deer harvested on a property and are rarely used in a manner that actually increases carrying capacity. In some situations, food plots may be useful in providing a source of increased forage quality when native plants are lower in nutritional quality. In the Southern Great Plains, these periods are typically in late summer (August- September) and in late winter (January- March). However,

drought limits food plot production just as it limits native plant food production. Food plots typically can be grown when they are not needed, but cannot be grown when they are needed most, such as during a drought.

Turnip, a cool-season annual, can be highly productive and may increase white-tailed deer harvest opportunities in late fall and winter.

Cultivated food plots can be used to increase deer harvest efficiency. Warm-season food plots of cowpeas or soybeans can compliment early season harvest strategies and cool-season plots of cereal grains can provide late season harvest opportunities. Unharvested corn can provide deer harvest opportunities throughout the season.

Antlers: What Limits Their Size?

Many hunters plant food plots with hopes that additional nutrition will equate to larger antlers on bucks harvested, but food plots generally do not impact antler size. Information in the Noble Foundation publication *Quality of Native Plant Forage Species Important to White-tailed Deer and Goats in South Central Oklahoma (NF-WF-04-02)* shows native vegetation can provide more than adequate nutrition levels needed for antler development. Deer density must be balanced with habitat quality for optimum nutrition. In most cases, managing native vegetation, deer densities, and buck age structure are much more effective and less expensive than food plots when trying to grow larger antlers. **The age of a buck limits antler size more than any other factor.** The single most important factor for larger antlers is to allow bucks to attain maturity. Nutrition is important, but managing the native plant community and deer numbers generally provide better nutrition to grow large antlers than can be provided by a few food plots. Finally, genetics play a role in determining antler growing potential, but they are very difficult to influence in a wild deer herd.

Carrying Capacity and Overabundant Deer Considerations

Carrying capacity is the maximum number of deer that an area can support without harming deer performance or habitat. When deer are overabundant relative to carrying capacity, they commonly consume most preferred crops planted in plots before the plots can provide much benefit. In over utilized situations, plots are less successful at attracting deer or making deer more visible because little crop production is present in the plots to feed deer.

Deer abundance relative to carrying capacity can be evaluated several ways such as monitoring deer weights per sex and age-class, monitoring antler measurements per age-class, monitoring fawn crops, and monitoring preferred food plant utilization (browse and perennial forb surveys). When properly measured with adequate sample sizes, such data can indicate whether an area has too many deer relative to carrying capacity. When deer become overabundant relative to carrying capacity, body weight declines, antler size declines, fawn survival declines, and food resources become over utilized. If browse surveys, deer weights, antler characteristics and/or fawn crops indicate deer densities are above carrying capacity, does should be harvested to balance populations.

Directly monitoring deer population parameters with population estimation procedures over time may also indicate whether harvest management is changing density, sex ratio, and fawn crop. Population management activities are more successful on larger acreages (more than 2,500 acres) than smaller acreages. Managers of smaller properties should consider forming a deer management cooperative with neighbors. A deer herd can be better managed and labor and other expenses can be divided among more participants in a cooperative.

One method to monitor deer population parameters is the use of motion-activated trail cameras. This method involves baiting deer to the camera sites and is best conducted during a time when food sources are least abundant and bucks still have antlers, such as December or January. Detailed information about conducting camera surveys can be found online under the adult programs link on the NREM Extension webpage (see Relevant Publications and Suggested Readings on page 63).

Management Cooperatives or Associations

Annual home range size for most deer encompasses more property than managers typically control. This fact usually does not have major implications on deer habitat management, but it does on population management goals, especially when considering managers of properties smaller than 1,000 acres probably do not control the fate of any bucks.

The primary factor limiting white-tailed buck antler size is age. Most bucks are harvested at too young of an age to express their genetic potential. Increasing buck age structure on small acreages is difficult due to potential harvest on neighboring lands. A management cooperative or association is a great solution for owners of small properties to manage deer population parameters such as buck antler size. A cooperative or association is a group of managers in a region who share common deer management goals and make a decision to cooperatively manage their shared deer herd.

In 1996, the Walnut Bayou Deer Management Association (WBDMA) was formed in south central Oklahoma, representing 7,750 contiguous acres and five landowners. The success of the WBDMA is evidenced by its growth during 2002 to 2011 to include 10 ranches and 12,516 contiguous acres. Members agree to support self-established goals including protection of yearling bucks, limiting total annual buck harvest, increasing doe harvest, and improving the buck:doe ratio. Exceptions to yearling buck harvest are allowed for youth and beginning hunters. Otherwise, there are no other rules or regulations regarding buck harvest. Spotlight estimated number of bucks increased from 199 in 2002 to 253 in 2010 and the buck:doe ratio improved from 1:2.7 to 1:1.6 since 1996. Average harvested buck dressed body weights increased from 116 to 131. Hunter selection is most likely responsible for much of the weight increase. The WBDMA is a model for private land deer herd management on small acreages based upon voluntary cooperation and education.

Wild Turkey

Annual home range of wild turkeys can be as large as 10,000 acres, while daily movement patterns through their home range can be 2 to three 3 and cover 200 to 1,000 acres. Movement patterns and home range size varies depending on season and food availability. Similar to deer, most managers do not control enough land to meet all of a turkey's habitat needs. Habitat needs vary throughout the different seasons.

Recently burned areas are magnets for wild turkeys. They feed and display in these open areas.

A turkey's annual diet is diverse, consisting of many different plants and insects, and varies with season. During late winter and early spring, turkeys seek fresh green shoots of emerging vegetation, insects, and leftover mast crops. During summer, their diet consists mostly of insects with several seeds and fruits.

Eastern turkeys often nest in forests with an open overstory, so dense herbaceous cover can hide their nests. Alternatively, they will nest under shrub cover or under downed woody debris in a more closed canopy forest.

During fall and winter, hard mast such as acorns, cool-season grasses, and seeds comprise the bulk of their diet. Areas recently burned are magnets for turkeys. Winter burning provides access to remaining acorns, creates a favorable environment for abundant insect populations (which are an excellent source of calcium for hens during egg laying) and promotes abundant fresh green forage growth that is an excellent source of vitamin A (important for reproduction). If using prescribed fire during nesting season, which is April through June, it is preferable to only burn a portion of the management area (perhaps 25 percent), and if possible, burn in patches. Avoid burning complete management areas. This allows unburned areas to exist for nesting while still providing insect rich burned areas for turkey poults and incubating hens. Food plots can be used in areas where habitat is poor. Cool-season food plots that are planted for deer are also often utilized by turkeys. During spring, these food plots can provide fresh green shoots and usually harbor an abundance of insects that turkeys need for their diet.

Brood rearing habitat (bugging grounds) should be located near good nesting habitat. Soon after poults hatch, hens lead them into these areas to feed on insects. Turkey poults depend on a diet comprised solely of insects for the first few weeks of their life. Good brooding habitat or bugging grounds should be rich in forbs, which attract and hold numerous insects and form an umbrella canopy that protects the poults from overhead predators while they move about underneath foraging.

Warm-season food plots planted with legumes, or other forb crops, in the spring attract insects and can serve as brood habitat during late spring and summer. Perennial food plots such as white clover and alfalfa serve as excellent brood habitat when they are not sprayed to control insects. Cool or warm-season food

plots fallowed during spring and summer can also provide excellent brooding habitat. It can be beneficial to have food plots large enough to be divided so portions can remain fallow during some growing seasons (see appendix for a list of food plot plants). Many native forbs grow in fallowed plots from the seed bank, creating proper structure for brood habitat and attracting insects. Any grain left in a plot also is a good food source for young, maturing turkeys.

The cedars created substantial heat during a fire, which subsequently top killed the cottonwoods. Cut and remove cedars from crucial roosting areas before conducting prescribed burns.

Importance of Maintaining Roosting Habitat for Turkeys

Turkeys spend the night roosted in trees to avoid predators. Mature trees with large, open crowns and somewhat horizontal limbs provide suitable roost habitat. Rio Grande turkeys in particular gather in large communal roosts during fall and winter. Fall and winter roosts are usually located in riparian areas (bottomlands) along streams or other bodies of water. Limited or no roosting habitat reduces available habitat for turkeys. Mature trees with sparse vegetation underneath allow turkeys to fly into roosts and allow predator detection before flying down. Suppression of fire has allowed eastern redcedar trees to establish in many riparian areas and become dense enough to render many traditional turkey roost sites unsuitable. Turkey managers should clear dense brush and cedars from underneath roost sites to maintain and improve roosting habitat. In the western Great Plains, the removal of mature cottonwood stands along creeks and drainages and the encroachment of eastern redcedar limits Rio Grande turkey habitat.

Northern Bobwhite

The northern bobwhite (hereafter bobwhite) eat various kinds of insects and seeds of many different native plants. Food is rarely the limiting factor for bobwhite populations, but rather, appropriate cover and its arrangement across the landscape usually limit bobwhite populations. Food plots provide fewer benefits for bobwhite than for the other game species discussed in this publication and are rarely applicable. Bobwhite require nesting cover, brooding cover, feeding cover, loafing cover, and escape cover. All of these habitat components need to be located in close proximity (preferably within a 20 to 60-acre area). Managers wanting to improve bobwhite populations on their properties should focus efforts that improve the native plant community before considering planting food plots. Additional information about evaluating and managing habitat for bobwhite is located in the *Bobwhite Quail Habitat Evaluation and Management Guide (E-904).*

Most bobwhite food plants and brood rearing cover require annual disturbance throughout most of the Southern Great Plains. The disturbance can be provided by grazing, burning or disking. However, excessive disturbance is detrimental. Overgrazing removes too many plants, eliminating preferred foods and herbaceous cover for bobwhite, while undergrazing allows plant communities to become too thick for bobwhite. Well managed light or moderate utilization grazing or a patch-burn grazing system can provide appropriate disturbance to maintain a desired plant community and structure necessary for bobwhite, provided there is a good shrub component, as quail are a shrub obligate species. During extreme droughts, no grazing may be the appropriate grazing intensity for bobwhite. For Oklahoma, a 1-3 year prescribed burn interval is typically appropriate for bobwhite. This varies depending on the production potential of the site and whether grazing is present. If burning serves as the primary disturbance regime, approximately 40-60 percent of the area should be burned annually in small patches that are interspersed with unburned patches. This is particularly important in the wetter, eastern por-

Conducting burns when conditions allow for incomplete burns assures some cover remains for bobwhite. This late July burn is patchy and leaves nesting cover adjacent to future brood cover.

The structure and composition of plants following a prescribed fire can create excellent brood rearing habitat. Notice the patches of bare ground between plants, which are important for bobwhite traveling and feeding.

tions of the state. Burn units should be small (20-100 acres) or burns should be conducted with prescriptions (e.g., high relative humidity, high plant moisture, discontinuous grass fuels, etc.) to allow for an incomplete burn, so cover remains throughout the burned area. In the western Great Plains, particularly in sandy soils, fire frequency can be much longer (5-10 years) to maintain appropriate cover. Burning prior to April 1 or after July 15th will not disturb most bobwhite nesting attempts. Information about patch-burn grazing and burning during the growing season can be found in the OSU Cooperative Extension publications *Patch Burning: Integrating Fire and Grazing to Promote Heterogeneity (E-998)* and *Burning in the growing Season (E-1025).*

The crop contents of this bobwhite indicate it has been feeding on johnsongrass and foxtail grass. These grasses often occur in fallow food plots or agricultural fields. While johnsongrass is used for food by bobwhite, it is a nonnative plant that tends to out-compete more desirable native plants. It also can quickly become too dense for quail to use as cover.

Food plots planted for turkey, dove or deer also may be utilized by bobwhite. Warm-season food plots of cowpea and grain sorghum for instance, attract insects, provide a canopy for cover when foraging, and have enough bare ground for chick movement. Warm-season food plots, with legumes or other forb crops, can provide good brooding habitat. They also can produce seed utilized by bobwhite during fall and winter months. Cool-season food plots can be left fallow during the following growing season allowing bobwhites to utilize leftover grain and germination of native forbs. However, fallow cool-season food plots do not provide quality brooding habitat like some warm-season food plots.

Agricultural crops utilized by bobwhite include corn, soybean, sorghum and other small grains. In farmed areas, a few rows of the crop can be left unharvested or partially mowed along field boundaries instead of planting food plots. This provides food and cover. Another option to traditional food plots for bobwhites is lightly disking native plant communities. Disking strips during different sea-

sons of the year can provide food and brood rearing cover. Disking is a disturbance that creates bare ground, encouraging germination of many food plants preferred by bobwhite. The growth structure of these plants provides cover for bobwhite chicks while feeding. Disked strips can be disked annually or once every 2 to 3 years depending on the desired native plant response. Note: large-scale disking is not recommended on soils that have never been previously cultivated or with slopes greater than 3 percent. Doing so changes the soil structure of these untilled prairies or can create erosion. The best practices for increasing food and improving habitat for bobwhite and other wildlife are proper use of timber management, prescribed fire, rest and grazing management.

Planting food plots and installing feeders has been shown to affect the daily movements of bobwhite by concentrating them in the habitat surrounding the supplemental food source. While these areas can be a good starting point to hunt bobwhite, research shows food plots and feeders rarely if ever increase the number of bobwhite. Food plots can influence bobwhite distribution, which potentially makes them more likely to be killed by a predator (human or other). The most efficient way of reducing predation is providing sufficient cover for the birds to escape predators.

Soil disturbance such as disking can promote plants that provide good brood rearing cover.

Ring-necked Pheasant

Ring-necked pheasants prefer landscapes with abundant grass cover mixed with agricultural grain crops. Pheasants use dense vegetation such as warm-season grasses, shrubs, and cattails for winter cover, nesting habitat, and loafing areas. Agricultural grain crops can serve as excellent food sources for pheasants. There are four critical needs for pheasants including nesting cover, brood cover, winter cover, and crops with standing stubble for fall and winter food. Nesting cover is often the most limiting habitat factor. Pheasants nest primarily during May and June, but depend on residual herbaceous growth from the previous year. Conservation Reserve Program (CRP) fields, native pastures, and wheat stubble fields can serve as good nesting habitat. Consideration should be given to nesting habitat requirements when making decisions regarding the use of grazing, haying (such as cutting time and height), and prescribed fire.

Successful pheasant recruitment also depends on good brood rearing habitat, which is a plant community that is relatively open at ground level to allow movement of chicks, has overhead cover to provide shade and protection from predators, and has a diversity of forbs, including herbaceous legumes. Forbs, such as legumes, attract insects which are the primary diet of pheasant chicks during the first few weeks of life. Winter survival cover is another important habitat component for pheasant. Winters in the Southern Great Plains occasionally bring ice and snow storms accompanied by extended periods of cold temperatures. During such times, pheasant seek high energy seeds, such as corn and milo, as well as seeds of native forbs. A dense cover of grass or shrubs should be adjacent to winter feeding areas to conserve energy reserves by reducing exposure to weather and to reduce chances of predation when traveling to feed. For woody plant cover, short-statured, fire-tolerant native shrubs should be promoted instead of trees that are detrimental to other grassland birds. Avoid using eastern redcedar as it tends to increase rapidly on many sites and will convert grasslands into woodlands that are avoided by many species of prairie or savannah wildlife. Prescribed

fire is an important tool for managing pheasant habitat. Disturbance created by fire helps create good brood rearing vegetation structure, decreases ground litter that impedes chick movement, and promotes forbs, which attract insects. Forbs also produce seeds, which are valuable during winter months.

Food plots are not typically needed in pheasant management because the birds normally occur in agricultural areas where waste crop grain is already readily available. Annual food plots can be useful if crop fields are subjected to fall or winter disking or other practices that make grain unavailable during winter months. Remember to position winter food plots adjacent to dense cover for protection from cold weather and predation. It can be a good idea to create multiple annual food plots and let some of them remain fallow to encourage annual native forbs and plant others to summer legumes for brood habitat. Cropping systems that use herbicides and pesticides can create a shortage of insects and the forbs that attract them. Alfalfa is a good choice for pheasant food plots in Oklahoma. Alfalfa is drought tolerant, persists for multiple years, is not invasive, and attracts and holds abundant populations of insects. Alfalfa can be interseeded into CRP fields that lack a good native forb and legume component (check with your local USDA NRCS office prior to manipulating any CRP field).

A buffer strip of native grasses and forbs along the edge of a crop field provides nesting and brood rearing cover and good winter cover adjacent to the crop that provides fall and winter food.

Waterfowl

Food plots for migrating and wintering waterfowl, can be dry or flooded. Waterfowl need high energy food sources to replenish and maintain body mass during migration. Seeds from some agricultural crops provide a high energy food source for waterfowl, but not some essential amino acids, vitamins, and minerals needed to complete their diet. This requirement is fulfilled by invertebrates (aquatic insects and other organisms) and native wetland plants. Managers who wish to attract and hold waterfowl on their property throughout the winter should consider providing both agricultural plantings and naturally occurring wetland plants.

Agricultural Plantings

Corn is an agricultural crop sometimes planted for waterfowl. An unharvested corn field that averages 100 bushels per acre can provide around 5,600 pounds of corn per acre. Leaving the corn on the cobs helps diminish losses that occur after harvest. When harvested, it is important to time the harvest as close as possible to flooding (which ideally occurs gradually during late September through December) to minimize losses to decomposition, germination and depredation by non-target wildlife. Waste grain from a harvested corn field can amount to 150-200 pounds per acre. If a cash crop is not desired, dwarf corn can be planted, which can be beneficial due to its thin husks and grain production within about 18 inches of the ground, making it easily accessible to waterfowl. For hunters and managers without farming rights to fields, paying a farmer to leave a portion of a field unharvested can provide substantial grain for waterfowl.

Other agricultural crops also provide high quality food for waterfowl. Grain sorghum, rice, millet, and buckwheat produce large quantities of seed that are readily utilized by waterfowl. Some varieties of millet mature in about 70 days and are a great option if the planting date for corn and grain sorghum is missed. Note: planted crops cannot be manipulated for the purpose of waterfowl hunting

(see sidebar: Federal Regulations for Baiting Dove and Waterfowl on page 48). Wheat planted in the fall can attract geese, American wigeon and other species.

Grain sorghum can produce large quantities of seed that is readily used by waterfowl.

Moist-soil Management

Although some waterfowl species use large, dry crop fields, a common thread among many waterfowl food management strategies is to flood food plants, which often involves water level manipulation. Some large dryland crop fields have low lying areas that naturally collect water during fall rains, making them more attractive to waterfowl. Waterfowl managers can take advantage of these low lying areas by planting preferred crops nearby and relying on fall and winter rains to provide water. However, fall rains are not consistent in the Southern Great Plains, and only in some years will they occur in sufficient amounts to flood these low lying areas. Flat, low lying areas can also be dammed to impound runoff from seasonal rainfall. Additionally, permanent artificial wetlands can be constructed and managed for native wetland plants. Agricultural crops can be planted near existing impoundments or impoundments can be drained for planting agricultural crops to be flooded later. Constructed wetlands should

have water control structures installed to allow for manipulation of water depth. A reliable water source nearby is advantageous, such as an irrigation well or an impoundment at a higher elevation that allows water to be diverted or released into the waterfowl impoundment. Otherwise, the manager will be at the mercy of the fall and winter rains in any given year. A number of different designs exist for structures that regulate the amount and timing of water releases into and out of impoundments. An internet search for "wetland water control structure" provides many designs. Common examples include flashboard risers, screw gates, and beaver pond levelers (used in natural wetlands that are dammed by beaver).

Moist-soil plants are those that typically grow in wetland soils. Their foliage and seeds persist longer after flooding than most agriculture crops. Most agricultural crops deteriorate by 50 percent or more after being flooded for 90 days whereas native plants, such as smartweed, deteriorate about 20 percent or less during the same time period. Smartweeds, sedges, and panic grasses are some examples of native moist-soil plants. Native plants also support a high density and diversity of insects and other organisms that complete the nutritional needs of waterfowl. Waterfowl that feed in native plant stands have been shown to be in better physical condition for migration and breeding compared to those eating grain crops. Managing native wetland plants is generally much cheaper than planting cultivated crops. Also, native plants can be legally manipulated for hunting, whereas planted agricultural crops cannot (see sidebar: Federal Regulations for Baiting Dove and Waterfowl on page 48).

Smartweed, a native moist-soil plant, supports a diversity of invertebrates and provides seeds that are slow to deteriorate during winter.

The seeds of these native moist-soil plants provide an excellent food source for waterfowl as well as support a diverse group of invertebrates that waterfowl need to complete their diet.

This photo was taken in early summer after the pond was drawn down to allow native moist-soil plants to establish before re-flooding in the fall.

Moist-soil management involves draining or partially draining wetlands in the spring and summer months to expose mud flats where native plants germinate and establish before re-flooding in the fall or winter. The plants that germinate and grow following a water drawdown vary depending upon on timing of drawdown, seed bank present, extent of the drawdown, and the subsequent moisture conditions. Moist-soil plants beneficial to waterfowl include plants such as sedges, barnyard grass, and smartweeds. Gradual drawdowns generally promote plant diversity whereas rapid drawdowns generally favor simple plant communities. As noted previously, the inconsistency of fall

rains in the Southern Great Plains makes this method of waterfowl management problematic if a water source is not available to re-flood the area. Alternatively, wetlands can be managed as permanently flooded to provide waterfowl habitat. Large ponds or natural wetlands often contain important submerged waterfowl plants such as pondweed. This plant is particularly attractive to American wigeon, gadwall, and ring-necked ducks. Further, the abundant biomass of pondweed harbors high abundance of aquatic invertebrates, such as water boatmen, that are consumed by many species of waterfowl. Even in these permanent wetlands, there will typically be some moist soil plant establishment around the periphery of the wetland as the water level recedes in summer from evaporation. However, if cattle have access to the entire margin of the wetland, plant growth will be minimal. Therefore, consider restricting livestock access to the wetland if waterfowl use is a goal.

Green tree reservoirs harbor abundant aquatic invertebrates, acorns and other hard mast, which are excellent winter food sources for ducks. Waterfowl also use these areas for roosting cover.

Green tree reservoirs are bottomland forests or woodlands that are flooded in the fall when trees are dormant to encourage waterfowl to utilize mast, such as oak acorns. Additionally, green tree reservoirs contain abundant aquatic invertebrates in late winter that are important foods for waterfowl. Green tree reservoirs should consist mainly of mature mast producing trees and comprise 10 acres or more. Soils should have a high clay component for good water holding potential. The reservoir needs shallow levees built around the perimeter to contain water and a water control structure to capture and release water as needed. The USDA NRCS or US Fish and Wildlife Service provide assistance with planning and constructing levees and water control structures and can advise you of any permits needed to alter certain waterways. Check with these organizations before constructing a green tree reservoir on your property. Flooding hardwoods to a depth of 1-18 inches during late fall and winter does

not typically damage the trees while they are dormant. However, water should be drained before tree buds begin to swell in late winter or early spring to avoid damaging the trees. If a reservoir is flooded at the same time of year for a long period of time (20 years or so), tree species in the stand can begin to shift toward trees more tolerant of flooding such as bald cypress. Therefore, it is a good idea to flood the area every other year, or flood 2 out of 3 consecutive years. The change of species in a reservoir also can be slowed by flooding the area at different times in the fall from year to year and drawing down water slowly in stages. Also, the forest stand can be managed in the summer by removing undesirable tree species and promoting the growth of desirable mast producing trees such as oaks, sweet gum, and pecan.

Although many woody plants are beneficial to waterfowl, some can become problematic. The amount of woody vegetation and their structure can influence the species of waterfowl using a wetland. If woody plants are desired for certain waterfowl species, reducing soil disturbance will allow them to establish. If woody plants are not desired, disking or burning every few years may be required to control woody plants. Disking favors annual plants (prolific seed producers) more than burning, but operating equipment is risky because of soft soil. Moist-soil management can be conducted on farm ponds, beaver ponds, or any other impoundment with a water control structure to manipulate water level. If a wetland does not have a water control structure, consider installing one.

Japanese millet can be purchased commercially and broadcast onto mud flats in moist-soil units after water levels have been drawn down in the summer. For optimum stands, it should be broadcast onto freshly exposed mud flats less than 12 hours following water removal. Commonly, wetlands are drawn down in stages, so when planting Japanese millet, it should be broadcast each day following a drawdown. Alternatively, dry mud flats can be disked, broadcast with Japanese millet, and harrowed to develop stands when rainfall or irrigation is available soon after planting to germinate and grow millet. Japanese millet requires between 60-110 days (depending upon strain and weather) to produce mature seed, so it is best to plant around 90 days prior to flooding. If a wetland depends on rainfall to flood it, time the maturation date before significant fall precipitation normally occurs. Japanese millet often re-establishes during future years in areas where it was previously grown when it is allowed to mature and produce seed, and the wetland is drawn down during spring to stimulate vol-

unteer growth. If nothing else is planted in the following years when volunteer stands of millet grow, the stand is considered "naturalized," so it is then legal to manipulate the area by burning, mowing or disking for hunting. (see sidebar: Federal Regulations for Baiting Dove and Waterfowl on page 48). However, such manipulations usually are unnecessary, or possibly undesirable, when millet will be flooded. Japanese millet can be an easy compliment to native moist-soil plant management to attract waterfowl to hunting spots.

Japanese millet can be a productive addition to moist-soil management. It is relatively inexpensive, easy to plant, and can produce a high volume of seed.

Federal Regulations Regarding Baiting Dove and Waterfowl

Doves and waterfowl are migratory birds protected under the Migratory Bird Treaty Act and certain special restrictions apply. It is illegal to hunt migratory birds with the aid of bait or in any area where it is known, or reasonably should be known, that the area has been baited. Baiting is defined as the direct or indirect placing, exposing, depositing, distributing, or scattering of salt, grain, or other feed that could lure or attract migratory game birds to, on, or over any areas where hunters are attempting to take them. Baited areas can be hunted only when the bait has been completely removed for at least 10 days.

Photo by: Adam Gourley

It is legal to manipulate natural vegetation for waterfowl hunting like this wet meadow that was burned to increase seed availability and reduce the stature of woody plants. It is not legal to manipulate any planted crop for hunting waterfowl.

Agricultural lands offer prime waterfowl hunting opportunities. Waterfowl can be hunted in flooded or dry fields of unharvested standing crops, normally harvested crops, and actively growing crops such as wheat. However, fields cannot be mowed, disked, or manipulated in any other way that is not a normal agricultural practice (except for dove hunting). The presence of seed or grain in an agricultural area rules out

waterfowl hunting unless the seed or grain is scattered solely as the result of a normal agricultural planting, normal agricultural harvesting, normal agricultural post-harvest manipulation, or normal soil stabilization practice. "Normal agricultural practices," are defined by the Cooperative Extension Service.

The seeds planted in this food plot have germinated; therefore, the plot would have been legal to hunt migratory birds over if corn had not been scattered in the plot to increase its attractiveness to deer, which constitutes baiting for migratory birds. It would have been illegal to hunt migratory birds on this plot.

It is also illegal to hunt waterfowl over freshly planted wildlife food plots (until 10 days after all seeds are germinated and growing, or consumed) where grain or seed has been distributed, scattered, or exposed because these plots are not normal agricultural plantings or normal soil stabilization practices. It is also illegal to hunt areas where grain has been harvested and then redistributed in the same field as this is considered baiting. Although there are more restrictions for waterfowl, many also apply to dove. However, dove can be hunted in areas where grain crops have been manipulated and grain is fed to livestock. It is the responsibility of the hunter to know when an area has been manipulated in a manner that deems the area baited. Always review federal and state migratory bird regulations before manipulating hunting areas for dove or waterfowl. Federal and state of Oklahoma migratory bird regulations can be found at www.fws.gov and at www.wildlifedepartment.com, respectively.

Mourning Dove

The mourning dove (hereafter dove) is the most harvested game bird in North America. Annual harvest of mourning doves surpass all other migratory species combined at around 40 million birds. The fall migration generally begins in mid August and continues throughout September. Doves are habitat generalists (meaning they don't require a specific habitat type), but they are most abundant in grasslands or agricultural areas with abundant seeds. Doves like to feed and loaf in areas where visibility is good, generally avoiding ungrazed grasslands, thick shrublands, and heavily forested areas.

Small food plots do not attract as many doves as larger plots. Generally, plots targeting doves should be at least 10-20 acres in size to maximize hunting. Doves readily use food plots. Around 99 percent of a dove's diet consists of seeds. Doves find seeds on bare ground areas. This is an important concept to remember when managing a dove plot. Since dove require bare ground to forage for seed, low seeding rates or manipulation of crops after seed production may be necessary (see sidebar: Federal Regulations for Baiting Dove and Waterfowl on page 48).

Management practices that increase seed availability in food plots include burning, mowing and raking, grazing, or disking.

Dove fields often contain abundant "weeds" or forbs. Many of these forbs such as ragweeds, pigweeds, crotons, and sunflowers also are dove foods. Limit herbicide use to only non-desirable plants and only spot treat specific undesirable species, avoiding broad area applications if possible. The importance of learning to identify and understand native plants cannot be stressed enough when managing wildlife habitat needs (see OSU Cooperative Extension publication: *Field Guide to Oklahoma Plants.* Noble Foundation: *Plant Image Gallery* and *The White-tailed Deer: Their Foods and Management in the Cross Timbers*).

Dormant season disking of areas with crotons or common sunflower can develop dove food plots without planting. Also, common sunflower is available commercially and can be planted where it does not exist. During the initial year, it is usually planted with another annual dove food crop, because common sunflower requires cold stratification (damp, cold conditions for several weeks) to break seed dormancy. Therefore, it generally does not germinate until a year or more after planting. After common sunflower germinates and develops a stand, the sunflower stand can be maintained in perpetuity via shallow (less than 4 inches deep) thorough disking during winter prior to March. When soils are deficient in phosphate or potash, appropriate fertilization of disked areas with phosphate or potash prior to disking increases dominance and production of crotons and common sunflower. However, avoid significant nitrogen fertilization (>25 pounds/acre) as it encourages grass competition, which also reduces bare ground. The same practices used to manipulate cultivated plants, can be used to manipulate native vegetation and improve access to seeds.

Dove use of a plot can be improved by locating the food source next to roosting trees (especially dead snags) and a water source. Also, a small burned area next to a pond can attract dove throughout the season. Prescribed fire is an excellent management strategy for creating and maintaining feeding areas for dove. Fire promotes the germination of desirable native plant species, removes litter accumulation for greater seed access, and controls undesirable woody plants. Fire sometimes stimulates crotons, common sunflower, and snow-on-the-mountain which are highly preferred native dove foods. In fact, a prescribed fire can produce an excellent dove food plot. Fires conducted during mid-summer are often

best as they stimulate food producing plants, and grass regrowth is not dense enough to limit dove access and feeding.

Native forbs like snow-on-the-mountain (top) and croton (bottom) often establish after a summer prescribed burn. The large seeds produced by such plants and the bare ground created by the prescribed fire attract dove.

Dove also prefer grazed areas where bare ground is created because the disturbance allows for improved seed access, encourages germination of forbs, and reduces grass dominance that allows more resources for forbs. Livestock also graze and trample vegetation around water sources, providing areas where birds can land and walk to water. Mowing a portion of the vegetation around a water source is an option where grazing is not feasible. Heavy grazing on small areas (e.g. feed grounds, water points, and mineral locations) or patch burn grazing usually create desirable areas for dove. Additionally, allowing cattle into a cultivated field grown up in sunflowers can create bare ground and shatter seed, increasing attractiveness to dove.

This mixture of sorghum, bean and millet can make a great dove plot if mowing, burning, disking or grazing are used to create bare ground and improve access to seed. Deer trampled the millet and knocked sorghum seeds out of the heads while foraging on bean plants. Without manipulation, dove will have difficulty feeding here due to the residual plant litter on the ground.

Disking, burning, mowing and raking, or other disturbances conducted in phases leading up to or through hunting season helps ensure seeds are available over a longer time period. Begin in mid-August (i.e. prior to hunting season) by creating open strips throughout the field. Then, every 2 weeks or so, create a new bare ground strip to improve seed accessibility. When creating dove plots to hunt over, keep hunter safety in mind. Generally, each hunter should be spaced at least 200 yards apart to ensure safe shooting. Manipulating different areas of a field each time can allow multiple people to safely hunt the same field.

Conclusions

Sound wildlife management includes managing native plant communities for food and cover as well as population management. It is important to understand that successful wildlife habitat management can be done without planting anything. Though it is usually cheaper, more efficient, and more effective to manage native plants for wildlife, it is not always an available option. For instance, many hunting leases do not allow lessee's to dictate forest and grazing management practices or conduct prescribed burns, but sometimes allow food plots. Food plots should be considered only one minor tool of many that can be used to attract wildlife. Working with the land and seeing wildlife respond can be rewarding. Use the information in this publication to better understand when and where food plots might help you achieve your goals. Set realistic goals, inventory habitat and population parameters, determine limiting factors, develop a plan, implement management practices, and monitor results. Above all, practice sound and comprehensive wildlife habitat management, which is far more than simply planting a food plot.

Notes

Plant		Life History	Season of Growth	
Common Name	**Scientific Name**	**P= Perennial A= Annual**	**W= Warm-season C= Cool-season**	
Grasses and Sedges				
Bristle grass	*Setaria spp.*	A or P	W	
Chufa	*Cyperus esculentus*	P	W	
Dropseed	*Sporobolus spp.*	P	W	
False nut-grass	*Cyperus strigosus*	P	W	
Panicum	*Panicum spp.*	A or P	C or W	
Paspalum	*Paspalum spp.*	P	W	
Purpletop	*Tridens flavus*	P	W	
Rice cut-grass	*Leersia oryzoides*	P	W	
Forbs				
Bull nettle	*Cnidosculus texanus*	P	W	
Carolina cranesbill	*Geranium carolinianum*	A	C	
Common broomweed	*Gutierrezia dracunculoides*	A	W	
Coreopsis beggar-ticks	*Bidens aristida*	A	W	
Croton	*Croton spp.*	A	W	
Cutleaf evening primrose	*Oenethera laciniata*	A	C	
Daisy fleabane	*Erigeron strigosus*	A or P	C	
Horseweed	*Conyza canadensis*	A	W	
Illinois bundleflower	*Desmanthus illinoensis*	P	W	
Leaf flower	*Phyllanthus spp.*	A or P	W	
Lespedeza*	*Lespedeza spp.*	P	W	
Mexican-hat	*Ratibida columnifera*	P	W	
Milk pea	*Galactia spp.*	P	W	
Pigweed	*Amaranthus spp.*	A	W	
Pokeweed	*Phytolacca americana*	A	W	
Poor-joe	*Diodia teres*	A	W	
Prickly poppy	*Argemone spp.*	A	C or W	
Purple poppy mallow	*Callirhoe involucrata*	P	C	
Pussy-toe	*Antennaria parlinii*	P	C	
Ragweed	*Ambrosia spp.*	A or P	W	
Showy partridge pea	*Chamaecrista fasciculata*	A	W	
Smartweed	*Polygonum spp.*	A or P	W	
Snow-on-the-mountain	*Euphorbia marginata*	A	W	
Sunflower	*Helianthus spp.*	A	W	
Three-seeded mercury	*Acalypha spp.*	A	W	
Tick clover	*Desmodium spp.*	P	W	
Violet	*Viola spp.*	A or P	C	
White avens	*Geum canadense*	P	C	

	White-tailed Deer	Northern Bobwhite	Ring-necked Pheasant	Wild Turkey	Mourning Dove	Waterfowl
		X	X	X	X	X
				X		X
				X	X	
						X
	X	X		X	X	X
		X		X	X	X
				X		
						X
					X	
	X	X			X	
		X				
	X					
	X	X		X	X	
					X	
	X					
	X					
	X					
					X	
	X	X		X		
	X					
	X	X				
		X			X	X
	X	X			X	
		X				X
					X	
	X					
	X					
	X	X	X	X	X	X
	X	X				
	X	X	X	X	X	X
		X			X	
		X	X	X	X	
	X	X			X	
	X	X		X		
		X			X	
	X	X				

Plant		Life History	Season of Growth	
Common Name	**(Scientific name)**	**P= Perennial A= Annual**	**W= Warm-season C= Cool-season**	
White vervain	*Verbena urticifolia*	A or P	W	
Wild bean	*Strophostyles spp.*	A or P	W	
Woods bedstraw	*Galium circaezans*	P	C	
Woodsorrel	*Oxalis stricta*	P	C	
Yellow ironweed	*Verbesina alternifolia*	P	W	
Woody Plants				
American beauty-berry	*Callicarpa americana*	P	W	
Ash	*Fraxinus spp.*	P	W	
Black locust	*Robinia psuedoacacia*	P	W	
Blackberry	*Rubus spp.*	P	W	
Blueberry/farkleberry	*Vaccinium spp.*	P	W	
Box-elder	*Acer negundo*	P	W	
Carolina snailseed	*Cocculus carolinus*	P	W	
Chittamwood	*Sideroxylon lanuginosum*	P	W	
Common elderberry	*Sambucus canadensis*	P	W	
Common honey locust	*Gleditsia triacanthos*	P	W	
Common persimmon	*Diospyros virginiana*	P	W	
Coralberry	*Symphoricarpos orbiculatus*	P	W	
Dogwood	*Cornus spp.*	P	W	
Elm	*Ulmus spp.*	P	W	
False indigo	*Amorpha fruticosa*	P	W	
Grape	*Vitis spp.*	P	W	
Greenbrier	*Smilax bona-nox*	P	W	
Hackberry	*Celtis spp.*	P	W	
Hawthorn	*Crataegus spp.*	P	W	
Honey mesquite	*Prosopis glandulosa*	P	W	
Oak	*Quercus spp.*	P	W	
Osage-orange	*Maclura pomifera*	P	W	
Pecan	*Carya illinoinensis*	P	W	
Plum/cherry	*Prunus spp.*	P	W	
Poison-ivy	*Toxicodendron radicans*	P	W	
Prickly pear	*Opuntia spp.*	P	W	
Southern blackhaw	*Viburnum rufidulum*	P	W	
Sumac	*Rhus spp.*	P	W	
Virginia creeper	*Parthenocissus quinquefolia*	P	W	

** Does not include sericia lespedeza*
spp.= Species.

	White-tailed Deer	Northern Bobwhite	Ring-necked Pheasant	Wild Turkey	Mourning Dove	Waterfowl
	X					
	X	X		X	X	
	X					
	X	X		X	X	
	X					
		X		X	X	
		X		X		X
		X		X		
	X	X		X		
	X	X		X		
	X					
	X					
	X	X		X		
	X			X		
	X					
	X	X		X		
	X		X			
	X	X	X	X		X
	X			X		
	X					
	X	X	X	X		X
	X			X		
	X	X	X	X		
	X	X				X
	X	X		X		
	X	X	X	X		X
	X	X		X		
	X	X		X		
	X	X	X	X		
	X	X		X		
	X			X		
	X			X		
	X	X		X		
	X			X		

Footnote: Partial list of preferred (denoted by X) native food plants for white-tailed deer, northern bobwhite, ring-necked pheasant, wild turkey, mourning dove, and waterfowl. Many additional native plants are utilized by wildlife either directly for food, or indirectly for cover and invertebrates (insects) that plants support.

			Seed Rate (lbs per acre)			
Crop	**Growing Season**	**Planting Date**	**Broadcast**	**Drilled**	**Planting Depth (in.)**	
Oats	Cool-season	Sept. - Oct.	75 - 85	65 - 75	1-2	
Red clover	Cool-season	Sept. - Oct.	10 - 12		1/4 - 1/2	
Rye	Cool-season	Sept. - Oct.	90 - 110	75 - 90	1 - 2	
Turnip	Cool-season	Sept. - Oct.	2 - 5	1 - 3	0 - 1/4	
Wheat	Cool-season	Sept. - Oct.	90 - 110	75 - 90	1 - 2	
White clover	Cool-season	Sept. - Oct.	3 - 5	3 - 4	1/4 - 1/2	
Alfalfa	Warm-season	Sept. - Oct.	20 - 25	15 - 20	1/4 - 1/2	
Chufa	Warm-season	Apr. - Jun.	30 - 50		1/4 - 1/2	
Corn	Warm-season	Mar. - Apr.	10 - 20	7 - 19	1 - 3	
Cowpea	Warm-season	Apr. - Jun. or Sept.	20 - 60	20 - 45	1/2 - 1	
Grain sorghum	Warm-season	May - Jun.	8 - 15	5 - 12	1 - 1 1/2	
Japanese millet	Warm-season	Apr. - Aug.	20 - 35	15 - 20	0 - 1/2	
Peredovik sunflower	Warm-season	Apr. - Jun.	10 - 30	7 - 15	1/2 - 3/4	
Proso millet	Warm-season	Apr. - Jul.	20 - 40	15 - 20	1/4 - 1/2	
Soybean	Warm-season	May - Jun. or Sept.	30 - 60	30 - 45	1 - 2	

	White-tailed Deer	Northern Bobwhite	Ring-necked Pheasant	Wild Turkey	Mourning Dove	Waterfowl
	X		X	X		X
				X		
	X			X		X
	X					
	X	X	X	X	X	X
	X			X		
	X		X	X		X
				X		X
	X	X	X	X	X	X
	X	X		X		
	X	X	X	X	X	X
		X			X	X
		X			X	
		X	X	X	X	X
	X	X	X	X		X

Relevant Publications and Suggested Readings

Most Samuel Roberts Noble Foundation Agricultural Division Publications publications are available online, can be ordered by email at ag-services-resources@noble.org, obtained by paper mail at Samuel Roberts Noble Foundation Agricultural Division Helpline, 2510 Sam Noble Parkway, Ardmore, OK 73401, or ordered by phone: 580-224-6500.

Northern Bobwhite:

E-904 Bobwhite Quail Habitat Evaluation and Management Guide
http://nrem.okstate.edu/Extension/

Pheasant:

NREM-9017 The Ring-necked Pheasant in Oklahoma
http://nrem.okstate.edu/Extension/

Plants:

Field Guide to Oklahoma Plants- This can be ordered on the OSU Marketplace website under Natural Resources Ecology & Management.
https://secure.touchnet.com/C20271_ustores/web

NREM-2872 A Checklist of Prairie, Shrubland, and Forest Understory Plants of Oklahoma: Characteristics and Value to Deer, Quail, Turkey, and Cattle
http://nrem.okstate.edu/Extension/

NREM-2876 Eastern Redcedar Control and Management-Best Management Practices to Restore Oklahoma's Ecosystems
http://nrem.okstate.edu/Extension/

Plant Image Gallery
http://www.noble.org/plantimagegallery/

NF-FO-04-01 Grasses of Southern Oklahoma and North Texas: A Pictorial Guide
http://www.noble.org/WebApps/PlantImageGallery/Grasses.aspx

NF-WF-08-01 Trees, Shrubs and Woody Vines: A Pictorial Guide
http://www.noble.org/WebApps/PlantImageGallery/Woodies.aspx

E-832 OSU Extension Agent's Handbook for Insect, Plant Disease, and Weed Control

http://entoplp.okstate.edu

Prescribed Fire:

E-927 Using Prescribed Fire in Oklahoma

http://nrem.okstate.edu/Extension/

E-998 Patch Burning: Integrating Fire and Grazing to Promote Heterogeneity

http://nrem.okstate.edu/Extension/

E-1025 Burning in the growing Season

http://nrem.okstate.edu/Extension/

NREM-2878 Fire Prescriptions for Maintenance and Restoration of Native Plant Communities

http://nrem.okstate.edu/Extension/

NREM-2885 The Best Time of Year to Conduct Prescribed Burns

http://nrem.okstate.edu/Extension/

VT112 Using Prescribed Fire in Oklahoma video

Call: (405) 744-5437

VT1139 The Effects of Fire

Call: (405) 744-5437

White-tailed Deer:

E-979 White-tailed Deer Habitat Evaluation and Management Guide

http://nrem.okstate.edu/Extension/

NREM-9009 Ecology and Management of Deer in Oklahoma

http://nrem.okstate.edu/Extension/

Conducting Trail Camera Surveys for White-tailed Deer

http://nrem.okstate.edu/Extension/adult-programs/deer-census.html

NF-WF-04-02 Quality of Native Plant Forage Species Important to White-tailed Deer and Goats in South Central Oklahoma

http://www.noble.org/ag/wildlife/qualitynativeplantforage/index.html

NF-WF-11-02 White-tailed Deer: Their Foods and Management in the Cross Timbers

http://www.noble.org/Ag/Wildlife/DeerFoods/index.html

NF-WF-99-10 Daylight Survey of Deer: Collecting and Interpreting Data

http://www.noble.org/Ag/Wildlife/SpotlightDaylightDeerSurvey/index.html

Wild Turkey:

NREM-8700 Management of Wild Turkey in Oklahoma

http://nrem.okstate.edu/Extension/

Other Publications:

A Guide to Successful Wildlife Food Plots Blending Science with Common Sense

https://utextension.tennessee.edu/publications/documents/PB1769.pdf

Supplemental Wildlife Food Planting Manual for the Southeast

http://msucares.com/pubs/publications/p2111.pdf

NREM-5032 Lease Hunting Opportunities for Oklahoma Landowners

http://nrem.okstate.edu/Extension/

PSS-2207 How to Get a Good Soil Sample

http://pods.dasnr.okstate.edu/

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This food plot guide was designed to provide wildlife enthusiasts information on a variety of topics related to food plots and the wildlife species that use them. This guide includes information on setting goals and determining limiting factors as well as how to develop a plan. When these have been completed the manager is taught how to determine where the food plot should be located and how to conduct a soil test. Once a soil test has been conducted the guide then gives the manager information on size, distribution, season, and rotation of the plot, how to prepare the plot for planting, and suggested seed mixtures. This guide also covers monitoring the success of food plots. Species discussed in this guide include white-tailed deer, wild turkey, northern bobwhite, ring-necked pheasant, waterfowl, and mourning dove. Specific topics include antler size and carrying capacity of white-tailed deer; managing roost habitat of wild turkeys; moist soil management for waterfowl; and Federal regulations regarding baiting. The end of this guide provides a useful table of native plants that wildlife utilize. Additional to food plots, this information can provide managers with the knowledge on how to manage native plants in their management plan.

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EXTENSION