



Wildlife Forage Areas for White-Tailed Deer

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White-tailed deer are a \$3 billion business annually in Texas and growing. Interest in this remarkable natural resource increases each year. While the average Texas producer may have difficulty with their cash flow from the livestock enterprise, many have realized profits from deer hunting operations. A key element to successful deer management is a population in balance with the habitat and forage supply. Although native habitat management is important, many managers are choosing to provide introduced forages during times when native plants may be absent or low in nutritive value. A wildlife forage area (WFA) may contribute to the overall quality of the managed herd, or can be a costly educational experience if sound agronomic procedures are not implemented. This publication discusses the establishment and management of WFA crops suitable for white-tailed deer.

What Does a Deer Eat?

White-tailed deer are ruminants like cows, but their diet selection is radically different. Cattle are grass-roughage eaters, have a relatively large rumen relative to body size, and depend heavily on grasses for their diet. Grasses are relatively low in crude protein and digestibility when compared with legumes or forbs (broadleaf weeds). Because of these nutritive parameters, grasses have a longer residence time in the cow rumen. Longer residence time increases rumen microflora (bacteria and protozoa) degradation of the forage. Thus for grass-roughage eaters like cattle and sheep, residence time is relatively long and rate of passage slow.

White-tailed deer are concentrate selectors. Their rumen is small relative to body size; thus, their diet must be higher in nutritive value and more rapidly degraded in the rumen. Therefore, white-tailed deer rely primarily on forbs and browse (leaves and twigs of woody plants), which are usually higher in crude protein and digestibility than grasses. Grasses comprise only a *very small* part of the overall diet of the white-tailed deer. Only grasses that are rapidly degraded in the rumen, such as the small grains and ryegrass, are used to any extent by deer. Other useful introduced forages include both warm- and cool-season legumes. Native plants used by white-tailed deer include browse, forbs, soft and hard mast (fruits, acorns), and mushrooms. Forbs and mast, while providing good nutrition, may not be available each year or at all times of the year. Browse is usually the most important source of deer nutrition because of year-round availability.

NOTE: Warm-season perennial grasses that supply cattle with most of their nutrients will not meet the nutrient and consumption requirements of white-tailed deer. Therefore, most WFAs planted for deer often use either forage legumes or cool-season annual grasses.

Where in the State are You?

Texas is a diverse state, both from a climatic and soils perspective. The state may be divided into vegetational areas (Fig. 1) based on similarities in temperature, moisture, and soils. These vegetational areas include the following:

- Pineywoods
- Gulf Prairies & Marshes
- Post Oak Savannah
- Blackland Prairies
- Cross Timbers & Prairies
- South Texas Plains
- Edwards Plateau
- Rolling Plains
- High Plains
- Trains-Pecos, Mountains, & Basins

Forage sustainability and adaptability are environment and site specific. While the main limiting factor to forage production is usually moisture, many plants are sensitive to temperature extremes, and others are intolerant of acid soils and require lime to increase soil pH for establishment and persistence. It is important to understand the unique soil and climatic requirements for forage species of interest and select only those that can persist at the WFA location.

For additional assistance in determining what specific forages will work in your vegetational area, contact your local County Agricultural Extension Agent and refer to Figure 1 and Tables 1 and 2.

Establishment Guidelines

Below is a checklist of important factors to consider when contemplating WFA establishment for white-tailed deer.

Objective

Reasons to establish WFAs usually involve supplementation of deer during times when forage quantity and/or nutritive value is low. Cost-efficient and biologically effective supplementation can only be accomplished by understanding the seasonal nutritive requirements of white-tailed deer. A WFA could also be used as an attractant to enhance opportunities for inventory, harvesting, photography, or simply observing.

Forage adaptation

By considering the following five topics, one can determine if certain forages are adapted to the area of interest and are able to produce enough forage to be considered economically viable. This all-important initial determination will save time, money, and frustration.

Soil type(s) and fertility

Site selection is critical to successful WFA establishment and production. Determine beforehand if there is an acceptable WFA site capable of supporting forage growth. Consider carefully the soil type at the site and whether or not the site is subject to drought, flood, or erosion. Obtain a soil analyses from the site(s).

Moisture availability during the establishment and growing seasons

There is a distinct moisture gradient that transects from east to west in Texas. Check long-term precipitation records, periods of drought, etc. to increase the success potential of WFA establishment. The importance of timely planting and good seedbed preparation are the best insurance against crop failure due to deficient moisture.

Temperature extremes

Many forage plants are sensitive to cold. Plants that persist for years in South Texas may not survive the first freeze event in North Texas. By the same token, some plants are intolerant of the extreme heat that can be experienced in South Texas and the Edwards Plateau. Ensure that the forages chosen will persist in the vegetational region of interest.

Forage palatability and acceptance

It matters not that the plant is adapted and produces great quantities of dry matter if the deer will not consume it. White-tailed deer are very selective in what they eat. Make sure that the forage is preferred, rather than tolerated or ignored, by white-tailed deer.

Forage availability for deer

White-tailed deer generally need supplemental nutrition during late summer and late winter when native forages may be lacking in quantity or nutritive value. Consider the growth cycle of forages chosen for the WFA. Spring-planted, warm-season forages generally provide nutrition June through September. Fall-planted, cool-season forages usually have forage available from November through April. Depending on the location and the forage, the WFA may provide valuable nutrition in a timely manner. If the WFA does not offer nutrition when it is needed (i.e., stress periods), there is little point to establishment and maintenance of those species.

Once the above aspects have been considered and the decision made to plant, consider the following checklist to maximize the potential for successful establishment of a WFA.

- ✓ **Select an appropriate site based on forage species requirements. Avoid excessively wet or dry sites.** Size of the WFA will depend on intended use (attractant, supplement, etc.) and the size of the managed property. Some authorities recommend planting 2% of the total acreage when supplementing deer. Plant to maximize “edge” effect; i.e., long narrow WFAs will increase the edge effect compared to square WFAs.
- ✓ **Obtain a soil sample from the site.**
- ✓ **Check seed availability and cost.** Seed is a relatively inexpensive component of the overall cost of establishment, therefore purchase seed with guaranteed analysis for pure live seed, weed seed, hard seed, etc. Besides excellent nutritional value, legumes provide their own nitrogen fertilizer. In order for nitrogen fixation to occur, legumes require inoculation with specific *Rhizobia* bacteria. If a legume is to be planted, make sure inoculant is available. Be sure to follow the inoculation procedure to optimize legume production.
- ✓ **Sod-seeded or clean tilled?** In east Texas, cool-season WFAs can be successfully established into warm-season perennial grass sods if certain establishment procedures are followed. In other cases, clean-tilled seedbeds usually provide more forage, but may not be an option due to equipment requirements.
- ✓ **Begin preparing seedbed in anticipation of planting.** Several trips across the field may be required to prepare the final clean-tilled seedbed. Allow adequate time for possible delays due to weather, equipment failure, etc. Keep the seedbed in a fallow (no plants growing) condition to conserve moisture at the site. If sod-seeding, make sure the warm-season grass is grazed or mown very short prior to planting.
- ✓ **Locate equipment required for establishment.** Locate equipment or custom operator well in advance of the planting date. If someone else establishes the WFA, make sure they understand the species, timing, seeding rate, etc. Write it down! This minimizes misunderstandings about WFA establishment.

- ✓ **Soil test and apply needed lime well in advance of planting.** Lime with an ECCE of 100 has the most rapid buffering capacity. Phosphorus and K should be incorporated into the clean-tilled seedbed. If sod-seeding, surface-apply lime again well in advance of planting and P and K prior to or at planting. Apply nitrogen to small grains WFAs after greenup. Do not use N with legumes as this may encourage grassy weed competition.
- ✓ **Plant quality seed at the proper rate to the proper depth at the proper time into a moist seedbed when possible.**
- ✓ **Surface-apply additional nitrogen midway through the growing season for small grains WFAs (usually 50 lbs/ac).**

Failure to follow the above recommendations will normally result in crop failure or less than satisfactory establishment and production.

WARNING!!



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- ✓ There are forages and products on the market whose advertisements cannot be substantiated with comparative scientific research. Many claims regarding forage production or nutritive value that sound too good to be true usually are. Before spending money, contact your local County Extension Agricultural Agent to determine if research with the forage or product has been conducted by Texas A&M University or other university/college in the nearby area. If so, check the results compared with standard forages of known value. If no studies have been conducted, inquire as to the potential for such products to have success in the region of interest.
- ✓ Managers should be wary of forage varieties developed for areas outside their region of interest. Beware also of products advertised as being able to grow year-round on all types of soils without irrigation. This is generally impossible at most locations in Texas.
- ✓ Forage mixes using seeds of dissimilar size should be viewed cautiously. Different seed size can create planting problems resulting in some seed being placed too deep or too shallow. Also be aware that grass/legume mixtures will normally not give maximum production of either species due to their very different growth and management requirements.
- ✓ Be aware that high deer densities may prevent successfully establishing a WFA. An enclosure fence may have to be erected to prevent deer from destroying seedlings. Once the forage has become established, then the WFA can be opened to the deer population. Fencing may be required to exclude livestock.
- ✓ Finally, do not be afraid to experiment, but test “new” varieties and species in small trials before implementing their establishment on a ranch-wide (more expensive) basis.

Establishment Scenarios

To illustrate establishment of WFAs, please note the following theoretical planting scenarios. Note that all scenarios involve the use of prepared seedbed rather than sod-seeded establishment. Also, please note that cafeteria-style WFAs involving multiple species may not be as desirable as using the best-adapted, most cost-efficient, highest producing single species.

Scenario 1: Summer WFA

Summer conditions in Texas can be nutritionally stressful for deer, so many wildlife managers choose to establish summer WFAs. The summer annual legume, cowpea, will be used as an example.

A soil sample should be obtained from the seedbed area well in advance of planting. Legumes, such as cowpea, are sensitive to low soil pH, P, and K. Based on soil test recommendations, lime should be applied as early as possible, while P and K should be incorporated into the seed-

bed as it is prepared. *Note that N fertilizer is not required for legumes.* A firm, fine seedbed should be prepared and at least 50 lbs. of pure live seed (PLS) drilled (ideally) per acre to a depth of ¾"-1" in early to mid May. If seed is broadcast, seeding rate should be increased to at least 60 lbs. PLS per acre and lightly disked to cover the seed. On sandy sites, the planted area should be rolled.

If moisture is available, the varietal mix of cowpea, 'Iron and Clay' will remain vegetative and actively growing until the first killing frost. This cowpea can provide excellent forage for nutritionally stressed deer through late summer and early autumn.

Scenario 2: Winter WFA

Winter can reduce available deer nutrition, and some winters can be extremely harsh. Timely establishment can provide forage early in the fall through early spring. In this example, a small grain will be used for winter forage. Remember that small grains are site specific.

Obtain a soil sample from the seedbed area. Incorporate lime at the earliest opportunity, and P and K based on soil test recommendations into the seedbed as it is prepared in mid to late summer. Drill (ideally) 60-120 lbs. of small grain seed into the seedbed at a depth of ¾"-1" from early September to mid October depending on moisture conditions and whether or not early forage is desired. Do not use the lower seeding rate if seed is broadcast. Lightly disk broadcast seed to cover no deeper than 1". After seed germinates and before plants reach approximately 4" in height, apply 50 lbs. N (150 lbs. 34-0-0) per acre. Plan on applying an additional 50 lbs. N per acre in February or March if spring forage is desired. When wildlife or livestock avoid the crop in spring, disk the area in early- to mid-summer and maintain in a fallow (weed free) condition until time to plant again.

Scenario 3: Summer-winter WFA combination

Many times, there is not adequate area for separate season WFAs. The following addresses the use of both warm-season and cool-season forages on the same site. Cowpea and small grains will be used as an example.

As discussed in the previous scenarios, obtain a soil sample from the seedbed area. Incorporate lime, P, and K based on soil test recommendations for the crop with the highest nutrient requirement, in this case the cowpea. Plant the cowpea in May. Instead of allowing the cowpea to grow until frost, however, disk the cowpeas into the soil in early to mid September to prepare the site for small grain planting. The small grain will likewise have to be disked in April for seedbed preparation and May planting of the cowpea. One of the benefits of this scenario is that the cowpea acts as a green manure crop and provides nitrogen for the subsequent small grain crop. Data obtained at the TAMU Overton Center indicated that after 2-4 years of this cowpea-small grain system, no N fertilizer was required for the small grain.

Summary

Managers attempting to provide WFAs for white-tailed deer should pay careful attention to basic agronomic principals regarding forage species adaptation, good seedbed preparation, and proper planting and fertilizer techniques.

Generally speaking, most of what is known about the establishment and maintenance of forages was developed decades ago. Basic establishment and management fundamentals are important to the success of row crops, pastures, and WFAs. Contact your local County Agricultural Extension Agent or personnel at TAMU Centers for additional information on varieties and management guidelines.

Suggested Reading

- Supplemental forage management for East Texas white-tailed deer. 1991. Billy J. Higginbotham and James C. Kroll. Tex. Agr. Ext. Ser. L-2457.
- Supplemental feeding for deer: Beyond Dogma. 1996. Symposium Proc., Oct. 8-10, 1996, Kerrville, TX.
- Food plots and supplemental feeding. 1998. Ben H. Koerth and James C. Kroll. Institute for White-tailed Deer Management and Research

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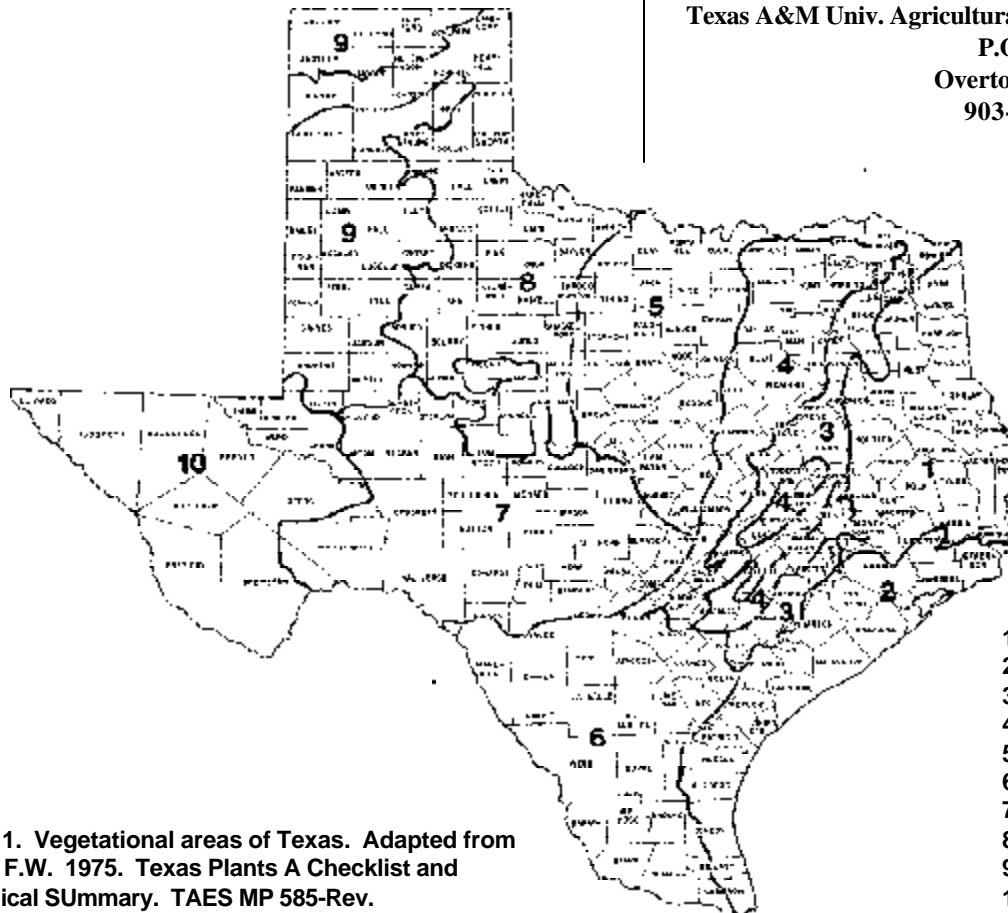


Figure 1. Vegetational areas of Texas. Adapted from Gould, F.W. 1975. Texas Plants A Checklist and Ecological Summary. TAES MP 585-Rev.

- 1 Pineywoods
- 2 Gulf Coast and Marshes
- 3 Post Oak Savannah
- 4 Blackland Prairies
- 5 Cross Timbers and Prairies
- 6 South Texas Plains
- 7 Edwards Plateau
- 8 Rolling Plains
- 9 High Plains
- 10 Trans-pecos

Table 1. Cool-season Forages used for Wildlife Forage Areas for White-Tailed Deer

Forage Species	Preferred Soil Characteristics			Seeding Rate (lbs/ac)	Seeding Depth (inches)	Planting Season	Growing Season	Resource Zone ¹
	Soil pH	Texture	Site Required					
Annual ryegrass	5.5-7.0	wide range	Good to excellent drainage	20-30 ²	¼"	Nov-Jan	Feb-May	1-7
Alfalfa	6.5-7.5	sandy loam	Excellent drainage	20	¼"	Oct-Nov	Mar-Oct	1, 5, 8
Arrowleaf clover	6.0-7.0	sandy loam	Good drainage	8-10	¼"	Oct-Nov	Feb-Jun	1, 3, 4, 5
Austrian winter pea	5.5-7.5	wide range	Good drainage	25-40	½"	Oct-Nov	Nov-Dec Mar-Apr	1-7
Ball clover	6.5-8.5	loam, clay	Fair to good drainage	2-3	¼"	Oct-Nov	Feb-May	1-5
Berseem clover	6.5-8.5	loam, clay	Poor to fair drainage	12-16	¼"	Oct-Nov	Nov-Dec Feb-May	1-6
Burr medic	6.5-8.0	wide range	Good drainage	10-15	¼"	Oct-Nov	Feb-May	2, 6, 7
Crimson clover	6.0-7.0	sandy loam, clay	Fair to good drainage	16-20	¼"	Oct-Nov	Feb-Apr	1-4
Hairy vetch	6.0-7.5	wide range	Good drainage	20-25	½-¾"	Oct-Nov	Feb-Apr	1-8
Oat	5.5-7.5	wide range	Fair to good drainage	90-100	¾-1"	Oct-Nov	Nov-Dec Feb-May	1-7
Rose clover	6.0-8.0	sand, loam, clay	Good to excellent drainage	12-16	¼"	Oct-Nov	Mar-May	1-8
Rye	5.5-7.5	wide range	Good to excellent drainage	90-100	¾-1"	Oct-Nov	Nov-Dec Feb-Apr	1-10
Wheat	5.5-7.5	wide range	Fair to good drainage	90-100	¾-1"	Oct-Nov	Nov-Dec Feb-May	1-10
White clover	6.0-7.5	loam, clay	Poor drainage	3-4	¼"	Oct-Nov	Feb - Jun	1-4

¹ Risk of establishment increases from east to west in the state due to decreasing moisture availability.

² Use the higher seeding rate if broadcast applying seed.

Table 2. Warm-season Forages used for Wildlife Forage Areas for White-Tailed Deer

Forage Species	Preferred Soil Characteristics			Seeding Rate (lbs/ac)	Seeding Depth (inches)	Planting Season	Growing Season	Resource Zone ¹
	Soil pH	Texture	Site Required					
Alfalfa	6.5-7.5	sandy loam	excellent drainage	20	¼"	Oct-Nov	Mar-Oct	1, 5, 8
Cowpea	5.5-7.0	sandy loam	good to excellent drainage	50-75 ²	¾-1"	May-Jun	May-Oct	1-8
Lablab	5.5-7.5	sandy loam	good to excellent drainage	10-15	¾-1"	May-Jun	May-Oct	1-8
Soybean	5.5-7.5	wide range	good to excellent drainage	50-75	¾-1"	May-Jun	May-Sep	1-8

¹ Risk of establishment increases from east to west in the state due to decreasing moisture availability.

² Use the higher seeding rate if broadcast applying seed.